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Research article

## Preschoolers' Executive Function Development and Maternal Birth Experience: The Moderating Role of Depression and the Mode of Delivery

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**Abstract.** Early executive functioning is a crucial precursor to the future cognitive and behavioral development of children. Given that the mother is typically the child's primary caregiver, her maternal behavior may be an important factor that either facilitates or hinders the child's cognitive development, especially if the mother suffers from depression. It is important to analyze these effects, taking into consideration the mother's birth experience. This study focuses on assessing the child's executive functions, the mother's concomitant depression and her birth experience, including the mode of delivery. The results obtained have shown no significant relationship between the executive function performance and the mother's concomitant depression. However, significant relationships have been found between the child's executive function performance and complications during the mother's pregnancy, birth and mode of delivery. The regression analysis shows that cesarean birth reduces the child's overall executive function performance by 1 point, while the data of the moderation analysis including the mode of delivery and mother's depression are not statistically significant. The total executive performance score is largely related to the mother's educational level. The mother's perinatal depression may have a stronger adverse effect on the child's development than her concomitant depression. A higher level of the mother's education may be a protective factor that could potentially offset the cesarean birth effect.

**Key words:** executive functions, parental depression, birth experience, child development, cognitive development, mode of delivery

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## Introduction

The quality of relationships with their caregivers is crucial for healthy secure attachment and cognitive development in children. Parental mental illness, such as depression, can have a detrimental effect on the parenting experience, the quality of caregiver-child interactions, and child health and development (Cook et al., 2018; Goodman et al., 2011; Van Ee et al., 2016). It is more difficult to remain sensitive and responsive to the child's cues when a caregiver is experiencing psychological distress or a mental illness (Erickson et al., 2019; Ku, Feng, 2021). In this paper, we focus on the effects of the mother's depression, birth experience and the mode of delivery on the preschoolers' cognitive development, in particular on executive functions.

Executive functions (EFs) are a set of higher cognitive processes that enable goal behavior such as problem solving, reasoning or planning in a novel context (Best et al., 2009; Nolvi et al., 2018; Snyder et al., 2015; Welsh et al., 2006). The three components of the EFs are inhibitory control, set-shifting, and working memory updating (Best et al., 2009; Miyake et al., 2000; Miyake, Friedman, 2012). The EFs develop rapidly in the first five years of life (Garon et al., 2008). Preschool age is a sensitive period in the development of the EFs, and already from this age they can be reliably assessed (Veraksa et al., 2020). Since the emergence of higher-order skills depends on the development of simpler abilities, suboptimal development of basic EFs in toddlerhood and preschool years negatively affects the development of more complex EF skills (De Cock et al., 2017).

Early executive functioning is a crucial precursor to the future cognitive and behavioral development of children. Greater gains in the EF skills between ages 4 and 6 have been associated with higher levels of socio-emotional competence and lower levels of emotional disturbances (e.g., hyperactivity) at age 6 (Hughes, Ensor, 2011). The EF skills in preschool age are predictive of academic success (such as reading and mathematical abilities) (Bierman et al., 2009; Blair, Razza, 2007; Blankson et al., 2012; Clark et al., 2010; Gagne, 2017; Utendale et al., 2011; Veraksa et al., 2020, 2022; Zelazo et al., 2003; Tikhomirova et al., 2021). Poor preschool executive functioning has been associated with higher rates of specific learning disorders (Operto et al., 2021), preschool problem behavior (Monette et al., 2015), externalizing and internalizing disorders (De Cock et al., 2017; Hughes, Ensor, 2011; Roman et al., 2016; Sulik et al., 2015), school dropout (Bierman et al., 2008), and poorer academic performance (Bull et al., 2008).

Strong predictors of the development of high EFs in children are parental education and socio-economic status (Conway et al., 2018; Waters et al., 2021). However, given that mothers are usually the primary caregivers of their children, maternal behavior and mental health may be an important factor that either facilitates or hinders children's cognitive development. According to the model proposed by Gergely and Unoka, there is a significant correlation between the development of higher emotional and cognitive functions (such as emotion regulation and executive functioning) and the relationship between children and their mothers (Gergely, Unoka, 2008), since the child's ability to mentalize is developed through synchronized, reciprocal and mindful interactions, which ultimately contributes to the maturation of higher cognitive and emotional functions (Priel et al.,

2020). The mother's ability to accurately comprehend and react to her child's cues facilitates the integration of these experiences into the child's emerging set of self-regulatory skills that serve as the basis for higher-order cognitive control abilities in early childhood, such as the executive functions (Gueron-Sela et al., 2018; Posner, Rothbart, 1998; Swingler et al., 2015).

