PSICOLOGIA

Revista da Associação Portuguesa de Psicologia
ISSN 2183-2471

Revista PSICOLOGIA, Vol. 36 (2), 2022, 66-73. doi: 10.17575/psicologia.1754

Controlling parenting and executive functioning in children born preterm

Carolina Toscano [1], Cindy Sá [1], Joana Baptista [2], Vanessa Moutinho [1] & Isabel Soares [1]

[1] *Psychology Research Center (CIPsi), School of Psychology, University of Minho*
[2] *Instituto Universitário de Lisboa (ISCTE-IUL), Centro de Investigação e de Intervenção Social (CIS-IUL)*

Abstract: This study investigated the relations between mothers' and fathers' controlling behaviors and the executive functioning of children born preterm. Sixty-eight preterm children and their parents were assessed when the children were 3 ½ years old. The executive functioning was measured using the Head-to-Toes-Task and controlling parenting behaviors were measured through a standardized observation of a parent-child interaction. Hierarchical regression analysis showed that both mothers' and fathers' controlling behaviors were associated with worse child executive functioning performance, after controlling for the child's cognitive ability. Findings suggest that both mothers and fathers play an important role in the development of executive functioning of children born prematurely, highlighting the need to consider both parents in the study of and intervention with these children.

Keywords: *Executive functioning; controlling parenting; father; prematurity.*

Controlling parenting and executive functioning in children born preterm

Executive functioning (EF) is frequently compromised in children born prematurely (Aarnoudse-Moens et al., 2009; Arpi et al., 2019). Controlling parenting might be one factor accounting for EF problems in children born preterm, because mothers of preterm-born children tend to display greater controlling parenting (Toscano et al., 2020), and studies with normative samples have shown that maternal controlling behaviors are associated with poorer children's EF (Fay-Stammbach et al., 2014). However, little is known about the potential role of controlling parenting in the development of preterm children's EF, and the few studies available were limited to the mother-child relationship. The present study adopts a more inclusive approach by analyzing the associations of both mothers' and fathers' controlling behaviors with the executive functioning of Portuguese preschoolers born preterm.

EF refers to a set of high-order cognitive processes that allow goal-directed behavior and regulate cognition and behavior, such as inhibitory control, working memory, and cognitive flexibility (Carlson et al., 2013). EF skills are crucial for the child's behavioral, emotional and social functioning, as well as for their academic success, enabling the child to ignore automatic, or impulsive thoughts and responses (Griffin et al., 2016). The development of EF has a neurobiological basis, depending heavily on the brain maturation of the frontal and prefrontal cortices (Anderson, 2001). However, a growing body of research with normative samples has shown that the quality of parenting behaviors also plays an important role in endorsing the emergence of EF (Valcan et al., 2017). Substantial evidence has shown that parenting behaviors that support the child's autonomy are particularly important in facilitating the development of better EF (Matte-Gagné & Bernier, 2011; Valcan et al., 2017). In contrast, controlling parenting behaviors, which are behaviors providing the child with excessive external control, directing and forcing the child to meet demands, restricting and intruding on the child's ongoing activities, and thus undermining the child's development of autonomy (Toscano et al., 2020), have been associated with poorer children's EF skills (Fay-Stammbach et al., 2014; Valcan et al., 2017).

Preterm birth, defined by the World Health Organization as birth before 37 weeks of gestation (WHO, 2018), has been appointed by the literature as a risk factor for children's development with repercussions throughout life, including impairments in EF (Aarnoudse-Moens, et al., 2009; Arpi et al., 2019). Compared with children born full-term, preterm-born children tend to perform worse on executive functioning tasks (Aarnoudse-Moens, et al., 2009; Arpi et al., 2019; Brydges et al., 2018). Although these difficulties may be explained, in part, by the incomplete prenatal maturation of the brain related to

[1] Correspondence address: Carolina Toscano, School of Psychology, University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal. E-mail: carolinatoscano1@gmail.com.
Carolina Toscano and Cindy Sá contributed equally to this paper and share first authorship.

prematurity (Brydges et al., 2018), few studies have examined the potential role of parenting. Premature birth is a challenging event for parents and can have a significant impact on parents' psychological well-being and parenting behavior (Goldberg & DiVitto, 2002). A meta-analysis of 34 studies, carried out mostly with mothers, revealed that parents of children born preterm exhibit more controlling behaviors compared with parents of full-term children (Toscano et al., 2020), highlighting the importance of considering controlling parenting when trying to explain EF impairments in preterm-born children. In line with this, a limited number of studies found a negative relation between mothers' controlling behavior and EF skills in children born-preterm (Clark & Woodward, 2015).

