
Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
WASI: Full Scale IQ Score						
Primary	993	0.599	-0.46 (-2.78, 1.87)	0.701	-1.27 (-3.75, 1.21)	0.315
Imputed outcomes	997	0.629	-0.41 (-2.74, 1.91)	0.727	-1.20 (-3.69, 1.28)	0.342
Stratified	993	0.332	-1.19 (-3.58, 1.19)	0.327	-1.71 (-4.03, 0.61)	0.149
Truncated weights: (01-99)	993	0.603	-0.36 (-2.62, 1.90)	0.753	-1.23 (-3.68, 1.22)	0.324
Truncated weights: (05-95)	993	0.393	-0.89 (-2.99, 1.20)	0.404	-1.63 (-3.99, 0.73)	0.177
Truncated weights: (10-90)	993	0.202	-1.30 (-3.28, 0.67)	0.196	-1.97 (-4.27, 0.32)	0.092
Covariate adjusted	993	0.055	-1.75 (-3.31, -0.19)	0.028	-1.72 (-3.63, 0.19)	0.078
Crude	993	0.003	-2.04 (-3.72, -0.37)	0.017	-3.32 (-5.34, -1.30)	0.001
Excluding bypass/intracranial procedures	975	0.592	-0.69 (-3.04, 1.65)	0.562	-1.30 (-3.81, 1.20)	0.308
WASI: Matrix Reasoning subtest (TS)						
Primary	993	0.136	-0.96 (-2.38, 0.46)	0.184	-1.59 (-3.17, 0.00)	0.049
Imputed outcomes	997	0.144	-0.94 (-2.36, 0.48)	0.195	-1.57 (-3.15, 0.02)	0.053
Stratified	993	0.057	-1.39 (-2.95, 0.16)	0.079	-1.74 (-3.25, -0.22)	0.025
Truncated weights: (01-99)	993	0.140	-0.97 (-2.38, 0.44)	0.178	-1.56 (-3.13, 0.02)	0.052
Truncated weights: (05-95)	993	0.044	-1.30 (-2.62, 0.01)	0.052	-1.76 (-3.27, -0.26)	0.022
Truncated weights: (10-90)	993	0.014	-1.54 (-2.79, -0.29)	0.016	-1.90 (-3.36, -0.43)	0.011
Covariate adjusted	993	0.006	-1.50 (-2.56, -0.44)	0.005	-1.71 (-3.01, -0.42)	0.010
Crude	993	<.001	-1.61 (-2.69, -0.53)	0.003	-2.29 (-3.59, -0.99)	<.001
Excluding bypass/intracranial procedures	975	0.153	-0.95 (-2.39, 0.48)	0.192	-1.57 (-3.20, 0.05)	0.058
WASI: Vocabulary subtest (TS)						
Primary	992	0.856	0.47 (-1.27, 2.20)	0.598	0.08 (-1.72, 1.87)	0.933
Imputed outcomes	997	0.850	0.49 (-1.24, 2.22)	0.578	0.14 (-1.66, 1.93)	0.882
Stratified	992	0.928	0.02 (-1.71, 1.75)	0.982	-0.29 (-1.98, 1.40)	0.738
Truncated weights: (01-99)	992	0.781	0.57 (-1.11, 2.24)	0.508	0.08 (-1.69, 1.86)	0.926
Truncated weights: (05-95)	992	0.866	0.28 (-1.26, 1.83)	0.719	-0.18 (-1.90, 1.55)	0.842

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Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Truncated weights: (10-90)	992	0.840	0.04 (-1.42, 1.50)	0.961	-0.44 (-2.13, 1.24)	0.607
Covariate adjusted	992	0.622	-0.56 (-1.70, 0.58)	0.333	-0.34 (-1.73, 1.05)	0.632
Crude	992	0.090	-0.79 (-2.02, 0.44)	0.208	-1.63 (-3.11, -0.15)	0.031
Excluding bypass/intracranial procedures	974	0.978	0.18 (-1.56, 1.92)	0.838	0.04 (-1.75, 1.84)	0.961
WASI: Matrix – Vocabulary subtests (TS)						
Primary	992	0.111	-1.43 (-3.11, 0.25)	0.095	-1.67 (-3.45, 0.11)	0.066
Imputed outcomes	997	0.105	-1.43 (-3.11, 0.25)	0.096	-1.70 (-3.49, 0.08)	0.061
Stratified	992	0.180	-1.41 (-3.21, 0.39)	0.124	-1.45 (-3.21, 0.31)	0.106
Truncated weights: (01-99)	992	0.094	-1.54 (-3.19, 0.11)	0.068	-1.65 (-3.42, 0.12)	0.068
Truncated weights: (05-95)	992	0.071	-1.59 (-3.14, -0.04)	0.044	-1.59 (-3.32, 0.13)	0.071
Truncated weights: (10-90)	992	0.070	-1.58 (-3.06, -0.11)	0.036	-1.46 (-3.16, 0.24)	0.092
Covariate adjusted	992	0.153	-0.94 (-2.20, 0.32)	0.144	-1.37 (-2.92, 0.17)	0.081
Crude	992	0.420	-0.82 (-2.10, 0.45)	0.206	-0.66 (-2.20, 0.88)	0.398
Excluding bypass/intracranial procedures	974	0.170	-1.14 (-2.82, 0.55)	0.185	-1.62 (-3.44, 0.20)	0.080
WRAML-2: Attention/Concentration Index (StdS)						
Primary	926	0.404	0.59 (-2.34, 3.53)	0.692	-1.58 (-4.57, 1.40)	0.299
Imputed outcomes	997	0.278	0.69 (-2.27, 3.66)	0.646	-1.85 (-4.80, 1.11)	0.220
Stratified	926	0.297	-0.44 (-3.30, 2.41)	0.760	-2.17 (-5.00, 0.65)	0.132
Truncated weights: (01-99)	926	0.450	0.23 (-2.57, 3.03)	0.872	-1.65 (-4.62, 1.32)	0.276
Truncated weights: (05-95)	926	0.357	-0.50 (-3.08, 2.07)	0.702	-2.09 (-4.97, 0.78)	0.153
Truncated weights: (10-90)	926	0.258	-0.95 (-3.40, 1.50)	0.449	-2.36 (-5.19, 0.47)	0.102
Covariate adjusted	926	0.239	-1.13 (-3.11, 0.84)	0.260	-2.00 (-4.45, 0.45)	0.109
Crude	926	0.034	-1.35 (-3.38, 0.68)	0.191	-3.27 (-5.74, -0.80)	0.010
Excluding bypass/intracranial procedures	908	0.689	0.44 (-2.58, 3.47)	0.773	-1.03 (-4.12, 2.06)	0.515
CPT-II: # Commissions (TS)						
Primary	981	0.742	-0.17 (-2.49, 2.15)	0.886	0.63 (-1.36, 2.61)	0.538