There is accumulating evidence of a negative correlation between exposure to the mother's depressive symptoms, especially in early childhood, and the child's later executive functioning (Belleau et al., 2013; Goodman et al., 2011; Gueron-Sela et al., 2018; Hughes et al., 2013; Pearson et al., 2016). According to Snyder's meta-analysis, maternal major depressive disorder uniquely predicts impaired EF performance (Snyder, 2013). Early exposure to the mother's depression is related to the child's impaired EFs at age 6 (Hughes et al., 2013), and maternal depressive symptoms in infancy, regardless of later exposure, predict poor EFs at school entry (Wang, Dix, 2017).

Several studies have shown that the mother's depression during pregnancy, but not in the postpartum period, is associated with adverse impacts on the child's neurodevelopment (Bluett-Duncan et al., 2021; Huot et al., 2004; Power et al., 2021; Tran et al., 2013; Zhang et al., 2023) and poorer EFs related to organization, planning, working memory, emotional control, and inhibition of inappropriate impulses (Faleschini et al., 2019).

A longitudinal Iranian study showed that developmental disabilities in communication and gross motor skills in 4-year-old children were associated with the mother's concomitant and chronic depression rather than perinatal depression (Abdollahi et al., 2017). However, the effects of the mother's concomitant depression on the EF development are still understudied.

We consider it important to investigate the possible impact of the mother's depression on the EF development in the light of childbirth experience. The mode of delivery can be both related to the mother's traumatic experience and the child's cognitive development. In recent years, there has been a discussion about how the mode of delivery, especially cesarean birth (CB), can affect the neurobehavioral development of children. While CB can be a life-saving intervention, when medically indicated, it may also have various adverse short- and long-term effects on mothers and their babies (Sandall et al., 2018). Although the potential impact of the mode of delivery on the child's neurobehavioral development has been widely discussed in recent years, most research has focused on children with autism spectrum disorders (Curran et al., 2015, 2016), low birth weight infants (Chen et al., 2016; Minguez-Milio et al., 2011) or preterm births (Gluck et al., 2021). Studies exploring the emotional, behavioral and cognitive outcomes after CB vs. vaginal delivery have reported mixed results.

An Irish study, comparing behavioral, cognitive, and motor developmental outcomes of 43,927 vaginal births vs. 9,460 elective CBs, found that, at the age of 9 months, elective CB affected the scores for personal social skills, problem solving and gross motor function (Khalaf et al., 2015). Conversely, an Australian study (Robson et al., 2015) did not find any significant association between CB and neurodevelopmental outcomes in children. Khadem and Khadivzadeh in Iran compared the intelligence quotient (IQ) in vaginally-born children vs. cesarean-

born children and did not find any association between the type of delivery and child cognitive development (Khadem, Khadivzadeh, 2010). Smithers and colleagues found little differences in the school performance between cesarean-born children ( $n = 650$ ) vs. vaginally-born children ( $n = 2,959$ ) at age 8 to women with previous CB (Smithers et al., 2016). Curran and colleagues assessed the school performance in Swedish adolescents aged 14 to 21 ( $n = 1,489,925$ ), using data from the National School Register and Medical Birth Register and found only a slight association between the reduced school performance and CBs (Curran et al., 2017). In a recent systematic review, Blake and colleagues analyzed 17 studies that compared cognitive outcomes of children born by CB with those born by vaginal delivery: four studies found a significant association between elective and emergency CBs and reduced children cognitive performance, while the other three studies did not find any associations (Blake et al., 2021). The long-term impact of the mode of delivery on the child's cognitive developmental outcomes, especially the EFs, is an area that is still understudied.