To our knowledge, the few previous studies examining the role of controlling parenting in preterm children's EF have been limited to mothers, representing a major gap in the literature. In fact, even when examining other domains of preterm children's development, research has given less attention to the fathers' influence. Some authors have suggested that fathers may be particularly important in fostering children's autonomy, because their parental role may be more focused on stimulating exploration and risk-taking, while mothers' role is typically more focused on providing care and protection (Bögels & Phares, 2008). Therefore, fathers' behaviors may be particularly important for the development of EF skills, as suggested by some studies with full-term samples (Baptista et al., 2018; Meuwissen & Carlson, 2015). If we wish to better predict the development of EF in children born preterm, the consideration of fathers' behaviors is crucial. In general, data on fathers of preterm children is scarce, but recent studies have suggested that preterm birth may also negatively impact fathers' psychological well-being (Barkmann et al., 2018), and parenting behaviors in terms of control (Feldman, 2007).

Another gap in the literature on the EF of children born preterm is the almost exclusive focus on children born very preterm (VPT; < 32 weeks of gestation), although they only represent about 10% of the preterm population (Euro-Peristat Project, 2018), because this group is exposed to more neonatal adversity and carries higher neurobiological immaturity. However, studies have shown that children born moderately-to-late preterm (MLPT; 32-37 weeks of gestation) are also at higher risk of behavioral maladjustment and academic problems in comparison to full-term children (Chyi et al., 2008; Talge et al., 2010). Therefore, the current study proposes a more inclusive approach to the study of EF in relation to prematurity by covering both VPT and MLPT children.

Taking into account all the evidence and gaps in the literature, this study aimed to analyze the relations of both mothers' and fathers' controlling behaviors with the executive functioning of preterm-born children at preschool age, which is considered the period of greatest EF development (Carlson et al., 2013). Children's EF abilities are intrinsically related to their cognitive ability (Bayless & Stevenson, 2007), so children's IQ was controlled for.

METHOD

Participants

The sample of the current study included 68 preterm-born children at $3^{1/2}$ years old and their parents. Table 1 provides detailed demographics and medical information of the study sample.

The sample was drawn from a larger longitudinal study about the cognitive and socio-emotional development of children born preterm during the first $3^{1/2}$ years post-partum, which recruited 172 preterm children from two hospitals in northern Portugal. Children were born between 2013 and 2015. Exclusion criteria included congenital or current neurological problems, chromosomal disorders, and/or fetal drug/alcohol exposure. From the initial recruited sample, 110 families participated in the last assessment point (i.e., when children were $3^{1/2}$ years old). However, 40 out of these 110 children refused to complete the EF assessment task; and two families were not able to provide parenting behavior assessment, and thus were not included in the sample of the current study. There were no differences between participants included in the sample of the current study and those from the original sample who were not (i.e., those who either dropped out or refused EF/parenting assessment) regarding child gender, gestational age, birth weight, family income, parental education, and father's age. However, mothers included in our sample were older, $t(169) = -2.79$, $p = .006$. Furthermore, children included in our study sample had a higher IQ than those who refused to complete the EF assessment task, $t(105) = -4.10$, $p < .001$. Both parents were invited, but not required, to take part, with the possibility of just the mother or just the father participating. Therefore, data on controlling parenting behavior of both parents was not available for all participating children. For 45 out of the 68 children, both mother's and father's data was available. For 19 children, however, only the mother's data was available; and for 4 children, only the father's.

Table 1. Study Sample Demographics and Medical Information

Variable	Range or frequency (%)	*M*	*SD*
Child age (months)	40-46	42.60	1.12
Child gender (% male)	44 (64.7%)		
Child first born	48 (71.6%)		
Child twin	16 (23.5%)		
Child gestational age	27-36	32.68	2.93
< 28 weeks	2 (2.9%)		
28-31 weeks	26 (38.2%)		
32-36 weeks	40 (58.8%)		
Child birth weight	770-3190	1850.15	594.02
Extremely low (< 1000 grams)	5 (7.4%)		
Very low (< 1500 grams)	16 (23.5%)		
Low (< 2500 grams)	37 (54.4%)		
≥ 2500 grams	10 (14.7%)		
Days hospitalized in NICU	0-91	25.66	25.37
5-min APGAR score	6-10	9.04	0.98
Maternal age (years)	25-46	37.33	4.28
Paternal age (years)	25-50	38.47	5.15
Maternal education (years)	6-17	12.58	2.90
Paternal education (years)	5-17	11.55	3.37
Family monthly income (euros)	557-4000	1712.18	685.61
Parents married/common-law marriage	63 (95.5%)		

