**APPENDIX 1: SUPPLEMENTARY MATERIAL**

**Description of Caregiver-Child Dyads.** At the five year follow-up, children and their primary caregivers participated in a 15-minute semi-structured parent-child interaction (PCI). Of the caregivers that participated in the PCI, 133 (95.0%) were mothers and 7 (5.0%) were fathers. Reasons for fathers attending the assessment and participating in the PCI included: father had sole custody of the child (*n*=1); parents were separated and had shared custody of the child, but the father was the only English-speaking parent (*n*=1); and child was being raised in a two-parent household but the mother was unable to take time off work to attend the appointment (*n*=5). There was no difference in the proportion of children born very preterm (VPT) and children born full-term (FT) that participated in the PCI with their mother or father (*x*2=2.57, *p*=0.14). Importantly, there were no differences in PCI ratings between mothers and fathers (Table S1).

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| **Table S1.** Maternal and Paternal Parenting Behavior at the Five Year Follow-up Assessment (*n*=140).  |
| *M (SD)* | **Mothers (*n*=133)** | **Fathers (*n*=7)** | **Welch statistic** | ***p*** |
| Sensitivity | 4.05 (1.1) | 4.14 (0.9) | 0.08 | .79 |
| Intrusiveness | 1.63 (0.9) | 1.29 (0.5) | 2.94 | .12 |
| Positive Regard  | 3.76 (1.1) | 3.43 (1.3) | 0.45 | .52 |
| Negative Regard  | 1.28 (0.7) | 1.00 (0.0) | - | - |
| Stimulation of Cognition | 3.20 (1.1) | 2.57 (0.5) | 1.37 | .28 |
| *Note.* Welch Robust Test of Equality of Means *p*-values reported for two-sample *t*-test with unequal samples and equal population variances not assumed. Welch *p*-value could not be calculated for Negative Regard because there was no variance for father ratings (*i.e*., all seven fathers received rating of 1). Of the dyads that returned for follow-up (*n*=154), there was 9.1% (*n*=14) missing PCI data (technical failure of video equipment) that could not be estimated when using two-sample *t*-tests. |

There were also no significant differences between mothers and fathers in terms of mean depression symptoms, anxiety symptoms, ADHD symptoms, or social-communication interaction problems. Mothers did, however, report higher levels of parenting stress than fathers (Table S2).

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| **Table S2.** Maternal and Paternal Psychosocial Background Factors (*n*=117).  |
| *M (SD)* | **Mothers (*n*=112)** | **Fathers (*n*=5)** | **Welch statistic** | ***p*** |
| Depression symptoms | 6.49 (8.3) | 4.20 (4.0) | 1.36 | .29 |
| Anxiety symptoms | 33.44 (10.3) | 33.60 (18.0) | <0.01 | .99 |
| ADHD symptoms | 42.63 (11.2) | 43.60 (10.4) | 0.04 | .85 |
| Social-communication interaction problems | 47.84 (10.1) | 44.00 (6.8) | 1.16 | .35 |
| Parenting stress percentiles  | 35.14 (33.5) | 11.10 (7.3) | 27.04 | <.001 |
| *Note.* Welch Robust Test of Equality of Means *p*-values reported for two-sample *t*-test with unequal samples and equal population variances not assumed. Data shown for parent sample (*i.e*., excluding duplicate parental psychosocial measure values of sibling children from multiple preterm birth) with PCI data.  |

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| **Table S3**. Summary of Principal Component Analysis on Dimensions of Parenting Behavior (*n*=140). |
|  | **Factor 1** | **Factor 2** |
| Variance explained (%) | 57.09 | 21.93 |
| Eigenvalues (Total)  | 2.85 | 1.10 |
| Parenting Dimension Loadings |  |  |
| Negative Regard  | .88 |  |
| Intrusiveness | .88 |  |
| Stimulation of Cognition |  | .88 |
| Positive Regard  |  | .81 |
| Sensitivity |  | .70 |
| *Note.* Extraction method: PCA, Rotation method: Varimax with Kaiser Normalization  |