To sum up all of the above, it is crucial to examine the EF development, taking into account the three potentially strong factors: (1) the mother's depression, (2) birth experience and (3) mode of delivery. The purpose of this study is to investigate the relationships between the mother's concomitant depression, birth experience and the child's EF development during preschool age. Finally, we intend to explore whether differences in the effects of the mother's depression and birth experience on the EF development are mediated by the mode of delivery.

## Materials and methods

**Procedure and participants.** The study included two stages: (1) a survey of parents to assess parental depression and collect information on childbirth experience and (2) observational diagnostics of the preschoolers' EF development. The data were collected during the period of April – June 2022 on the basis of 10 kindergartens in four Russian regions (Yakutia, Perm, Tatarstan, and Moscow). The study involved children from three kindergartens in Yakutia, two kindergartens in Tatarstan, three kindergartens in Moscow and two kindergartens in Perm. The results were based on responses from a sample of 251 dyads: the parents ( $M = 33.74$ ,  $SD = 5.08$ ) and the preschool children ( $M = 4.92$ ,  $SD = 0.44$ ). The participants received an invitation to take part in the study through the kindergarten's administration. The study included families in which the participating parents lived with their children and were their legal representatives, and could also speak and read Russian.

**Ethical considerations.** The design of the study was approved by the Ethical Committee of the Russian Psychological Society, Lomonosov Moscow State University, Protocol No. 2021/68. All the participants signed an informed consent using an online form before proceeding to complete the parental survey. The participants also signed an agreement for their children to participate in the study. The study was conducted in accordance with the Declaration of Helsinki. All the participants took part in the study voluntarily. The assessments were carried out using the Testograph online platform, and the confidentiality of the responses was guaranteed to the parents.

**Measures. Demographic questionnaire.** The participants self-reported their age at the time of testing, educational level (primary/secondary/higher), marital status (married/co-partner/single) and socioeconomic status (low/middle/high). We also collected data on the child's age, gender, chronic medical conditions (reported by the parents), and gestational age at birth.

**Beck Depression Inventory (BDI).** We used the Russian version of the Beck Depression Inventory to assess the levels of parental depression (Yakupova, 2018). The BDI is a 21-item, self-report questionnaire to assess depressive symptoms (Beck et al., 1961). Items are scored on a scale from 0 to 3, e.g., 0: "I do not feel irritated more often than usual," 1: "I feel irritated a little more often than usual," 2: "I often feel irritated" 3: "I feel irritated all the time". The depression score is obtained by summing the scores for 21 items. For the Russian version, Cronbach's  $\alpha = 0,866$ .

**Childbirth experience.** We collected information about the mode of delivery (vaginal birth, emergency CB, elective CB). We also collected data on medical complications during pregnancy and childbirth.

**Executive functions.** Executive functioning was assessed individually with each participant. The experimenter presented the tasks using cards, with the exception of *working memory task*, which was presented orally.

The Russian version of the NEPSY-II 'Repetition of sentences' subtest was used to measure auditory-speech *working memory* (Korkman M. et al., 2007; Veraksa et al., 2020). It consisted of 17 progressively complicated sentences, which the child was asked to repeat after the experimenter. The sentences were spoken slowly. For each exactly repeated sentence, the participant was awarded two points. For each category of errors (adding new words, skipping words, replacing a word), one point was deducted. The sum of all the points determined the final score for testing auditory-speech working memory (maximum 34 points).

The Russian version of the NEPSY-II 'Inhibition' subtest was aimed at assessing the speed of information processing and *inhibition* (cognitive inhibitory control) (Korkman M. et al., 2007; Veraksa et al., 2020). It consisted of two blocks: (1) a series of white and black shapes (circles and squares) and (2) a series of arrows with different directions (up and down). With each series of pictures, two tasks were performed: (1) a task for naming shapes (in this case, the participants simply were to name the figures that they saw at a fast pace) and (2) an inhibition task, in which the participants were to do the opposite: e.g., if a square was shown, they were supposed to say "circle" and so on. In each task, the experimenter recorded the number of errors made, the number of corrected errors that could not be corrected, and the amount of time spent on the task. Based on these data, as well as the exact age of the child in months, complex scores for naming and inhibition were calculated (maximum 19 points).