Procedure

The study was approved by the Portuguese National Commission for Data Protection and by the ethical commissions of the University of Minho and the participating hospitals. Written informed consent was obtained from all participating parents. Participation in the research assessments was voluntary and participants received no financial compensation.

Two assessment visits were conducted by a clinical psychologist, either at the hospital (n = 59), at the university laboratory (n = 3), or at the participants' home (n = 6), according to the family's availability. One visit was dedicated to the assessment of the mother's behavior and the other to the assessment of the father's, through a videotaped parent-child interaction divided into three episodes: (1) child plays with a developmentally challenging toy with parental guidance (5 minutes); (2) the dyad plays with developmentally appropriate toys (2.5 minutes), and (3) child tidies up the toys (2.5 minutes). To avoid order effects, the order in which mothers and fathers were assessed was counterbalanced between families. Child cognitive ability and EF were assessed during the first visit, except in a few cases in which the child refused a task and the experimenter left it for the second assessment visit. In 86% of the cases, the second visit was conducted within one month of the first.

Measures

Child Executive Functioning. Children's EF was assessed using the Head-to-Toes-Task (HTT; Ponitz et al., 2008). The HTT is a structured response conflict task in which the children are asked to play a game in which they must do the opposite of a command provided by the experimenter (head/toes). Therefore, if the experimenter commands the children to touch their head, they should touch their toes, and if the experimenter commands the children to touch their toes, they should touch their head. Children were first introduced with 4 practice items, followed by 10 trial items. Each trial was scored with 0 (*incorrect response*), 1 (*self-correct response*), or 2 (*correct response*), with a total score ranging from 0 to 20. The HTT task measures primarily children's capacity for inhibitory control (children must inhibit the dominant response of following the examiner command), and also working memory (children must remember the rules because instructions are not repeated on each trial), and attention shifting (children must focus and shift between the commands presented by the experimenter) (Ponitz et al., 2008). Higher scores indicate higher levels of executive function. The HTT has been shown to be a valid and reliable measure of EF in previous studies with preschool-aged children (Ponitz et al., 2008). In this study, the HTT showed a good internal consistency (α = .88).

Controlling Parenting Behavior. To examine mothers' and fathers' controlling parenting, the videotaped parent-child interaction was coded by a system developed by Johnson and Holmbeck (1995), which

includes 6 subscales covering several dimensions of controlling parenting: (a) Nonverbal prevention of exploratory behavior in the child, (b) Parental encouragement of child's expression of individual views or opinions, (c) Excessive physical contact with the child, (d) Parental behavior that infantilizes the child, (e) Active catering to the child, and (f) Excessive parental control. In this study, the second subscale was inverted and renamed 'Verbal prevention of child expression of individual views or opinions', so that higher scores on all the subscales would represent more controlling behavior. For each subscale, behaviors were coded on a 5-point Likert scale separately for each of the tasks (see Procedure), and the mean score across all three tasks was used for analysis. Because of very low frequencies of occurrence, the subscales 'Excessive physical contact with child' and 'Active catering to the child' were dropped from further analysis. When entered in a principal component analysis (PCA), the remaining four subscales loaded on the first unrotated component (loadings between .42 and .93 for mothers, and between .45 and .92 for fathers) and, therefore, were summed up to create a global measure of controlling parenting (α = .77 for mothers and .84 for fathers).

The coding system was translated into Portuguese and two experienced coders of parenting behavior trained a team of three coders. Intercoder reliability was assessed based on 36% of the mother cases and 20% of the father cases. Intraclass correlations (ICCs) across the four subscales ranged from .90 to .91 (mean ICC = .91) for mothers, and from .96 to .99 (mean ICC = .97) for fathers, indicating high interrater agreement. This measure has been used by previous studies as a measure of controlling parenting behaviors with clinical and normative samples (e.g., Turminello et al., 2012; Zukerman et al., 2010).