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| **Table S4**. Markers of Neighborhood Disadvantage Included in Area Deprivation Index Percentiles. a |
| **Demographics** | * Percent of the population aged 25 and older with less than 9 years of education
* Percent of the population aged 25 and older with at least a high school diploma
* Percent of single-parent households with children less than 18 years of age
* Percent employed persons aged 16 and older in white-collar occupations
* Percent of civilian labor force population aged 16 years and older who are unemployed
 |
| **Income/poverty**  | * Median family income in USA dollars
* Income disparity
* Percent of families below federal poverty level
* Percent of the population below 150% of the federal poverty threshold
 |
| **Housing** | * Median home value in USA dollars
* Median gross rent in USA dollars
* Median monthly mortgage in USA dollars
* Percent of owner-occupied housing units
* Percent of households with more than 1 person per room
 |
| **Basic necessities**  | * Percent of households without a motor vehicle
* Percent of households without a telephone
* Percent of occupied housing units without complete plumbing
 |
| a Kind AJH, Buckingham W. Making Neighborhood Disadvantage Metrics Accessible: The Neighborhood Atlas. *New England Journal of Medicine*, 2018. 378: 2456-2458. DOI: 10.1056/NEJMp1802313. PMCID: PMC6051533. See also: https://www.neighborhoodatlas.medicine.wisc.edu/ |

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| **Table S5.** Bivariate Correlations between Parental Psychosocial Adversity Measures. |
|  | **1.** | **2.** | **3.** | **4.** | **5.** |
| **1.** Depression symptoms | - |  |  |  |  |
| **2.** Anxiety symptoms | .63 \*\*\* | - |  |  |  |
| **3.** ADHD symptoms | .49 \*\*\* | .54 \*\*\* | - |  |  |
| **4.** Social-communication interaction problems | .56 \*\*\* | .59 \*\*\* | .55 \*\*\* | - |  |
| **5.** Parenting stress percentiles | .54 \*\*\* | .65 \*\*\* | .51 \*\*\* | .55 \*\*\* | - |
| *\*\*\* p* ≤ .001*Note.* Spearman Rho reported. Data shown for parent sample (*i.e*., excluding duplicate parental psychosocial measure values of sibling children from multiple preterm birth). Correlation *n* range: 125 – 109 depending on missing data across measures. Correlations were not adjusted for children’s birth-group because there were no significant between-groups differences on parental psychosocial measures (see Table 1 main body of the manuscript).  |

**Associations between Infant Clinical Factors and Executive Function Ability at Age Five Years in Children Born VPT**

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| **Table S6.** Bivariate Correlations between Infant Clinical Factors and Executive Function Ability (*n*=86). |
|  | **1.** | **2.** | **3.** | **4.**  |
| **1.** Executive Function Component Score | - |  |  |  |
| **2.** Gestational age a | -.17 | - |  |  |
| **3.** Birthweight a | -.06 | .76 \*\*\* | - |  |
| **4.** Infant clinical risk index b | .03 | -.54 \*\*\* | -.55 \*\*\* | - |
| a Pearson correlation reported.b Spearman Rho reported. Description of infant clinical risk index provided in main manuscript.*\*\*\* p* ≤ .001 |

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| **Table S7.** Comparison of Executive Function Ability between Children born VPT with None, Mild or Moderate/Severe Neonatal White Matter Abnormalities (*n*=57) |
|  | **Non (*n*=19)** | **Mild (*n*=22)** | **Moderate/****Severe (*n*=16)** | ***F*** | ***p*** |
| Executive Function Component Score, *m (SD)* | -0.33 (1.09) | -0.45 (0.98) | -0.39 (0.83) | .07 | .93 |
| *Note.* White matter abnormalities were assessed from term-equivalent postmenstrual age MRI using the qualitative scoring system described in: Kidokoro, H., Neil, J. J., & Inder, T. E. (2013). New MR imaging assessment tool to define brain abnormalities in very preterm infants at term. *American Journal of Neuroradiology*, *34*(11), 2208–2214. DOI: org/10.3174/ajnr.A3521 |

**Age, Educational Setting, and Child Executive Function.** At the five year follow-up, information from parent- and teacher- reports was collected to determine whether children were in an early childhood education setting (day-care and pre-kindergarten) or in a primary school setting (kindergarten and grade school, collectively referred to elementary school in the USA). As shown in Table S8, most of the children in this study were in a primary school setting at the time of their follow-up assessment (64%). Children born FT (86%) were more likely to be in a primary school setting compared to children born VPT (59%). However, as shown in Table S9, school setting was not significantly related to EF ability (*p*=.41) over and above the effect of preterm birth (*p*=.001), and there was no interaction between birth group and school setting on EF ability (*p*=.37). When taken together, these results suggest that schooling at this age did not explain birth-group differences in EF performance. Interestingly, we note that these findings are consistent with our finding that age at assessment was not correlated with EF performance (*r*=.11, *p*=.25).

