

SUPPLEMENTARY MATERIAL

Neurocognition and academic achievement among bereaved children in the Generation R Cohort

Bolhuis, K^{t,1}; Espinosa Dice, AL^{t,2}; Jansen, P.W.^{1,3}; Tiemeier, H^{1,2,4}; Denckla, C.A.*⁴

Table S1 – Characteristics of bereaved individuals by age at when loss occurred

Variable		Bereaved before IQ@5 assessment (N=359)	Bereaved after IQ@5 assessment (N=395)
Child's sex	Female	195 (54.3%)	216 (54.7%)
	Male	164 (45.7%)	179 (45.3%)
	N missing	0	0
Mother's marital status	Married or living with partner	320 (93.3%)	334 (90.5%)
	No partner	23 (6.7%)	35 (9.5%)
	N missing	16	26
Parental national origin	Dutch	243 (67.9%)	264 (67.7%)
	Non-Dutch non-European	86 (24.0%)	94 (24.1%)
	Non-Dutch European	29 (8.1%)	32 (8.2%)
	N missing	1	5
Household income	<1400	34 (11.7%)	45 (13.4%)
	1400-2200	52 (17.9%)	61 (18.1%)
	>2200	205 (70.4%)	231 (68.5%)
	N missing	68	58
Mother's education	Low	11 (3.2%)	14 (3.8%)
	Medium	137 (39.8%)	151 (41.0%)
	High	196 (57.0%)	203 (55.2%)
	N missing	15	27
Mother's psychopathology score	Mean (SD)	0.2 (0.3)	0.2 (0.3)
	Range	0.0 - 2.1	0.0 - 2.3
	N missing	83	75

Note: Some individuals (n=42) had missing data on age at IQ@5 assessment, so we could not categorize the timing of their loss. As a result, the total number of bereaved individuals in this table (n=754) does not match the total number of bereaved individuals in Table 1 (n=796).

Table S2 – Primary analysis sensitivity analyses: association between bereavement before age 10 and neurocognitive outcomes at ages 12-13, restricting to losses with at least some (>1) influence on child (N=1821, N bereaved = 482)

Outcome	Model	Estimate	SE	P value
CITO language percentile score	Unadjusted	-1.96	1.45	0.18
	Adjusted	-2.48	1.36	0.07
CITO math percentile score	Unadjusted	-2.47	1.45	0.09
	Adjusted	-2.65	1.38	0.06
CITO test score	Unadjusted	-0.70	0.48	0.14
	Adjusted	-0.83	0.45	0.06
WISC CD T-score	Unadjusted	-0.17	0.17	0.33
	Adjusted	-0.17	0.17	0.32
WISC DS T-score	Unadjusted	-0.24	0.14	0.09
	Adjusted	-0.24	0.14	0.08
WISC MR T-score	Unadjusted	-0.46	0.14	0.00
	Adjusted	-0.48	0.14	0.00
WISC Vocab T-score	Unadjusted	0.11	0.15	0.48
	Adjusted	0.08	0.15	0.57
WISC Estimated FSIQ	Unadjusted	-1.36	0.69	0.05
	Adjusted	-1.44	0.66	0.03
Academic underachievement	Unadjusted	-0.02	0.05	0.70
	Adjusted	-0.03	0.05	0.53

Note: CITO = primary school test; WISC = Weschler Intelligence Scale for Children; FSIQ = full scale intelligence quotient; CD = Coding; DS = Digit-span; MR = Matrix reasoning. Unadjusted models for CITO test score and academic underachievement include CITO test administration year and age at CITO assessment as covariates. Unadjusted models for CITO subscale percentile scores include age at CITO assessment as a covariate. All adjusted models include the following covariates, in addition to any CITO-specific covariates mentioned: child sex, parental national origin, maternal psychopathology, household income, maternal education, and maternal marital status.

Table S3: Primary analysis sensitivity analyses: association between bereavement before age 10 and neurocognitive outcomes at ages 12-13, restricting to losses with no or a little (≤ 2) influence on child (N=2039; N bereaved = 700)

Outcome	Model	Estimate	SE	P value
CITO language percentile score	Unadjusted	-0.60	1.26	0.63
	Adjusted	-0.70	1.18	0.56
CITO math percentile score	Unadjusted	-0.42	1.27	0.74
	Adjusted	-0.46	1.20	0.70
CITO test score	Unadjusted	-0.17	0.42	0.68
	Adjusted	-0.21	0.39	0.58
WISC CD T-score	Unadjusted	-0.15	0.15	0.33
	Adjusted	-0.18	0.15	0.23
WISC DS T-score	Unadjusted	-0.16	0.12	0.20
	Adjusted	-0.15	0.12	0.21
WISC MR T-score	Unadjusted	-0.21	0.12	0.08
	Adjusted	-0.21	0.12	0.08
WISC Vocab T-score	Unadjusted	-0.06	0.13	0.63
	Adjusted	-0.06	0.13	0.63
WISC Estimated FSIQ	Unadjusted	-1.02	0.59	0.09
	Adjusted	-1.06	0.57	0.06
Academic underachievement	Unadjusted	0.04	0.05	0.37
	Adjusted	0.04	0.04	0.39

Note: CITO = primary school test; WISC = Weschler Intelligence Scale for Children; FSIQ = full scale intelligence quotient; CD = Coding; DS = Digit-span; MR = Matrix reasoning. Unadjusted models for CITO test score and academic underachievement include CITO test administration year and age at CITO assessment as covariates. Unadjusted models for CITO sub-scale percentile scores include age at CITO assessment as a covariate. All adjusted models include the following covariates, in addition to any CITO-specific covariates mentioned: child sex, parental national origin, maternal psychopathology, household income, maternal education, and maternal marital status.