Child Cognitive Ability. Children's cognitive ability was assessed using the Information and Block Design subtests of the Wechsler Preschool and Primary Scales of Intelligence (WPPSI; Wechsler, 2003), providing an estimated child IQ score as recommended by Sattler (1992).

Analysis Plan

Data was analyzed with SPSS version 27.0. Preliminary analyses were performed to examine descriptive and bivariate correlations between the study variables, and to investigate demographic covariates of children's EF. Furthermore, potential differences in EF between VPT and MLPT children were examined using student's *t* tests.

Hierarchical regression analyses were then computed to examine the association of mothers' and fathers' controlling parenting with child EF, after accounting for child cognitive ability. Facing sample size constraints due to different numbers of participating fathers and mothers, two separate regression models were tested: one examining mothers' behavior, and the other fathers'.

Facing the inclusion of 8 twin pairs in the study sample (see Table 1), all analyses were re-run after randomly selecting one twin from each pair and there were no significant changes in the results. Therefore, and considering that preterm birth is more common in multiple pregnancies, in order to maintain the representativeness of prematurity, results using both twins are reported.

RESULTS

Preliminary Analyses

Descriptive statistics and bivariate correlations for the study variables are presented in Table 2. As shown in the Table, children's EF performance was positively related to their cognitive ability, and negatively related to both mothers' and fathers' controlling parenting behaviors. Examination of potential demographic covariates revealed that child EF was positively related to mother's years of education, r = .29, p = .02, and father's years of education, r = .27, p = .03. There were no child gender effects on EF performance, $t(66) = 0.51$, p = .62. Child EF was not significantly related to gestational age, r = -.03, p = .79, or birth weight, r = .14, p = .26. Furthermore, there were no significant differences between children born VPT and children born MLPT regarding EF, $t(66) = 0.68$, p = .05.

Table 2. Descriptive and Bivariate Correlations for Study Variables

	M	*SD*	Min-Max	1	2	3	4
Child executive functioning [a]	6.74	6.32	0-20	-			
Child cognitive ability [a]	109.66	13.97	76-147	.34**	-		
Maternal controlling parenting [b]	7.62	2.28	4.33-14.00	-.35**	-.36**	-	
Paternal controlling parenting [c]	7.59	2.83	4.00-15.33	-.34*	-.20	.49**	-

Note. Pearson correlation coefficients (two-tailed). [a] n = 68. [b] n = 64. [c] n = 49.
+ p < .10. *p < .05. **p < .01. ***p < .001.

Table 3 presents the results of the two hierarchical regression models predicting child EF from controlling parenting, after controlling for child cognitive ability. The first presented model examines the predictive role of father's controlling parenting, and the second examines the predictive role of mother's. Visual inspection of scatterplots and normal P-P plots indicate the fulfillment of assumptions of linearity, normality, and homoscedasticity. VIF values indicate no multicollinearity concerns and examination of standardized residuals, and Mahalanobis and Cook's Distances revealed no outliers.

Table 3. Hierarchical Regression Models Predicting Child Executive Functioning From Controlling Parenting, Controlling for Child Cognitive Ability

	R^2	B	SE B	β
Model with fathers (n = 49)				
Step 1	.09			
Child cognitive ability		0.14	0.06	.30*
Step 2	.17			
Child cognitive ability		0.11	0.06	.25+
Paternal controlling parenting		-0.66	0.31	-.29*
Model with mothers (n = 64)				
Step 1	.10			
Child cognitive ability		0.15	0.06	.31*
Step 2	.16			
Child cognitive ability		0.10	0.06	.21+
Maternal controlling parenting		-0.74	0.35	-.27*

+ $p < .10$. *$p < .05$.

As shown in Table 3, for the model with fathers, in the first stepchild cognitive ability was significantly associated with child EF, $p = .03$, accounting for 9% of its variance. After controlling for child cognitive ability, fathers' controlling parenting was significantly associated with child EF, $p = .04$, accounting for an additional 8% of the variance in child EF, and the association between child cognitive ability and EF became marginal, $p = .08$. Similarly, for the model with mothers, in the first stepchild cognitive ability was significantly associated with child EF, $p = .01$, and accounted for 10% of its variance. After controlling for child cognitive ability, mothers' controlling parenting was significantly associated with child EF, $p = .04$, accounting for an additional 6% of its variance, and child cognitive ability became a marginal predictor, $p = .09$.