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| **Table S8.** Rates of Early Childhood and Primary Education for Children Born VPT and Children Born FT (*n*=141). |
|  | **All Children** | **VPT Group** | **FT Group** | ***X2*** | **VPT vs. FT *p*** |
| Early childhood education, % *(n)* | 29.8 (42) | 41.0 (34) | 13.8 (8) |  |  |
| Primary school, % *(n)* | 70.2 (99) | 59.0 (49) | 86.2 (50) | 12.05 | .001 |
| *Note.* School information was unable to be obtained for 13 (VPT=5, FT=8) children due to parent unwilling to provide school contact information. Missing school data could not be estimated in chi-square analysis.  |

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| **Table S9.** Associations between Birth Group and School Setting on Executive Function Ability at Age Five Years (*n*=154). |
|  | **Estimate** | **Standard Error** | ***p*** |
| Birth group | 0.78 | 0.23 | .001 |
| School setting | -0.22 | 0.26 | .41 |
| Interaction: Birth group with School setting | -0.44 | 0.49 | .37 |
| *Note.* Estimates from linear mixed-effect models shown. Family membership included to account for sibling correlation. Birth Group coded FT=0, VPT=1. School Setting coded Early Childhood Education=1, Primary School=2. For linear mixed-effect models conducted in SPSS, the highest value of a categorical factor is used as the reference group.  |

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| **Table S10**. Bivariate Associations between Parental Background Factors and Parenting Behavior Component Scores. |
|  | **Estimate** | **Standard Error** | ***p*** |
| **Positive Parenting Component Score** |  |  |  |
| Parent depression symptoms  | 0.01 | 0.103 | .92 |
| Parent anxiety symptoms | -0.12 | 0.093 | .20 |
| Parent ADHD symptoms | -0.13 | 0.095 | .18 |
| Parent social-communication interaction problems | -0.24 | 0.094 | .01 |
| Parenting stress percentiles | -0.19 | 0.091 | .04 |
| Socioeconomic Adversity Composite a | -0.16 | 0.091 | .08 |
| Maternal demographic stressor index | -0.18 | 0.090 | .05 |
| Income-to-Needs Ratio | 0.12 | 0.088 | .18 |
| Area Deprivation Index | -0.16 | 0.090 | .07 |
| **Negative Parenting Component Score** |  |  |  |
| Parent depression symptoms | 0.21 | 0.077 | .006 |
| Parent anxiety symptoms | 0.10 | 0.069 | .16 |
| Parent ADHD symptoms | 0.12 | 0.069 | .08 |
| Parent social-communication interaction problems | 0.35 | 0.062 | <.001 |
| Parenting stress percentiles | 0.18 | 0.068 | .009 |
| Socioeconomic Adversity Composite a | 0.29 | 0.061 | <.001 |
| Maternal demographic stressor index | 0.28 | 0.064 | <.001 |
| Income-to-Needs Ratio | -0.21 | 0.066 | .002 |
| Area Deprivation Index | 0.25 | 0.060 | <.001 |
| *Note.* Standardized estimates from linear mixed-effect models shown. Birth-group and family membership included in all models to account for children born very preterm and sibling correlation. a Socioeconomic Adversity Composite Score based upon summation of maternal demographic stressor index, Income-to-Needs Ratio (reversed scored), and Area Deprivation Index percentile *z*-scores. |

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| **Table S11.** Between-Groups Differences in Parenting Quality Component Scores by Demographic Stressor Factor |
| **Dependent variable, *M (SD)*** | **Independent variable, Demographic Stressor**  | **Stressor present** | **Stressor absent** | ***p*** |
| Positive Parenting Component Score | Young mother at delivery (≤ 18 years) | -0.90 (0.93) | 0.04 (0.83) | .04 |
| Racial minority population | -0.07 (0.85) | 0.05 (0.85) | .53 |
| No High School degree  | -0.24 (0.90) | 0.05 (0.84) | .40 |
| Single parent | -0.21 (0.85) | 0.20 (0.85) | .03 |
| Public health insurance | -0.16 (0.83) | 0.22 (0.83) | .04 |
| Negative Parenting Component Score | Young mother at delivery (≤ 18 years) | 0.18 (0.76) | -0.09 (0.68) | .44 |
| Racial minority population | 0.06 (0.68) | -0.20 (0.68) | .06 |
| No High School degree | 0.62 (0.70) | -0.13 (0.66) | .003 |
| Single parent | 0.20 (0.64) | -0.27 (0.64) | <.001 |
| Public health insurance | 0.22 (0.63) | -0.35 (0.64) | <.001 |
| *Note.* Estimated means and standard errors from linear mixed-effect models shown. Birth-group and family membership included in all models to account for child prematurity and sibling correlation. See Table 1 of main manuscript for *n* for each demographic stressor factor. |