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Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Imputed outcomes	997	0.718	-0.20 (-2.52, 2.12)	0.867	0.66 (-1.37, 2.68)	0.525
Stratified	981	0.616	-0.28 (-2.52, 1.97)	0.807	0.82 (-1.35, 3.00)	0.457
Truncated weights: (01-99)	981	0.800	0.13 (-2.01, 2.27)	0.905	0.64 (-1.35, 2.63)	0.527
Truncated weights: (05-95)	981	0.742	0.35 (-1.64, 2.33)	0.733	0.77 (-1.19, 2.73)	0.441
Truncated weights: (10-90)	981	0.676	0.36 (-1.51, 2.23)	0.704	0.86 (-1.04, 2.76)	0.377
Covariate adjusted	981	0.826	0.26 (-1.29, 1.81)	0.745	0.59 (-1.31, 2.49)	0.541
Crude	981	0.553	0.20 (-1.36, 1.77)	0.800	1.03 (-0.85, 2.92)	0.283
Excluding bypass/intracranial procedures	964	0.938	0.07 (-2.29, 2.44)	0.952	0.36 (-1.68, 2.39)	0.732
CPT-II: # Omissions (TS)						
Primary	981	0.196	-1.77 (-4.55, 1.00)	0.211	0.64 (-2.50, 3.78)	0.690
Imputed outcomes	997	0.294	-1.77 (-5.20, 1.65)	0.310	0.72 (-3.04, 4.48)	0.708
Stratified	981	0.576	-1.13 (-4.16, 1.89)	0.463	0.50 (-2.46, 3.46)	0.741
Truncated weights: (01-99)	981	0.222	-1.45 (-3.98, 1.08)	0.261	0.89 (-2.07, 3.85)	0.554
Truncated weights: (05-95)	981	0.314	-1.03 (-3.39, 1.32)	0.390	1.10 (-1.70, 3.90)	0.441
Truncated weights: (10-90)	981	0.394	-0.79 (-3.09, 1.52)	0.503	1.16 (-1.59, 3.91)	0.407
Covariate adjusted	981	0.501	-1.00 (-3.10, 1.11)	0.352	0.39 (-2.19, 2.97)	0.765
Crude	981	0.403	-0.95 (-3.09, 1.19)	0.385	0.79 (-1.79, 3.37)	0.549
Excluding bypass/intracranial procedures	964	0.114	-2.15 (-5.12, 0.82)	0.157	0.77 (-2.62, 4.15)	0.657
CPT-II: Hit Reaction Time (TS)						
Primary	981	0.504	0.20 (-1.89, 2.29)	0.853	1.09 (-0.84, 3.03)	0.268
Imputed outcomes	997	0.486	0.36 (-1.72, 2.44)	0.733	1.17 (-0.78, 3.12)	0.241
Stratified	981	0.480	1.00 (-1.00, 3.00)	0.328	1.07 (-0.89, 3.04)	0.283
Truncated weights: (01-99)	981	0.445	0.18 (-1.79, 2.15)	0.858	1.16 (-0.75, 3.08)	0.235
Truncated weights: (05-95)	981	0.400	0.19 (-1.61, 1.99)	0.837	1.20 (-0.63, 3.03)	0.199
Truncated weights: (10-90)	981	0.377	0.27 (-1.43, 1.98)	0.755	1.23 (-0.54, 3.01)	0.173
Covariate adjusted	981	0.655	0.26 (-1.12, 1.64)	0.714	0.80 (-0.90, 2.49)	0.357

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Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Crude	981	0.349	0.56 (-0.83, 1.95)	0.432	1.22 (-0.45, 2.90)	0.152
Excluding bypass/intracranial procedures	964	0.487	0.02 (-2.17, 2.21)	0.987	1.11 (-0.93, 3.14)	0.286
CPT-II: Hit Reaction Time Std Error (TS)						
Primary	981	0.472	-0.29 (-2.23, 1.65)	0.768	0.85 (-1.20, 2.89)	0.417
Imputed outcomes	997	0.458	-0.18 (-2.12, 1.77)	0.860	0.97 (-1.08, 3.02)	0.355
Stratified	981	0.598	0.23 (-1.66, 2.12)	0.813	0.94 (-0.92, 2.80)	0.323
Truncated weights: (01-99)	981	0.438	-0.15 (-1.98, 1.68)	0.872	0.99 (-0.97, 2.95)	0.322
Truncated weights: (05-95)	981	0.405	0.14 (-1.49, 1.78)	0.863	1.17 (-0.65, 2.99)	0.208
Truncated weights: (10-90)	981	0.343	0.40 (-1.13, 1.92)	0.610	1.30 (-0.45, 3.06)	0.145
Covariate adjusted	981	0.544	0.61 (-0.67, 1.89)	0.352	0.73 (-0.84, 2.30)	0.363
Crude	981	0.205	0.84 (-0.47, 2.15)	0.208	1.33 (-0.24, 2.91)	0.098
Excluding bypass/intracranial procedures	964	0.513	-0.38 (-2.46, 1.69)	0.716	0.76 (-1.43, 2.94)	0.497
CPT-II: Variability (TS)						
Primary	981	0.619	-0.51 (-2.46, 1.44)	0.610	0.48 (-1.47, 2.43)	0.627
Imputed outcomes	997	0.609	-0.46 (-2.42, 1.50)	0.646	0.55 (-1.40, 2.51)	0.579
Stratified	981	0.726	-0.19 (-2.11, 1.74)	0.850	0.59 (-1.31, 2.49)	0.544
Truncated weights: (01-99)	981	0.630	-0.35 (-2.19, 1.49)	0.710	0.58 (-1.32, 2.49)	0.549
Truncated weights: (05-95)	981	0.642	-0.09 (-1.76, 1.58)	0.917	0.73 (-1.09, 2.55)	0.431
Truncated weights: (10-90)	981	0.629	0.13 (-1.44, 1.71)	0.869	0.84 (-0.93, 2.61)	0.354
Covariate adjusted	981	0.955	0.20 (-1.12, 1.53)	0.762	0.13 (-1.50, 1.75)	0.880
Crude	981	0.658	0.39 (-0.97, 1.74)	0.576	0.74 (-0.89, 2.37)	0.375
Excluding bypass/intracranial procedures	964	0.734	-0.49 (-2.57, 1.60)	0.646	0.36 (-1.71, 2.42)	0.736
CPT-II: Detectability (TS)						
Primary	981	0.077	-0.80 (-3.03, 1.43)	0.482	1.48 (-0.29, 3.26)	0.102
Imputed outcomes	997	0.072	-0.80 (-3.02, 1.41)	0.477	1.51 (-0.28, 3.31)	0.098
Stratified	981	0.073	-0.79 (-2.74, 1.17)	0.430	1.51 (-0.39, 3.41)	0.119

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Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Truncated weights: (01-99)	981	0.097	-0.46 (-2.43, 1.52)	0.649	1.46 (-0.31, 3.23)	0.106
Truncated weights: (05-95)	981	0.088	-0.33 (-2.15, 1.49)	0.721	1.51 (-0.22, 3.23)	0.087
Truncated weights: (10-90)	981	0.065	-0.33 (-2.04, 1.39)	0.710	1.57 (-0.11, 3.25)	0.067
Covariate adjusted	981	0.135	-0.16 (-1.52, 1.20)	0.814	1.48 (-0.19, 3.15)	0.082
Crude	981	0.053	-0.26 (-1.63, 1.11)	0.710	1.73 (0.08, 3.38)	0.040
Excluding bypass/intracranial procedures	964	0.168	-0.74 (-2.99, 1.52)	0.522	1.23 (-0.59, 3.05)	0.184
WRAML-2: Verbal Memory Index (StdS)						
Primary	993	0.269	1.27 (-1.08, 3.63)	0.289	-0.82 (-3.23, 1.60)	0.507
Imputed outcomes	997	0.267	1.27 (-1.08, 3.62)	0.288	-0.81 (-3.22, 1.59)	0.507
Stratified	993	0.255	1.15 (-1.29, 3.59)	0.356	-0.97 (-3.36, 1.42)	0.425
Truncated weights: (01-99)	993	0.371	0.92 (-1.38, 3.21)	0.433	-0.88 (-3.29, 1.53)	0.474
Truncated weights: (05-95)	993	0.435	0.29 (-1.86, 2.43)	0.793	-1.24 (-3.62, 1.14)	0.307
Truncated weights: (10-90)	993	0.386	-0.04 (-2.07, 1.99)	0.970	-1.51 (-3.84, 0.82)	0.205
Covariate adjusted	993	0.532	0.13 (-1.53, 1.79)	0.876	-1.00 (-3.03, 1.03)	0.335
Crude	993	0.078	-0.20 (-1.93, 1.53)	0.821	-2.29 (-4.37, -0.21)	0.031
Excluding bypass/intracranial procedures	975	0.269	1.41 (-1.04, 3.86)	0.260	-0.79 (-3.25, 1.67)	0.528
WRAML-2: Story Memory Delay Recall subtest (SS)						
Primary	995	0.018	0.33 (-0.10, 0.76)	0.133	-0.35 (-0.79, 0.08)	0.115
Imputed outcomes	997	0.018	0.33 (-0.10, 0.76)	0.133	-0.35 (-0.78, 0.09)	0.117
Stratified	995	0.018	0.35 (-0.11, 0.81)	0.131	-0.33 (-0.78, 0.12)	0.147
Truncated weights: (01-99)	995	0.024	0.27 (-0.14, 0.69)	0.194	-0.36 (-0.79, 0.08)	0.109
Truncated weights: (05-95)	995	0.034	0.17 (-0.22, 0.56)	0.386	-0.40 (-0.83, 0.03)	0.066
Truncated weights: (10-90)	995	0.032	0.12 (-0.25, 0.49)	0.536	-0.44 (-0.86, -0.02)	0.039
Covariate adjusted	995	0.050	0.10 (-0.22, 0.41)	0.550	-0.38 (-0.77, 0.00)	0.051
Crude	995	0.006	0.06 (-0.26, 0.39)	0.696	-0.55 (-0.94, -0.16)	0.006
Excluding bypass/intracranial procedures	977	0.025	0.36 (-0.08, 0.80)	0.113	-0.32 (-0.76, 0.12)	0.154