Given the significant correlation between child EF and parents' years of education identified in the preliminary analyses, hierarchical regression models were re-run in order to examine the association of mothers' and fathers' controlling parenting with child EF, after accounting for parents' education. For the model with fathers, after controlling for father's years of education, controlling parenting was marginally associated with child EF, $\beta = -.28$, $p = .05$. For the model with mothers, after controlling for mother's years of education, controlling parenting was significantly associated with child EF, $\beta = -.30$, $p = .02$.

DISCUSSION

The current study investigated the relations between mothers' and fathers' controlling behaviors and the EF of Portuguese preschoolers born preterm. Results showed that more controlling behaviors of both mothers and fathers were associated with worse EF performance of preterm-born children, even after controlling for children's cognitive ability. Furthermore, parents' level of education was also significantly related to children's EF performance. Several studies have shown that children born preterm are at risk of EF impairments due to their neurobiological vulnerability (Aarnoudse-Moens, et al., 2009; Arpi et al., 2019; Brydges et al., 2018). Our results bring evidence to the additional important role of environmental factors in the EF development of this population, suggesting that parental socialization – in particular, controlling parenting behavior - may also play a role in such impairments. This highlights the importance of providing psychosocial support to parents of children born preterm in order to help them develop adaptive parenting strategies and benefit the children's (already at risk) EF development.

Despite the already documented relation between mothers' controlling behaviors and EF skills in children born preterm (Clark & Woodward, 2015), to our knowledge, this is the first study assessing the association between fathers' control and EF skills in preterm-born children, revealing the important role of fathers in these children's development. Our results are in line with studies with normative samples, in which the implication of fathers' behaviors on EF development has already been analyzed. Meuwessin and Carlson (2015), for example, found that fathers' controlling behaviors have a negative influence on preschoolers' EF development. According to these authors, controlling behaviors, such as criticism and

interference, take away the power of children to control their environment, activities, and behavior. Therefore, this may be reflected in fewer self-regulation abilities in children at preschool age, which includes EF skills (Karreman et al., 2006). The significant association between fathers' behaviors and children's EF highlights the importance for health professionals to include and engage fathers in the monitoring, support, and intervention provided to children born preterm during their first years of life. Furthermore, results also reinforce the importance of including fathers in the study of parenting and child outcomes of prematurity.

One strength of this study was the inclusion of a large gestational-age range given that, to date, most studies examining EF in children born preterm were exclusive to children born VPT, and little attention has been given to children born MLPT (e.g., Aarnoudse-Moens, 2009). Our results showed no differences in the EF between children born VPT and children born MLPT, highlighting the importance of monitoring both groups, providing also attention to MLPT children when studying the outcomes of prematurity. Although these children might be exposed to less neurobiological risk, they are, nevertheless, at risk for less optimal developmental outcomes, as suggested by previous studies (Chyi et al., 2008; Talge et al., 2010).

Other strengths of the study included the observational nature of the assessment, the inclusion of both mothers and fathers, and the unique nature of the Portuguese sample. Limitations should also be discussed, however. Firstly, a significant number of children rejected EF assessment, and these were children with lower cognitive abilities, representing a major limitation for the generalization of the results. Secondly, the attrition rates of the longitudinal sample from which participants were drawn were high and selective on maternal age. Thirdly, there were a different number of participating mothers and fathers, thus the inclusion of both parents in the same regression model was not possible. Fourthly, participants were assessed in different settings (i.e., hospital, university laboratory, or participant's home), which could have had different effects on behavior (Gardner, 2000). Finally, the cross-sectional nature of the data did not allow the examination of causality and direction of the relations between executive functioning and controlling parenting behaviors. Future research would benefit from the longitudinal analysis of these relations, and should examine the associations between controlling parenting and preterm-born children's EF in other age groups. Furthermore, it would be relevant to explore the impact of other domains of fathers' parenting on preterm-born children's EF development, given that the father's role in the development of these children remains under-investigated.

In conclusion, this study suggests that, besides the well-known effect of mothers' behavior on preterm children's EF development, which is crucial for the child's socio-emotional and behavioral development (Griffin et al., 2016), fathers' parenting behavior also plays an important role in the EF outcomes of these children. Findings highlight the importance for healthcare professionals to support and guide both mothers and fathers of preterm infants in developing adaptive parenting strategies, in order to prevent their engagement in excessive controlling behavioral patterns and associated EF problems in the child. Mother- and father-child relationships and, in particular, parents' ability to support children's autonomy, should be considered as important targets for interventions aimed at improving preterm-born children's EF, and, consequently, their behavioral, emotional, social, and academic functioning.