Table S4 – Primary analysis sensitivity analyses: association between bereavement before age 10 and neurocognitive outcomes at ages 12-13, restricting to losses with at least moderate (>2) influence on child (N=1435; N bereaved = 96)

Outcome	Model	Estimate	SE	P value
CITO language percentile score	Unadjusted	-4.71	2.87	0.10
	Adjusted	-4.45	2.72	0.10
CITO math percentile score	Unadjusted	-8.81	2.89	0.00
	Adjusted	-7.60	2.76	0.01
CITO test score	Unadjusted	-2.12	0.95	0.03
	Adjusted	-1.83	0.89	0.04
WISC CD T-score	Unadjusted	-0.08	0.35	0.82
	Adjusted	-0.05	0.34	0.89
WISC DS T-score	Unadjusted	-0.36	0.28	0.20
	Adjusted	-0.29	0.28	0.29
WISC MR T-score	Unadjusted	-0.70	0.28	0.01
	Adjusted	-0.68	0.27	0.01
WISC Vocab T-score	Unadjusted	0.16	0.30	0.60
	Adjusted	0.22	0.29	0.44
WISC Estimated FSIQ	Unadjusted	-1.69	1.36	0.21
	Adjusted	-1.37	1.31	0.30
Academic underachievement	Unadjusted	-0.21	0.11	0.05
	Adjusted	-0.18	0.10	0.07

Note: CITO = primary school test; WISC = Weschler Intelligence Scale for Children; FSIQ = full scale intelligence quotient; CD = Coding; DS = Digit-span; MR = Matrix reasoning.

Unadjusted models for CITO test score and academic underachievement include CITO test administration year and age at CITO assessment as covariates. Unadjusted models for CITO subscale percentile scores include age at CITO assessment as a covariate. All adjusted models include the following covariates, in addition to any CITO-specific covariates mentioned: child sex, parental national origin, maternal psychopathology, household income, maternal education, and maternal marital status.

Table S5 – Primary analysis sensitivity analyses: association between bereavement before age 10 and Cito test score, restricting to Cito test scores in the middle 50th percentile and toggling the perceived influence of the loss on the child and restricting to Cito test scores (N=1175; 988)

Influence Filter	Model	Estimate	SE	P value
No filter (1 no influence – 4 a lot of influence)	Unadjusted	-0.16	0.24	0.49
	Adjusted	-0.18	0.24	0.46
>1 (at least some influence)	Unadjusted	-0.20	0.28	0.48
	Adjusted	-0.24	0.28	0.40

Note: CITO = primary school test. Unadjusted models for CITO test score include CITO test administration year and age at CITO assessment as covariates. Adjusted models also include the following covariates: child sex, parental national origin, maternal psychopathology, household income, maternal education, and maternal marital status.

Table S6 – Secondary analysis sensitivity analyses: association between bereavement between ages 5 and 10 and neurocognitive outcomes at ages 12-13, restricting to losses with at least some (>1) influence on child (N=1598)

Outcome	Model	Estimate	SE	P value
WISC MR T-score	Adjusted + IQ	-0.33	0.17	0.05
	Adjusted + CBCL	-0.35	0.18	0.04
	Adjusted + CBCL + IQ	-0.33	0.17	0.06
WISC Estimated FSIQ	Adjusted + IQ	-0.65	0.79	0.41
	Adjusted + CBCL	-0.83	0.84	0.32
	Adjusted + CBCL + IQ	-0.64	0.78	0.42

Note: WISC = Weschler Intelligence Scale for Children; FSIQ = full scale intelligence quotient; MR = Matrix reasoning. Models include the following covariates: child sex, parental national origin, maternal psychopathology, household income, maternal education, and maternal marital status. As specified, they also include IQ and/or CBCL scores at age 5.

Table S7: Secondary analysis sensitivity analyses: association between bereavement between ages 5 and 10 and neurocognitive outcomes at ages 12-13, restricting to losses with at least moderate (>2) influence on child (N=1396)

Outcome	Model	Estimate	SE	P value
WISC MR T-score	Adjusted + IQ	-0.91	0.35	0.01
	Adjusted + CBCL	-0.96	0.35	0.01
	Adjusted + CBCL + IQ	-0.90	0.35	0.01
WISC Estimated FSIQ	Adjusted + IQ	-1.25	1.58	0.43
	Adjusted + CBCL	-1.63	1.68	0.33
	Adjusted + CBCL + IQ	-1.16	1.58	0.46

Note: WISC = Weschler Intelligence Scale for Children; FSIQ = full scale intelligence quotient; MR = Matrix reasoning. Models include the following covariates: child sex, parental national origin, maternal psychopathology, household income, maternal education, and maternal marital status. As specified, they also include IQ and/or CBCL scores at age 5.