**Cognitive flexibility** was assessed by the Russian Version Dimensional Change Card Sort (DCCS) task (Zelazo, 2006; Veraksa et al., 2020). This system included three sets of cards sorting exercises. In the first task, the child was supposed to first sort the cards by color before moving on to the shapes. Then, using a complicated method, the child was supposed to sort the cards by color, if the card had a frame, and by shape, if it did not. The child was awarded one point for each successfully sorted card. Next, the number of points for each attempt was calculated

(maximum 6, 6 and 12 points, respectively). Finally, the total score for all the tasks was calculated (maximum 24 points).

*Covariates.* As covariates, the analysis included: (1) child's age at testing, (2) gestational age at birth, (3) mother's age at testing, (4) mother's educational level, (5) marital status, (6) socioeconomic status (SES), (7) region, and (8) parity.

*Statistical analysis.* A univariate analysis was used to examine the relationships between parental depression, executive functioning and mode of delivery, complications during pregnancy and delivery, and mother's educational level.

A multiple linear regression analysis investigated the relationship between parental depression and child cognitive development. It was further used to analyze the moderation and interaction between these variables and mode of delivery and mother's educational level.

The BDI scores were log-transformed for regression analyses to achieve normality. In the analysis of the mother's depression, Model 1 was adjusted for the child's age at testing and gestational age at birth; Model 2 was further adjusted for the parity, mother's age, educational level, family status, region, and SES. The regression analysis of mode of delivery and education also includes adjustment for parity, mother's age, educational level (by mode of delivery only), family status, region, and SES.

All the analyses were performed using SPSS 28 software (IBM).

## Results

The sample characteristics are presented in Table 1. All the parents participating in the study were mothers, 69.7% with middle income, 61.8% of the participants had higher education and 81.6% were married. The study involved girls (57.6%) and boys (42.4%); the average age of the children's sample was 4.92 years; 9.7% of children were born before 37 weeks of gestation.

There were no significant associations between mode of delivery and depression scores ( $F = .749, p = .474$  and  $F = 1.831, p = .163$  respectively).

Child's age at testing and gestational age at birth were not significantly correlated with overall EF scores (Pearson's correlation coefficient =  $-0.035, p = .602$ , Pearson's correlation coefficient =  $0.036, p = .598$ ). Both Models 1 and 2 did not reveal any significant association between EF scores and the mother's concomitant depression (Table 2).

However, there was a significant relationship between EF performance and complications during pregnancy and childbirth and mode of delivery (Table 3).

The regression analysis showed that CB reduced overall EF performance by one point ( $B = -1.053; CI: -1.964, -.141; p = 0.024$ ), while the moderation analysis data, including mode of delivery and the mother's depression ( $B = -.044; CI: -.115; .026; p = 0.218$ ), were not statistically significant.

The overall executive performance score was significantly associated with the mother's educational level ( $F = 4.547, p = .012$ ). The regression analysis showed this level added 1.8 points to the total EF performance ( $B = 1.806, CI: .032, 3.579; p = .046$ ), while the analysis of interaction with the mother's depression ( $B = .003; CI: -.098, .105; p = 0.946$ ) did not show any statistically significant relationships.

Table 1

<b>Sample characteristics</b>				
<b>Characteristics</b>	<b>N, total</b>	<b>Mean, N</b>	<b>SD, %</b>	<b>Range</b>
<b>Parental characteristics</b>				
Age (years)	227	33.74	5.08	22–48
Sex: female	251	251	100	
Education:	228			
– general secondary/vocational education		87	38.2	
– higher education		141	61.8	
Family status:	228			
– married		186	81.6	
– has a partner		16	7.0	
– single		26	11.4	
SES:	228			
– low		42	18.4	
– middle		159	69.7	
– high		27	11.8	
Region:				
– Moscow		41	16.3	
– Tatarstan		87	34.7	
– Yakutia		72	28.7	
– Perm		51	20.3	
Mode of birth:	251			
– vaginal		169	67.3	
– planned CB		43	17.2	
– emergency CB		39	15.5	
BDI (raw)	251	5.16	7.27	0–54
<b>Child characteristics</b>				
Age at testing (years)	251	4.92	0.44	3–7
Gender:	250			
– female		144	57.6	
– male		106	42.4	
Parity (number of children in the family):	228			
– 1		67	29.4	
– 2		79	34.6	
– 3+		82	36.0	
Inhibition	233	10.3	0.22	0–19
Working memory	240	16.3	0.34	0–34
Flexibility	243	18.9	0.14	0–24

Note: SES – socioeconomic status; CB – cesarean birth; BDI – Beck Depression Inventory.