REFERENCES

Aarnoudse-Moens, C. S. H., Weisglas-Kuperus, N., van Goudoever, J. B., & Oosterlaan, J. (2009). Meta-analysis of neurobehavioural outcomes in very preterm and/or very low birth weight children. *Pediatrics 124*(2), 717–728. https://doi.org/10.1542/peds.2008-2816

Anderson, V. (2001). Assessing executive functions in children: Biological, psychological, and developmental considerations. *Pediatric* R*ehabilitation*, *4*(3), 119-136. https://doi.org/10.1080/13638490110091347

Arpi, E., D'Amico, R., Lucaccioni, L., Bedetti, L., Berardi, A., & Ferrari, F. (2019). Worse global intellectual and worse neuropsychological functioning in preterm-born children at preschool age: A meta-analysis. *Acta Paediatrica*, *108*(9), 1567-1579. https://doi.org/10.1111/apa.14836

Baptista, J., Sousa, D., Soares, I., & Martins, C. (2018). Fathers' sensitive guidance moderates the association between coparenting and behavioral regulation in preschoolers. *International Journal of Behavioral Development*, *42*(6), 574-580. https://doi.org/10.1177/0165025418761816

Barkmann, C., Helle, N., & Bindt, C. (2018). Is very low infant birth weight a predictor for a five-year course of depression in parents? A latent growth curve model. *Journal of Affective Disorders, 229*(5), 415-420. https://doi.org/10.1016/j.jad.2017.12.020

Bayless, S., & Stevenson, J. (2007). Executive functions in school-age children born very prematurely. *Early Human Development*, *83*(4), 247-254. https://doi.org/10.1016/j.earlhumdev.2006.05.021

Bögels, S. M., & Phares, V. (2008). Fathers' role in the etiology, prevention and treatment of child anxiety: A review and new model. *Clinical Psychology Review, 28*(4), 539–558. https://doi.org/10.1016/j.cpr.2007.07.011

Brydges, C. R., Landes, J. K., Reid, C. L., Campbell, C., French, N., & Anderson, M. (2018). Cognitive outcomes in children and adolescents born very preterm: A meta-analysis. *Developmental Medicine & Child Neurology*, *60*(5), 452-468. https://doi.org/10.1111/dmcn.13685

Carlson, S. M., Zelazo, P. D., & Faja, S. (2013). Executive function. In P. D. Zelazo (Ed.), *Oxford library of psychology. The Oxford handbook of developmental psychology (Vol. 1): Body and mind* (p. 706–743). Oxford University Press.

Chyi, L. J., Lee, H. C., Hintz, S. R., Gould, J. B., & Sutcliffe, T. L. (2008). School outcomes of late preterm infants: Special needs and challenges for infants born at 32 to 36 weeks gestation. *The Journal of Pediatrics*, *153*(1), 25-31. https://doi.org/10.1016/j.jpeds.2008.01.027

Clark, C. A. C., & Woodward, L. J. (2015). Relation of perinatal risk and early parenting to executive control at the transition to school. *Developmental Science, 18*(4), 525-542. https://doi.org/10.1111/desc.12232

Euro-Peristat Project. (2018). *European perinatal health report.* https://www.europeristat.com/index.php/reports/european-perinatal-health-report-2015.html

Fay-Stammbach, T., Hawes, D. J., & Meredith, P. (2014). Parenting influences on executive function in early childhood: A review. *Child Development Perspectives, 8*(4), 258-264. https://doi.org/10.1111/cdep.12095

Feldman, R. (2007). Maternal versus child risk and the development of parent – child and family relationships in five high-risk populations. *Development and Psychopathology*, *19*, 293–312. https://doi.org/10.1017/S0954579407070150

Gardner, F. (2000). Methodological issues in the direct observation of parent–child interaction: Do observational findings reflect the natural behavior of participants? *Clinical Child and Family Psychology Review, 2*(3), 185-198. https://doi.org/10.1023/a:1009503409699

Goldberg, S., & DiVitto, B. (2002). Parenting children born preterm. In M. H. Bornstein (Ed.), *Handbook of Parenting* (pp. 329-354). Erlbaum.