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WRAML-2: Verbal Learning Delay Recall subtest (SS)						
Primary	994	0.759	0.12 (-0.41, 0.65)	0.648	0.19 (-0.33, 0.71)	0.469
Imputed outcomes	997	0.786	0.12 (-0.41, 0.65)	0.647	0.18 (-0.34, 0.70)	0.504
Stratified	994	0.788	0.18 (-0.38, 0.73)	0.535	0.15 (-0.39, 0.68)	0.592
Truncated weights: (01-99)	994	0.803	0.05 (-0.46, 0.55)	0.856	0.17 (-0.34, 0.68)	0.515
Truncated weights: (05-95)	994	0.828	-0.04 (-0.50, 0.43)	0.877	0.12 (-0.38, 0.62)	0.646
Truncated weights: (10-90)	994	0.843	-0.06 (-0.50, 0.39)	0.801	0.09 (-0.40, 0.58)	0.720
Covariate adjusted	994	0.644	-0.08 (-0.46, 0.30)	0.694	0.15 (-0.32, 0.61)	0.529
Crude	994	0.811	-0.10 (-0.49, 0.28)	0.599	0.03 (-0.43, 0.49)	0.889
Excluding bypass/intracranial procedures	976	0.626	0.18 (-0.39, 0.74)	0.533	0.25 (-0.28, 0.78)	0.353
WRAML-2: Delayed Verbal Recall composite (StdS)†						
Primary	994	0.340	1.13 (-0.84, 3.11)	0.261	-0.40 (-2.40, 1.60)	0.697
Imputed outcomes	997	0.329	1.13 (-0.84, 3.11)	0.260	-0.43 (-2.43, 1.57)	0.676
Stratified	994	0.243	1.32 (-0.79, 3.43)	0.219	-0.47 (-2.52, 1.58)	0.653
Truncated weights: (01-99)	994	0.475	0.80 (-1.10, 2.70)	0.408	-0.47 (-2.46, 1.53)	0.646
Truncated weights: (05-95)	994	0.586	0.34 (-1.44, 2.11)	0.710	-0.71 (-2.67, 1.25)	0.475
Truncated weights: (10-90)	994	0.559	0.15 (-1.55, 1.85)	0.864	-0.88 (-2.81, 1.04)	0.369
Covariate adjusted	994	0.764	0.04 (-1.40, 1.49)	0.953	-0.59 (-2.36, 1.18)	0.515
Crude	994	0.322	-0.10 (-1.58, 1.38)	0.897	-1.30 (-3.08, 0.48)	0.153
Excluding bypass/intracranial procedures	976	0.337	1.34 (-0.71, 3.39)	0.199	-0.17 (-2.20, 1.85)	0.868
WRAML-2: Story Memory Recognition subtest (SS)						
Primary	995	0.081	0.12 (-0.32, 0.55)	0.591	-0.40 (-0.87, 0.07)	0.092
Imputed outcomes	997	0.092	0.12 (-0.32, 0.56)	0.590	-0.39 (-0.86, 0.08)	0.102
Stratified	995	0.119	0.17 (-0.30, 0.63)	0.483	-0.33 (-0.78, 0.12)	0.154
Truncated weights: (01-99)	995	0.102	0.09 (-0.34, 0.53)	0.668	-0.40 (-0.86, 0.07)	0.098
Truncated weights: (05-95)	995	0.134	0.03 (-0.38, 0.44)	0.873	-0.40 (-0.86, 0.06)	0.087

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Truncated weights: (10-90)	995	0.125	-0.02 (-0.41, 0.37)	0.919	-0.43 (-0.87, 0.01)	0.058
Covariate adjusted	995	0.103	-0.09 (-0.41, 0.24)	0.599	-0.42 (-0.82, -0.03)	0.035
Crude	995	0.035	-0.09 (-0.42, 0.23)	0.571	-0.51 (-0.91, -0.12)	0.011
Excluding bypass/intracranial procedures	977	0.065	0.12 (-0.32, 0.57)	0.587	-0.44 (-0.91, 0.03)	0.068
WRAML-2: Verbal Learning Recognition subtest (SS)						
Primary	993	0.897	0.11 (-0.34, 0.56)	0.645	0.06 (-0.39, 0.51)	0.797
Imputed outcomes	997	0.913	0.10 (-0.36, 0.55)	0.676	0.06 (-0.39, 0.51)	0.796
Stratified	993	0.854	0.13 (-0.33, 0.59)	0.580	0.04 (-0.41, 0.49)	0.859
Truncated weights: (01-99)	993	0.935	0.07 (-0.36, 0.49)	0.766	0.07 (-0.37, 0.51)	0.748
Truncated weights: (05-95)	993	0.957	0.01 (-0.39, 0.41)	0.954	0.06 (-0.36, 0.49)	0.774
Truncated weights: (10-90)	993	0.952	0.00 (-0.38, 0.38)	0.987	0.06 (-0.36, 0.48)	0.770
Covariate adjusted	993	0.829	0.01 (-0.31, 0.33)	0.944	0.12 (-0.28, 0.51)	0.557
Crude	993	0.917	-0.07 (-0.40, 0.26)	0.676	-0.03 (-0.43, 0.36)	0.864
Excluding bypass/intracranial procedures	975	0.849	0.14 (-0.34, 0.61)	0.572	0.08 (-0.39, 0.54)	0.749
WRAML-2: Verbal Recognition Composite (StdS)						
Primary	992	0.343	0.78 (-1.46, 3.02)	0.495	-1.02 (-3.27, 1.24)	0.378
Imputed outcomes	997	0.374	0.76 (-1.47, 2.99)	0.505	-0.96 (-3.22, 1.30)	0.406
Stratified	992	0.306	0.98 (-1.30, 3.25)	0.399	-0.87 (-3.08, 1.34)	0.441
Truncated weights: (01-99)	992	0.442	0.57 (-1.59, 2.73)	0.603	-0.95 (-3.19, 1.28)	0.404
Truncated weights: (05-95)	992	0.548	0.21 (-1.80, 2.23)	0.835	-1.00 (-3.17, 1.18)	0.369
Truncated weights: (10-90)	992	0.549	0.02 (-1.89, 1.92)	0.986	-1.09 (-3.21, 1.04)	0.316
Covariate adjusted	992	0.649	-0.19 (-1.78, 1.39)	0.811	-0.91 (-2.85, 1.03)	0.357
Crude	992	0.253	-0.46 (-2.09, 1.16)	0.576	-1.65 (-3.61, 0.30)	0.098
Excluding bypass/intracranial procedures	974	0.316	0.90 (-1.44, 3.24)	0.450	-1.06 (-3.38, 1.26)	0.369
WRAML-2: Design Memory subtest (SS)						
Primary	995	0.037	0.11 (-0.37, 0.60)	0.648	-0.54 (-1.03, -0.05)	0.030

Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Imputed outcomes	997	0.032	0.11 (-0.37, 0.60)	0.648	-0.55 (-1.04, -0.07)	0.026
Stratified	995	0.021	0.10 (-0.44, 0.64)	0.713	-0.61 (-1.14, -0.09)	0.021
Truncated weights: (01-99)	995	0.046	0.03 (-0.43, 0.49)	0.907	-0.56 (-1.04, -0.07)	0.024
Truncated weights: (05-95)	995	0.035	-0.09 (-0.51, 0.33)	0.670	-0.61 (-1.09, -0.14)	0.011
Truncated weights: (10-90)	995	0.023	-0.16 (-0.56, 0.25)	0.446	-0.66 (-1.12, -0.19)	0.006
Covariate adjusted	995	0.031	-0.25 (-0.62, 0.11)	0.174	-0.60 (-1.04, -0.15)	0.009
Crude	995	0.002	-0.26 (-0.63, 0.10)	0.160	-0.81 (-1.26, -0.36)	<.001
Excluding bypass/intracranial procedures	977	0.044	0.19 (-0.31, 0.69)	0.459	-0.50 (-0.99, -0.01)	0.047
WRAML-2: Design Recognition subtest (SS)						
Primary	995	0.828	0.17 (-0.38, 0.71)	0.550	0.12 (-0.44, 0.68)	0.678
Imputed outcomes	997	0.828	0.17 (-0.38, 0.71)	0.550	0.12 (-0.44, 0.68)	0.681
Stratified	995	0.975	0.05 (-0.54, 0.65)	0.860	0.06 (-0.52, 0.64)	0.837
Truncated weights: (01-99)	995	0.907	0.11 (-0.42, 0.65)	0.677	0.09 (-0.46, 0.65)	0.746
Truncated weights: (05-95)	995	1.000	0.00 (-0.51, 0.51)	0.991	-0.01 (-0.54, 0.53)	0.979
Truncated weights: (10-90)	995	0.976	-0.04 (-0.53, 0.44)	0.862	-0.05 (-0.58, 0.47)	0.845
Covariate adjusted	995	0.550	-0.23 (-0.64, 0.18)	0.276	-0.09 (-0.60, 0.42)	0.733
Crude	995	0.486	-0.23 (-0.64, 0.19)	0.286	-0.24 (-0.74, 0.26)	0.353
Excluding bypass/intracranial procedures	977	0.588	0.29 (-0.27, 0.86)	0.304	0.13 (-0.45, 0.72)	0.650
D-KEFS Trail Making Test: Condition 1 (SS)						
Primary	996	0.009	-0.13 (-0.69, 0.43)	0.653	-0.79 (-1.32, -0.27)	0.003
Imputed outcomes	997	0.008	-0.13 (-0.69, 0.43)	0.653	-0.80 (-1.33, -0.27)	0.003
Stratified	996	0.004	-0.22 (-0.72, 0.29)	0.404	-0.82 (-1.32, -0.33)	0.001
Truncated weights: (01-99)	996	0.011	-0.21 (-0.75, 0.34)	0.460	-0.79 (-1.32, -0.26)	0.003
Truncated weights: (05-95)	996	0.004	-0.31 (-0.82, 0.19)	0.223	-0.86 (-1.37, -0.36)	<.001
Truncated weights: (10-90)	996	0.001	-0.34 (-0.81, 0.13)	0.157	-0.91 (-1.41, -0.42)	<.001
Covariate adjusted	996	<.001	-0.44 (-0.79, -0.09)	0.015	-0.89 (-1.32, -0.46)	<.001

Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Crude	996	<.001	-0.47 (-0.83, -0.11)	0.010	-1.14 (-1.57, -0.70)	<.001
Excluding bypass/intracranial procedures	978	0.012	-0.15 (-0.74, 0.43)	0.602	-0.78 (-1.30, -0.25)	0.004
D-KEFS Trail Making Test: Condition 2 (SS)						
Primary	996	0.004	0.02 (-0.39, 0.43)	0.935	-0.76 (-1.25, -0.27)	0.002
Imputed outcomes	997	0.004	0.02 (-0.39, 0.43)	0.935	-0.76 (-1.25, -0.27)	0.002
Stratified	996	0.001	0.03 (-0.43, 0.49)	0.888	-0.74 (-1.19, -0.29)	0.001
Truncated weights: (01-99)	996	0.003	-0.01 (-0.41, 0.39)	0.964	-0.78 (-1.26, -0.29)	0.002
Truncated weights: (05-95)	996	0.002	-0.08 (-0.46, 0.30)	0.693	-0.83 (-1.30, -0.36)	<.001
Truncated weights: (10-90)	996	<.001	-0.11 (-0.47, 0.25)	0.559	-0.87 (-1.33, -0.41)	<.001
Covariate adjusted	996	0.002	-0.11 (-0.43, 0.21)	0.503	-0.70 (-1.09, -0.31)	<.001
Crude	996	<.001	-0.13 (-0.46, 0.20)	0.431	-0.94 (-1.33, -0.55)	<.001
Excluding bypass/intracranial procedures	978	0.007	0.02 (-0.40, 0.43)	0.943	-0.73 (-1.22, -0.23)	0.004
D-KEFS Trail Making Test: Condition 3 (SS)						
Primary	995	0.005	0.26 (-0.27, 0.79)	0.335	-0.73 (-1.33, -0.13)	0.017
Imputed outcomes	997	0.004	0.26 (-0.27, 0.79)	0.335	-0.75 (-1.35, -0.15)	0.014
Stratified	995	0.001	0.17 (-0.38, 0.73)	0.536	-0.81 (-1.35, -0.27)	0.003
Truncated weights: (01-99)	995	0.006	0.20 (-0.32, 0.73)	0.452	-0.76 (-1.34, -0.17)	0.012
Truncated weights: (05-95)	995	0.005	0.07 (-0.43, 0.56)	0.793	-0.85 (-1.42, -0.28)	0.003
Truncated weights: (10-90)	995	0.002	0.02 (-0.44, 0.48)	0.946	-0.92 (-1.47, -0.37)	0.001
Covariate adjusted	995	<.001	-0.07 (-0.46, 0.31)	0.708	-0.87 (-1.35, -0.40)	<.001
Crude	995	<.001	-0.11 (-0.50, 0.28)	0.594	-1.10 (-1.57, -0.63)	<.001
Excluding bypass/intracranial procedures	977	0.029	0.21 (-0.33, 0.76)	0.442	-0.60 (-1.20, 0.00)	0.049
D-KEFS Trail Making Test: Condition 4 (SS)						
Primary	994	0.194	0.22 (-0.37, 0.80)	0.469	-0.33 (-0.99, 0.33)	0.323
Imputed outcomes	997	0.175	0.21 (-0.37, 0.80)	0.474	-0.35 (-1.02, 0.31)	0.295
Stratified	994	0.157	0.11 (-0.44, 0.66)	0.688	-0.41 (-0.95, 0.13)	0.136

Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Truncated weights: (01-99)	994	0.245	0.14 (-0.43, 0.71)	0.626	-0.36 (-1.01, 0.29)	0.273
Truncated weights: (05-95)	994	0.251	0.01 (-0.52, 0.53)	0.984	-0.45 (-1.07, 0.16)	0.147
Truncated weights: (10-90)	994	0.186	-0.05 (-0.53, 0.43)	0.838	-0.52 (-1.11, 0.07)	0.085
Covariate adjusted	994	0.145	-0.18 (-0.56, 0.21)	0.368	-0.47 (-0.94, 0.00)	0.050
Crude	994	0.004	-0.23 (-0.63, 0.16)	0.242	-0.80 (-1.27, -0.32)	<.001
Excluding bypass/intracranial procedures	976	0.288	0.20 (-0.42, 0.81)	0.532	-0.30 (-0.99, 0.39)	0.389
D-KEFS Trail Making Test: Condition 5 (SS)						
Primary	996	0.022	-0.34 (-0.69, 0.01)	0.056	-0.45 (-0.80, -0.11)	0.011
Imputed outcomes	997	0.024	-0.34 (-0.69, 0.01)	0.056	-0.45 (-0.79, -0.10)	0.012
Stratified	996	0.018	-0.28 (-0.62, 0.06)	0.108	-0.47 (-0.80, -0.15)	0.005
Truncated weights: (01-99)	996	0.023	-0.32 (-0.66, 0.01)	0.058	-0.46 (-0.80, -0.11)	0.010
Truncated weights: (05-95)	996	0.008	-0.36 (-0.67, -0.04)	0.026	-0.49 (-0.84, -0.15)	0.005
Truncated weights: (10-90)	996	0.002	-0.37 (-0.65, -0.08)	0.013	-0.53 (-0.86, -0.20)	0.002
Covariate adjusted	996	0.005	-0.29 (-0.53, -0.05)	0.016	-0.43 (-0.72, -0.14)	0.003
Crude	996	<.001	-0.30 (-0.54, -0.06)	0.015	-0.55 (-0.84, -0.27)	<.001
Excluding bypass/intracranial procedures	978	0.020	-0.36 (-0.70, -0.01)	0.045	-0.43 (-0.77, -0.09)	0.013
D-KEFS Tower Test: Total Achievement Score (SS)						
Primary	996	0.350	0.02 (-0.42, 0.46)	0.939	-0.29 (-0.76, 0.17)	0.216
Imputed outcomes	997	0.368	0.02 (-0.42, 0.46)	0.938	-0.29 (-0.75, 0.18)	0.228
Stratified	996	0.238	0.09 (-0.36, 0.55)	0.688	-0.29 (-0.73, 0.15)	0.197
Truncated weights: (01-99)	996	0.334	-0.03 (-0.44, 0.39)	0.899	-0.32 (-0.78, 0.14)	0.174
Truncated weights: (05-95)	996	0.267	-0.03 (-0.42, 0.36)	0.866	-0.34 (-0.79, 0.10)	0.131
Truncated weights: (10-90)	996	0.242	-0.03 (-0.40, 0.35)	0.890	-0.35 (-0.79, 0.09)	0.117
Covariate adjusted	996	0.435	0.00 (-0.32, 0.32)	0.995	-0.23 (-0.62, 0.15)	0.236
Crude	996	0.133	0.01 (-0.30, 0.33)	0.930	-0.35 (-0.73, 0.03)	0.071
Excluding bypass/intracranial procedures	978	0.529	0.01 (-0.44, 0.46)	0.962	-0.24 (-0.71, 0.24)	0.331

Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Wisconsin Card Sort: Perseverative Responses (TS)						
Primary	958	0.104	1.46 (-0.92, 3.85)	0.229	-1.40 (-3.97, 1.17)	0.286
Imputed outcomes	997	0.087	1.34 (-1.03, 3.71)	0.268	-1.61 (-4.17, 0.95)	0.217
Stratified	958	0.097	1.01 (-1.58, 3.59)	0.447	-1.91 (-4.46, 0.65)	0.144
Truncated weights: (01-99)	958	0.106	1.43 (-0.96, 3.82)	0.242	-1.43 (-4.01, 1.14)	0.275
Truncated weights: (05-95)	958	0.127	1.07 (-1.18, 3.32)	0.353	-1.62 (-4.13, 0.89)	0.206
Truncated weights: (10-90)	958	0.140	0.72 (-1.42, 2.86)	0.510	-1.82 (-4.29, 0.65)	0.148
Covariate adjusted	958	0.089	0.63 (-1.19, 2.45)	0.497	-1.92 (-4.16, 0.33)	0.095
Crude	958	0.031	0.27 (-1.57, 2.11)	0.774	-2.63 (-4.86, -0.39)	0.021
Excluding bypass/intracranial procedures	941	0.070	1.89 (-0.53, 4.32)	0.126	-1.29 (-3.89, 1.32)	0.333
Wisconsin Card Sort: Perseverative Errors (TS)						
Primary	958	0.036	1.58 (-0.60, 3.76)	0.156	-1.58 (-3.96, 0.80)	0.193
Imputed outcomes	997	0.029	1.46 (-0.71, 3.63)	0.188	-1.79 (-4.16, 0.58)	0.139
Stratified	958	0.044	1.21 (-1.21, 3.63)	0.327	-1.97 (-4.37, 0.42)	0.106
Truncated weights: (01-99)	958	0.036	1.56 (-0.62, 3.75)	0.162	-1.60 (-3.99, 0.78)	0.186
Truncated weights: (05-95)	958	0.042	1.26 (-0.82, 3.33)	0.236	-1.80 (-4.12, 0.52)	0.129
Truncated weights: (10-90)	958	0.046	0.93 (-1.05, 2.92)	0.357	-2.01 (-4.30, 0.27)	0.084
Covariate adjusted	958	0.025	0.91 (-0.80, 2.62)	0.299	-2.07 (-4.18, 0.04)	0.055
Crude	958	0.008	0.55 (-1.17, 2.28)	0.530	-2.75 (-4.85, -0.66)	0.010
Excluding bypass/intracranial procedures	941	0.020	1.99 (-0.21, 4.19)	0.076	-1.53 (-3.92, 0.86)	0.211
CTOPP: Rapid Naming Composite Score (StdS)						
Primary	995	0.047	-2.03 (-4.78, 0.72)	0.147	-3.51 (-6.32, -0.70)	0.014
Imputed outcomes	997	0.046	-2.04 (-4.79, 0.71)	0.145	-3.52 (-6.33, -0.71)	0.014
Stratified	995	0.030	-2.55 (-5.34, 0.25)	0.074	-3.53 (-6.25, -0.82)	0.011
Truncated weights: (01-99)	995	0.036	-2.37 (-5.05, 0.30)	0.082	-3.59 (-6.39, -0.78)	0.012
Truncated weights: (05-95)	995	0.014	-2.78 (-5.24, -0.33)	0.026	-3.74 (-6.46, -1.02)	0.007

Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Truncated weights: (10-90)	995	0.008	-2.86 (-5.17, -0.54)	0.016	-3.82 (-6.47, -1.16)	0.005
Covariate adjusted	995	0.015	-2.14 (-4.05, -0.22)	0.029	-3.12 (-5.46, -0.78)	0.009
Crude	995	0.002	-2.39 (-4.33, -0.45)	0.016	-4.00 (-6.33, -1.66)	<.001
Excluding bypass/intracranial procedures	977	0.083	-2.28 (-5.05, 0.49)	0.107	-3.04 (-5.89, -0.20)	0.036
Boston Naming Test (StdS)						
Primary	882	0.506	0.45 (-3.06, 3.97)	0.801	-1.56 (-5.13, 2.02)	0.394
Imputed outcomes	913	0.676	0.46 (-3.10, 4.02)	0.799	-1.09 (-4.70, 2.53)	0.556
Stratified	882	0.371	0.43 (-2.90, 3.77)	0.799	-1.85 (-5.09, 1.39)	0.264
Truncated weights: (01-99)	882	0.483	0.62 (-2.82, 4.07)	0.723	-1.48 (-5.01, 2.05)	0.412
Truncated weights: (05-95)	882	0.387	0.47 (-2.68, 3.63)	0.768	-1.80 (-5.17, 1.58)	0.297
Truncated weights: (10-90)	882	0.350	0.20 (-2.73, 3.13)	0.892	-2.04 (-5.31, 1.24)	0.222
Covariate adjusted	882	0.560	-0.59 (-2.92, 1.75)	0.623	-1.52 (-4.29, 1.25)	0.283
Crude	882	0.077	-1.10 (-3.54, 1.34)	0.376	-3.29 (-6.14, -0.45)	0.023
Excluding bypass/intracranial procedures	867	0.323	0.52 (-3.01, 4.05)	0.772	-2.13 (-5.79, 1.53)	0.254
D-KEFS Verbal Fluency: Category Fluency (SS)						
Primary	996	0.205	0.30 (-0.32, 0.92)	0.340	-0.29 (-0.89, 0.31)	0.340
Imputed outcomes	997	0.189	0.30 (-0.32, 0.92)	0.340	-0.31 (-0.91, 0.29)	0.315
Stratified	996	0.275	0.35 (-0.25, 0.96)	0.251	-0.14 (-0.73, 0.45)	0.643
Truncated weights: (01-99)	996	0.211	0.27 (-0.31, 0.85)	0.367	-0.29 (-0.89, 0.31)	0.347
Truncated weights: (05-95)	996	0.214	0.22 (-0.32, 0.75)	0.427	-0.31 (-0.89, 0.26)	0.288
Truncated weights: (10-90)	996	0.175	0.19 (-0.30, 0.69)	0.446	-0.35 (-0.91, 0.21)	0.221
Covariate adjusted	996	0.274	0.08 (-0.33, 0.50)	0.688	-0.33 (-0.84, 0.18)	0.202
Crude	996	0.036	0.03 (-0.40, 0.45)	0.902	-0.61 (-1.12, -0.09)	0.020
Excluding bypass/intracranial procedures	978	0.187	0.32 (-0.32, 0.97)	0.327	-0.31 (-0.92, 0.30)	0.315
Expressive language composite (StdS)†						
Primary	882	0.202	1.31 (-1.21, 3.83)	0.309	-1.13 (-3.75, 1.49)	0.398

Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Imputed outcomes	913	0.243	1.27 (-1.29, 3.83)	0.331	-1.00 (-3.63, 1.63)	0.455
Stratified	882	0.255	1.23 (-1.27, 3.74)	0.334	-0.92 (-3.34, 1.51)	0.458
Truncated weights: (01-99)	882	0.209	1.31 (-1.17, 3.78)	0.302	-1.08 (-3.68, 1.52)	0.417
Truncated weights: (05-95)	882	0.194	0.99 (-1.27, 3.25)	0.391	-1.37 (-3.87, 1.13)	0.282
Truncated weights: (10-90)	882	0.179	0.75 (-1.33, 2.84)	0.478	-1.58 (-4.01, 0.85)	0.203
Covariate adjusted	882	0.340	0.17 (-1.56, 1.90)	0.845	-1.31 (-3.37, 0.74)	0.210
Crude	882	0.027	-0.25 (-2.08, 1.59)	0.793	-2.78 (-4.92, -0.65)	0.011
Excluding bypass/intracranial procedures	867	0.121	1.50 (-1.06, 4.06)	0.251	-1.41 (-4.10, 1.28)	0.303
Beery: Motor Coordination (StdS)						
Primary	995	0.047	-0.10 (-2.58, 2.39)	0.939	-3.06 (-5.72, -0.39)	0.025
Imputed outcomes	997	0.052	-0.10 (-2.58, 2.39)	0.939	-3.00 (-5.67, -0.34)	0.027
Stratified	995	0.044	-0.67 (-3.28, 1.93)	0.612	-3.12 (-5.65, -0.59)	0.016
Truncated weights: (01-99)	995	0.049	-0.44 (-2.81, 1.93)	0.715	-3.15 (-5.80, -0.50)	0.020
Truncated weights: (05-95)	995	0.029	-1.06 (-3.33, 1.22)	0.362	-3.52 (-6.12, -0.91)	0.008
Truncated weights: (10-90)	995	0.016	-1.33 (-3.48, 0.82)	0.224	-3.74 (-6.29, -1.20)	0.004
Covariate adjusted	995	0.016	-1.32 (-3.11, 0.47)	0.148	-3.18 (-5.38, -0.99)	0.004
Crude	995	<.001	-1.90 (-3.75, -0.06)	0.043	-4.33 (-6.56, -2.11)	<.001
Excluding bypass/intracranial procedures	977	0.109	0.00 (-2.57, 2.57)	0.999	-2.63 (-5.37, 0.11)	0.060
Grooved Pegboard dominant hand (StdS)						
Primary	988	0.001	-2.25 (-6.18, 1.69)	0.264	-7.76 (-11.94, -3.57)	<.001
Imputed outcomes	997	0.001	-2.34 (-6.26, 1.58)	0.242	-7.72 (-11.90, -3.54)	<.001
Stratified	988	<.001	-2.53 (-6.31, 1.25)	0.189	-7.93 (-11.57, -4.30)	<.001
Truncated weights: (01-99)	988	0.001	-2.51 (-6.40, 1.38)	0.206	-7.73 (-11.90, -3.55)	<.001
Truncated weights: (05-95)	988	<.001	-3.15 (-6.66, 0.37)	0.079	-8.25 (-12.29, -4.21)	<.001
Truncated weights: (10-90)	988	<.001	-3.33 (-6.53, -0.13)	0.041	-8.68 (-12.60, -4.76)	<.001
Covariate adjusted	988	<.001	-3.05 (-5.62, -0.48)	0.020	-7.44 (-10.59, -4.29)	<.001

Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Crude	988	<.001	-3.60 (-6.26, -0.95)	0.008	-9.74 (-12.93, -6.54)	<.001
Excluding bypass/intracranial procedures	970	0.004	-2.28 (-6.30, 1.75)	0.267	-7.09 (-11.25, -2.93)	<.001
Grooved Pegboard other hand (StdS)						
Primary	988	<.001	-3.70 (-7.81, 0.41)	0.078	-11.52 (-16.46, -6.58)	<.001
Imputed outcomes	997	<.001	-3.41 (-7.57, 0.74)	0.107	-11.16 (-16.12, -6.20)	<.001
Stratified	988	<.001	-3.09 (-7.61, 1.44)	0.181	-11.08 (-15.51, -6.66)	<.001
Truncated weights: (01-99)	988	<.001	-3.50 (-7.58, 0.58)	0.092	-11.47 (-16.41, -6.54)	<.001
Truncated weights: (05-95)	988	<.001	-3.73 (-7.53, 0.08)	0.055	-11.78 (-16.52, -7.04)	<.001
Truncated weights: (10-90)	988	<.001	-3.72 (-7.30, -0.15)	0.041	-11.92 (-16.48, -7.35)	<.001
Covariate adjusted	988	<.001	-2.80 (-5.96, 0.35)	0.082	-9.75 (-13.61, -5.89)	<.001
Crude	988	<.001	-2.89 (-6.08, 0.31)	0.077	-11.18 (-15.02, -7.34)	<.001
Excluding bypass/intracranial procedures	970	<.001	-3.53 (-7.77, 0.71)	0.103	-10.67 (-15.78, -5.55)	<.001
Fine motor composite (StdS)†						
Primary	988	<.001	-1.34 (-3.91, 1.23)	0.306	-5.53 (-8.42, -2.64)	<.001
Imputed outcomes	997	0.001	-1.22 (-3.79, 1.35)	0.352	-5.36 (-8.25, -2.47)	<.001
Stratified	988	<.001	-1.72 (-4.34, 0.89)	0.196	-5.60 (-8.13, -3.07)	<.001
Truncated weights: (01-99)	988	<.001	-1.65 (-4.15, 0.85)	0.196	-5.56 (-8.45, -2.68)	<.001
Truncated weights: (05-95)	988	<.001	-2.27 (-4.58, 0.04)	0.054	-6.00 (-8.82, -3.18)	<.001
Truncated weights: (10-90)	988	<.001	-2.47 (-4.62, -0.32)	0.024	-6.30 (-9.06, -3.54)	<.001
Covariate adjusted	988	<.001	-2.25 (-4.03, -0.47)	0.013	-5.35 (-7.53, -3.18)	<.001
Crude	988	<.001	-2.83 (-4.69, -0.97)	0.003	-7.06 (-9.30, -4.83)	<.001
Excluding bypass/intracranial procedures	970	0.003	-1.33 (-3.92, 1.26)	0.315	-5.01 (-7.88, -2.13)	<.001
Beery: Visual-Motor Integration (StdS)						
Primary	990	0.148	-2.48 (-5.00, 0.04)	0.054	-1.40 (-3.77, 0.97)	0.246
Imputed outcomes	997	0.156	-2.44 (-4.96, 0.08)	0.057	-1.43 (-3.81, 0.95)	0.238
Stratified	990	0.149	-2.36 (-4.81, 0.09)	0.059	-1.51 (-3.89, 0.87)	0.215

Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Truncated weights: (01-99)	990	0.177	-2.27 (-4.69, 0.15)	0.066	-1.38 (-3.74, 0.99)	0.253
Truncated weights: (05-95)	990	0.110	-2.36 (-4.60, -0.12)	0.039	-1.52 (-3.79, 0.75)	0.189
Truncated weights: (10-90)	990	0.069	-2.39 (-4.49, -0.29)	0.025	-1.72 (-3.92, 0.48)	0.126
Covariate adjusted	990	0.149	-1.67 (-3.35, 0.01)	0.051	-0.73 (-2.78, 1.33)	0.489
Crude	990	0.068	-1.73 (-3.45, -0.01)	0.048	-2.03 (-4.10, 0.05)	0.056
Excluding bypass/intracranial procedures	972	0.128	-2.69 (-5.30, -0.08)	0.043	-1.01 (-3.39, 1.38)	0.408
Beery: Visual Perception (StdS)						
Primary	995	0.472	-0.62 (-2.70, 1.46)	0.561	-1.36 (-3.53, 0.81)	0.221
Imputed outcomes	997	0.472	-0.62 (-2.70, 1.46)	0.561	-1.35 (-3.52, 0.81)	0.221
Stratified	995	0.186	-1.17 (-3.13, 0.80)	0.245	-1.76 (-3.68, 0.16)	0.072
Truncated weights: (01-99)	995	0.321	-0.92 (-2.81, 0.97)	0.338	-1.55 (-3.60, 0.50)	0.139
Truncated weights: (05-95)	995	0.130	-1.25 (-2.92, 0.41)	0.141	-1.82 (-3.73, 0.10)	0.063
Truncated weights: (10-90)	995	0.073	-1.38 (-2.96, 0.19)	0.086	-1.94 (-3.81, -0.08)	0.041
Covariate adjusted	995	0.103	-1.14 (-2.46, 0.18)	0.091	-1.53 (-3.15, 0.09)	0.063
Crude	995	0.015	-1.31 (-2.65, 0.03)	0.055	-2.28 (-3.90, -0.66)	0.006
Excluding bypass/intracranial procedures	977	0.753	-0.57 (-2.80, 1.67)	0.618	-0.87 (-3.16, 1.43)	0.459
Judgment of Line Orientation (StdS)						
Primary	529	0.350	-2.71 (-6.53, 1.11)	0.164	-0.36 (-4.26, 3.54)	0.856
Imputed outcomes	553	0.361	-2.70 (-6.48, 1.08)	0.162	-1.68 (-5.60, 2.23)	0.399
Stratified	529	0.280	-3.02 (-6.86, 0.82)	0.123	-0.61 (-4.53, 3.32)	0.762
Truncated weights: (01-99)	529	0.342	-2.68 (-6.45, 1.09)	0.163	-0.31 (-4.21, 3.60)	0.878
Truncated weights: (05-95)	529	0.349	-2.54 (-6.15, 1.07)	0.168	-0.33 (-4.22, 3.57)	0.870
Truncated weights: (10-90)	529	0.375	-2.34 (-5.75, 1.07)	0.178	-0.36 (-4.17, 3.44)	0.852
Covariate adjusted	529	0.444	-1.40 (-4.35, 1.56)	0.354	0.78 (-2.69, 4.24)	0.661
Crude	529	0.429	-1.94 (-4.96, 1.07)	0.206	-0.41 (-3.88, 3.07)	0.818
Excluding bypass/intracranial procedures	517	0.413	-2.38 (-6.30, 1.55)	0.235	0.13 (-3.84, 4.10)	0.947

Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Visual-spatial abilities composite (StdS)†						
Primary	529	0.490	-1.73 (-4.61, 1.15)	0.239	-0.95 (-3.73, 1.84)	0.506
Imputed outcomes	553	0.307	-1.64 (-4.48, 1.19)	0.255	-2.05 (-4.90, 0.80)	0.159
Stratified	529	0.266	-2.13 (-4.78, 0.51)	0.114	-1.41 (-4.12, 1.30)	0.309
Truncated weights: (01-99)	529	0.387	-1.90 (-4.65, 0.84)	0.174	-1.07 (-3.83, 1.69)	0.447
Truncated weights: (05-95)	529	0.277	-2.03 (-4.57, 0.51)	0.117	-1.28 (-3.97, 1.42)	0.353
Truncated weights: (10-90)	529	0.237	-1.99 (-4.36, 0.39)	0.101	-1.38 (-4.00, 1.24)	0.301
Covariate adjusted	529	0.473	-1.26 (-3.27, 0.76)	0.222	-0.65 (-3.01, 1.72)	0.592
Crude	529	0.195	-1.74 (-3.81, 0.33)	0.100	-1.66 (-4.05, 0.74)	0.175
Excluding bypass/intracranial procedures	517	0.582	-1.56 (-4.60, 1.48)	0.315	-0.26 (-3.12, 2.60)	0.859
BRIEF: Global Executive Composite (TS)						
Primary	840	<.001	4.64 (2.36, 6.92)	<.001	3.23 (0.89, 5.57)	0.007
Imputed outcomes	913	<.001	4.50 (2.20, 6.81)	<.001	3.31 (0.93, 5.70)	0.006
Stratified	840	<.001	4.55 (2.30, 6.79)	<.001	3.57 (1.36, 5.78)	0.002
Truncated weights: (01-99)	840	<.001	4.89 (2.70, 7.09)	<.001	3.35 (1.06, 5.65)	0.004
Truncated weights: (05-95)	840	<.001	4.94 (2.85, 7.04)	<.001	3.47 (1.24, 5.71)	0.002
Truncated weights: (10-90)	840	<.001	4.65 (2.67, 6.63)	<.001	3.48 (1.28, 5.68)	0.002
Covariate adjusted	840	<.001	3.76 (2.13, 5.39)	<.001	2.94 (1.00, 4.89)	0.003
Crude	840	<.001	4.05 (2.39, 5.72)	<.001	3.88 (1.92, 5.84)	<.001
Excluding bypass/intracranial procedures	826	<.001	4.39 (2.05, 6.74)	<.001	3.40 (0.96, 5.83)	0.006
CBCL: Internalizing Problems (TS)						
Primary	829	0.038	1.16 (-1.25, 3.57)	0.347	2.94 (0.68, 5.20)	0.011
Imputed outcomes	913	0.031	1.32 (-1.04, 3.68)	0.272	3.02 (0.75, 5.29)	0.009
Stratified	829	0.010	1.94 (-0.28, 4.15)	0.086	3.38 (1.21, 5.56)	0.002
Truncated weights: (01-99)	829	0.024	1.47 (-0.84, 3.77)	0.212	3.06 (0.86, 5.26)	0.006
Truncated weights: (05-95)	829	0.011	1.63 (-0.50, 3.76)	0.133	3.22 (1.10, 5.34)	0.003

Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Truncated weights: (10-90)	829	0.009	1.53 (-0.47, 3.52)	0.134	3.22 (1.15, 5.29)	0.002
Covariate adjusted	829	0.005	1.13 (-0.47, 2.73)	0.166	3.13 (1.23, 5.04)	0.001
Crude	829	0.002	1.46 (-0.14, 3.06)	0.075	3.43 (1.54, 5.31)	<.001
Excluding bypass/intracranial procedures	815	0.036	1.12 (-1.40, 3.64)	0.384	3.03 (0.71, 5.35)	0.010
CBCL: Externalizing Problems (TS)						
Primary	829	<.001	2.03 (-0.24, 4.30)	0.080	3.91 (1.90, 5.92)	<.001
Imputed outcomes	913	0.001	1.98 (-0.29, 4.25)	0.087	3.77 (1.74, 5.80)	<.001
Stratified	829	<.001	2.59 (0.51, 4.67)	0.015	3.93 (1.89, 5.98)	<.001
Truncated weights: (01-99)	829	<.001	2.33 (0.26, 4.39)	0.027	4.04 (2.11, 5.98)	<.001
Truncated weights: (05-95)	829	<.001	2.60 (0.71, 4.48)	0.007	4.15 (2.27, 6.03)	<.001
Truncated weights: (10-90)	829	<.001	2.53 (0.74, 4.31)	0.005	4.13 (2.28, 5.98)	<.001
Covariate adjusted	829	0.001	1.63 (0.14, 3.12)	0.032	3.29 (1.52, 5.07)	<.001
Crude	829	<.001	2.07 (0.56, 3.58)	0.007	3.92 (2.14, 5.70)	<.001
Excluding bypass/intracranial procedures	815	0.002	1.79 (-0.63, 4.22)	0.148	3.74 (1.66, 5.82)	<.001
CBCL: Total Problems (TS)						
Primary	828	0.001	2.10 (-0.68, 4.88)	0.139	4.75 (2.23, 7.27)	<.001
Imputed outcomes	913	0.001	2.16 (-0.56, 4.87)	0.119	4.70 (2.21, 7.19)	<.001
Stratified	828	<.001	2.89 (0.49, 5.30)	0.018	5.18 (2.82, 7.53)	<.001
Truncated weights: (01-99)	828	<.001	2.51 (-0.06, 5.08)	0.056	4.94 (2.54, 7.35)	<.001
Truncated weights: (05-95)	828	<.001	2.71 (0.35, 5.07)	0.025	5.11 (2.83, 7.40)	<.001
Truncated weights: (10-90)	828	<.001	2.53 (0.34, 4.72)	0.024	5.09 (2.87, 7.30)	<.001
Covariate adjusted	828	<.001	1.77 (0.06, 3.49)	0.042	4.48 (2.43, 6.52)	<.001
Crude	828	<.001	2.18 (0.44, 3.92)	0.014	5.15 (3.10, 7.20)	<.001
Excluding bypass/intracranial procedures	814	0.002	1.98 (-0.94, 4.91)	0.184	4.62 (2.00, 7.25)	<.001
CBCL: ADHD Problems (TS)						
Primary	828	0.026	1.41 (-0.05, 2.86)	0.058	1.97 (0.51, 3.44)	0.008

Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Imputed outcomes	913	0.069	1.35 (-0.35, 3.05)	0.119	2.14 (0.27, 4.02)	0.025
Stratified	828	0.002	1.45 (0.25, 2.65)	0.018	2.08 (0.90, 3.27)	<.001
Truncated weights: (01-99)	828	0.002	1.61 (0.34, 2.87)	0.013	2.14 (0.84, 3.43)	0.001
Truncated weights: (05-95)	828	<.001	1.80 (0.63, 2.96)	0.003	2.27 (1.07, 3.47)	<.001
Truncated weights: (10-90)	828	<.001	1.69 (0.61, 2.76)	0.002	2.30 (1.12, 3.47)	<.001
Covariate adjusted	828	<.001	1.32 (0.45, 2.19)	0.003	1.97 (0.93, 3.00)	<.001
Crude	828	<.001	1.46 (0.58, 2.34)	0.001	2.40 (1.36, 3.44)	<.001
Excluding bypass/intracranial procedures	814	0.050	1.30 (-0.27, 2.86)	0.104	2.00 (0.40, 3.59)	0.015
CLDQ: Math Scale (ZS)						
Primary	894	0.210	0.17 (-0.09, 0.43)	0.204	0.23 (-0.04, 0.50)	0.089
Imputed outcomes	997	0.677	0.16 (-0.37, 0.70)	0.555	0.33 (-0.44, 1.11)	0.393
Stratified	894	0.046	0.21 (-0.03, 0.44)	0.085	0.28 (0.05, 0.52)	0.017
Truncated weights: (01-99)	894	0.087	0.22 (-0.02, 0.46)	0.078	0.25 (0.00, 0.50)	0.048
Truncated weights: (05-95)	894	0.018	0.27 (0.05, 0.49)	0.017	0.28 (0.05, 0.52)	0.019
Truncated weights: (10-90)	894	0.012	0.26 (0.05, 0.47)	0.013	0.29 (0.05, 0.52)	0.015
Covariate adjusted	894	0.007	0.25 (0.08, 0.42)	0.003	0.23 (0.02, 0.43)	0.028
Crude	894	0.002	0.25 (0.08, 0.42)	0.004	0.32 (0.12, 0.52)	0.002
Excluding bypass/intracranial procedures	879	0.288	0.15 (-0.13, 0.42)	0.294	0.22 (-0.06, 0.50)	0.121
CLDQ: Reading Scale (ZS)						
Primary	895	<.001	0.24 (0.07, 0.42)	0.005	0.44 (0.24, 0.64)	<.001
Imputed outcomes	997	0.002	0.25 (0.05, 0.46)	0.016	0.49 (0.18, 0.80)	0.002
Stratified	895	<.001	0.23 (0.04, 0.42)	0.019	0.42 (0.23, 0.61)	<.001
Truncated weights: (01-99)	895	<.001	0.25 (0.08, 0.42)	0.004	0.43 (0.23, 0.63)	<.001
Truncated weights: (05-95)	895	<.001	0.26 (0.10, 0.43)	0.002	0.43 (0.23, 0.63)	<.001
Truncated weights: (10-90)	895	<.001	0.26 (0.10, 0.42)	0.001	0.43 (0.23, 0.62)	<.001
Covariate adjusted	895	<.001	0.26 (0.13, 0.40)	<.001	0.37 (0.21, 0.54)	<.001

Supplemental Digital Content 9: Primary and sensitivity analyses

Test (Outcome) and analysis approach	N	P*	Single exposure, estimate (95% CI)	P**	Multiple exposures, estimate (95% CI)	P**
Crude	895	<.001	0.29 (0.15, 0.43)	<.001	0.47 (0.31, 0.64)	<.001
Excluding bypass/intracranial procedures	880	<.001	0.25 (0.07, 0.42)	0.006	0.44 (0.24, 0.65)	<.001

* 2 degrees of freedom test for overall difference, significance indicated in bold for $p < 0.05$

** Pairwise comparisons of single or multiple exposures versus no exposure, significance indicated in bold for $p < 0.025$ (Bonferroni adjustment).

† In addition to scores derived from the test developers, 4 study-specific composite scores were defined *a priori* from individual tests to increase the ability to detect effects when more than one instrument assessed a particular domain. Individual test scores were first converted to standard-scores using available normative data from either the test developers or available scientific literature. The individual standard-scores were then averaged to create an overall composite domain score.

N indicated number of children completing a given test. TS, T score (mean = 50, standard deviation = 10); SS, Scaled score (mean = 10, standard deviation = 3); StdS, Standard score (mean = 100, standard deviation = 15); ZS, Z score (mean = 0, standard deviation = 1). D-KEFS, Delis-Kaplan Executive Function System; WASI, Wechsler Abbreviated Scale of Intelligence; WRAML-2, Wide Range Assessment of Memory and Learning- Second Edition; CPT II, Connor's Continuous Performance Test II; CTOPP, Comprehensive Test of Phonological Processing; VMI, visual motor integration; ADHD, attention deficit hyperactivity disorder; BRIEF, Behavior Rating Inventory of Executive Function; CLDQ, Colorado Learning Difficulties Questionnaire; CBCL, Child Behavior Checklist.

Primary analysis, Inverse probability treatment weighting (IPTW) using available scores; Imputed outcomes, IPTW analysis using multiple imputation to account for missing outcome data; Stratified, for each sex subjects were stratified by quintiles of the propensity score distribution (10 strata total) among the multiply exposed, and the effects of anesthesia exposure on the outcomes were assessed using multivariable models to adjust for strata; Truncated weights, truncations were performed on the distribution of IPTW weights using (a) 1st and 99th percentiles, (b) 5th and 95th percentiles, and (c) 10th and 90th percentiles; Covariate adjusted, multivariable regression model adjusted for potential confounders using those variables previously identified and used in the propensity score model), providing an estimate of an effect of exposure on treatment, conditional on baseline covariates; Crude, estimates of the differences between exposure groups were performed without adjustment or weighting; Exclude bypass/intracranial, primary IPTW analysis performed excluding the 18 children who had a cardiopulmonary bypass or intracranial procedure. The Appendix provides more details regarding these supplemental analyses.