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| **Table S12**. Bivariate Associations between Socio-environmental Background Factors and Executive Function Component Scores. |
|  | **Estimate** | **Standard Error** | ***p*** |
| Positive Parenting Component Score | 0.01 | 0.100 | .90 |
| Negative Parenting Component Score | -0.31 | 0.108 | .005 |
| Parental involvement in home learning | 0.27 | 0.102 | .01 |
| Parent depression symptoms | -0.40 | 0.118 | .001 |
| Parent Anxiety Symptoms | -0.24 | 0.091 | .009 |
| Parent ADHD symptoms | -0.01 | 0.110 | .95 |
| Parent social-communication interaction problems | -0.20 | 0.132 | .14 |
| Parenting stress percentiles | -0.14 | 0.094 | .14 |
| Parent FSIQ score  | 0.34 | 0.095 | .001 |
| Child FSIQ score | 0.58 | 0.091 | <.001 |
| Socioeconomic Adversity Composite a | -0.42 | 0.085 | <.001 |
| Maternal demographic stressor index | -0.38 | 0.091 | <.001 |
| Income-to-needs ratio | 0.28 | 0.087 | .002 |
| Area Deprivation Index | -0.41 | 0.080 | <.001 |
| *Note.* Standardized estimates from linear mixed-effect models shown. Birth-group and family membership included in all models to account for children born very preterm and sibling correlation. FSIQ, Full Scale Intellectual Quotient.a Socioeconomic Adversity Composite Score based upon summation of maternal demographic stressor index, Income-to-Needs Ratio (reversed scored), and Area Deprivation Index percentile *z*-scores. |

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| **Table S13.** Domain-Specific Associations between PCIRS Subscales and Executive Function Ability (*n*=154). |
| **PCIRS Subscales** | **EF Component Scores** | **Working Memory Accuracy** | **Inhibition Efficiency**  | **Shifting Efficiency**  | **Executive control Efficiency**  |
| **Sensitivity** | 0.14 (0.09) | 2.79 (0.80) \*\*\* | 0.01 (0.03) | 0.03 (0.02) | 0.02 (0.02) |
| **Cognitive Stimulation** | 0.02 (0.09) | 1.70 (0.76) \* | 0.02 (0.03) | 0.01 (0.02) | -0.02 (0.02) |
| **Positive Regard** | 0.06 (0.09) | 1.25 (0.78) | -0.01 (0.03) | 0.02 (0.02) | 0.02 (0.02) |
| **Intrusiveness** | -0.34 (0.12) \*\* | -3.36 (0.94) \*\*\* | -0.08 (0.04) \* | -0.07 (0.02) \*\* | -0.07 (0.03) \* |
| **Negative Regard** | -0.47 (0.18) \*\* | -3.21 (1.3) \* | -0.06 (0.05) | -0.09 (0.03) \*\* | -0.11 (0.04) \* |
| *\* p* ≤ .05*\*\* p* ≤ .01*\*\*\* p* ≤ .001*Note.* Estimates from linear mixed-effect models shown. Birth-group and family membership included in all models to account for children born very preterm and sibling correlation. |

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| **Table S14**. Associations Between Psychosocial Risk Factors and Executive Function Ability Adjusted for Parent and Child Intellectual Quotient (*n*=154).  |
| ***Models with parental depression symptoms*** | ***Models with parental anxiety symptoms*** |  |
|  | **Estimate *(SE)***  | ***p*** |  | **Estimate *(SE)*** | ***p*** |
| Birth group  | 0.27 (0.18) | .13 | Birth group  | 0.26 (0.17) | .13 |
| Parental depression symptoms | -0.24 (0.11) | .03 | Parental anxiety symptoms | -0.22 (0.07) | .003 |
| Socioeconomic Adversity Composite a | -0.25 (0.11) | .03 | Socioeconomic Adversity Composite a | -0.27 (0.11) | .01 |
| Child FSIQ score | 0.47 (0.11) | <.001 | Child FSIQ score | 0.46 (0.10) | <.001 |
| Parent FSIQ score | 0.04 (0.12) | .73 | Parent FSIQ score | 0.06 (0.11) | .59 |
| *Note.* Standardized estimates from linear mixed-effect models shown. Family membership included in all models to account for sibling correlation. *SE*, Standard Error. FSIQ, Full Scale Intellectual Quotient. Birth Group coded FT=0, VPT=1. For linear mixed-effect models conducted in SPSS, the highest value of a categorical factor is used as the reference group. a Socioeconomic Adversity Composite Score based upon summation of maternal demographic stressor index, Income-to-Needs Ratio (reversed scored), and Area Deprivation Index percentile *z*-scores. |