Griffin, J. A., Freund, L. S., McCardle, P., DelCarmen-Wiggins, R., & Haydon, A. (2016). Introduction to executive function in preschool-age children. In J. A. Griffin, P. McCardle, & L. S. Freund (Eds.), *Executive Function in Preschool-age Children: Integrating Measurement, Neurodevelopment, and Translational Research* (pp. 3–7). American Psychological Association.

Johnson, S. Z., & Holmbeck, G. N. (1995). *Manual for OP coding system* [Unpublished manuscript]. Loyola University of Chicago.

Karreman, A., Van Tuijl, C., van Aken, M. A., & Deković, M. (2006). Parenting and self-regulation in preschoolers: A meta-analysis. *Infant and Child Development: An International Journal of Research and Practice*, *15*(6), 561-579. https://doi.org/10.1002/icd.478

Matte-Gagné, C., & Bernier, A. (2011). Prospective relations between maternal autonomy support and child executive functioning: Investigating the mediating role of child language ability. *Journal of Experimental Child Psychology*, *110*(4), 611-625. https://doi.org/10.1016/j.jecp.2011.06.006

Meuwissen, A. S., & Carlson, S. M. (2015). Fathers matter: The role of father parenting in preschoolers' executive function development. *Journal of Experimental Child Psychology, 140*, 1-15. https://doi.org/10.1016/j.jecp.2015.06.010

Ponitz, C. E. C., McClelland, M. M., Jewkes, A. M., Connor, C. M., Farris, C. L., & Morrison, F. J. (2008). Touch your toes! Developing a direct measure of behavioral regulation in early childhood. *Early Childhood Research Quarterly, 23*, 141-158. https://doi.org/10.1016/j.ecresq.2007.01.004

Sattler, J. M. (1992). *Assessment of children: Revised and updated third edition.* Jerome M. Sattler Publisher, Inc.

Talge, N. M., Holzman, C., Wang, J., Lucia, V., Gardiner, J., & Breslau, N. (2010). Late-preterm birth and its association with cognitive and socioemotional outcomes at 6 years of age. *Pediatrics, 126*(6), 1124-1131. https://doi.org/10.1542/peds.2010-1536

Toscano, C., Soares, I., & Mesman, J. (2020). Controlling parenting behaviors in parents of children born preterm: A meta-analysis. *Journal of Developmental and Behavioral Pediatrics, 41*(3), 230-241. https://doi.org/10.1097/DBP.0000000000000762

Turminello, E. R., Holmbeck, G. N., & Olson, R. (2012). Executive functions in adolescents with spina bifida: Relations with autonomy development and parental intrusiveness. *Child Neuropsychology, 18*(2), 105-124. https://doi.org/10.1080/09297049.2011.590470

Valcan, D. S., Davis, H., & Pino-Pasternak, D. (2017). Parental behaviours predicting early childhood executive functions: A meta-analysis. *Educational Psychology Review, 30*, 607–649. https://doi.org/10.1007/s10648-017-9411-9

Wechsler, D. (2003). *Escala de inteligência de Wechsler para a idade pré-escolar e primária: Edição revista.* CEGOC.

World Health Organization (2018). *Preterm birth.* https://www.who.int/news-room/fact-sheets/detail/preterm-birth

Zukerman, J. M., Devine, K. A., & Holmbeck, G. N. (2010). Adolescent predictors of emerging adulthood milestones in youth with spina bifida. *Journal of Pediatric Psychology, 36*(3), 1-12. https://doi.org/10.1093/jpepsy/jsq075

CRediT AUTHORSHIP CONTRIBUTION STATEMENT

Carolina Toscano: Conceptualization; Methodology; Software; Formal analysis; Investigation; Data curation; Writing – original draft; Visualization; Funding acquisition; **Cindy Sá:** Conceptualization; Investigation; Data curation; Writing – original draft; Visualization; **Joana Baptista:** Conceptualization; Methodology; Resources; Supervision; Data curation; Project administration; Writing – review & editing; **Vanessa Moutinho:** Methodology; Investigation; Data curation; **Isabel Soares:** Conceptualization; Methodology; Resources; Supervision; Project administration.

ACKNOWLEDGMENTS

This study was supported by the Portuguese Foundation for Science and Technology (SFRH/BD/118495/2016).

Historial do artigo

Recebido	01/03/2021
Aceite	01/10/2021
Publicado online	-
Publicado	19/12/2022