Table 2

**Relationship between parental depression and child executive functioning development**

Predictor	Maternal depression					
	Model 1			Model 2		
Outcome	<i>B</i>	SE	95% CI	<i>B</i>	SE	95% CI
Card sorting test	.076	0.318	0.239; 0.811	-.115	.341	-.787; .557
Inhibition	-.207	0.484	-0.428; 0.669	-.376	.519	-1.401; .648
Sentence repetition	.967	0.750	-0.510; 2.44	.277	.808	-1.315; 1.869
Total score	.646	1.194	-1.708; 2.999	-0.246	1.279	-2.769; 2.277

Note: *B* – unstandardized the regression coefficient from the multiple regression model; *SE* – standard error; *95% CI* – the 95% confidence interval.

Table 3

**Relationship between parental birth experience and child executive functioning development**

Predictor	Complication during pregnancy and birth				Mode of delivery	
	Mother		Infant		<i>F</i>	<i>p</i>
Outcome	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>
Card sorting test	.455	.653	.319	.728	.285	.752
Inhibition	<b>4.903</b>	<b>.008</b>	.271	.763	2.158	.118
Sentence repetition	<b>3.393</b>	<b>.035</b>	.971	.380	<b>3.094</b>	<b>.047</b>
Total score	<b>4.116</b>	<b>.018</b>	.405	.668	2.952	.055

Note: *F* – the univariate analysis coefficient. The results are adjusted for child age at testing and gestational age at birth, parity, parents’ age. Statistically significant results are given in bold, *p* < 0.05.

**Discussion**

The purpose of this study was to investigate the relationship between the mother’s comorbid depression and the child’s EF development during preschool age. We also analyzed the role of mode of delivery in developing the EFs. There was a significant relationship found between EF performance and mother’s medical complications during pregnancy and childbirth. Based on these results we can assume that medical complications during pregnancy and birth might be a strong factor, influencing the child’s cognitive development.

In the current study, the mother’s depression did not reveal any significant relationship with the child’s EF development. Most research has focused on early exposure of the mother’s depression and its adverse effects on the child’s cognitive development (Belleau et al., 2013; Hughes et al., 2013; Pearson et al., 2016; Gueron-Sela et al., 2018;). There is evidence suggesting that the mother’s comorbid depression may be a stronger factor. For example, the study of 1,992 mother-child dyads showed the significance of the mother’s concomitant depressive symptoms for the child’s emotional development and communication skills (Hentges et al., 2020). However, our results do not support this assumption. We can speculate that the mother’s perinatal depression could have stronger adverse effects on the child’s development than her concomitant depression. Comparing effects of



the mother's perinatal and concomitant depressions could be the topic for further research.

It should be noted that there are studies showing that the mother's depression itself does not significantly correlate with the child's EF development, but the cumulative effect of chronic stress and depression does (Nordenswan et al., 2021). Collecting data on cumulative maternal stress could enrich our understanding of the impact of depression on the EF development.

There is another possible explanation for the presented results. Parental depression is highly stigmatized in Russian society (Beshanova, 2020), which may lead to data bias: the participants tended to give more socially desirable answers. The data were collected through the kindergartens and, despite guaranteed confidentiality, the parents could be worried about reporting depressive symptoms.

In the present study, we examined the differences in the impact of the mother's concomitant depression on the child's EF development depending on the mode of delivery. *Working memory* was largely related to the mode of delivery. The overall EF development showed borderline significance. The regression analysis showed that CB reduced the overall EF performance by 1 point. Research on the topic is controversial and the potential impact of mode of delivery on the child's cognitive development is still under debate. For example, a prospective cohort study ( $n = 1,328$ ) conducted by Zavez and colleagues in Seychelles found no difference in multiple measures of cognitive, language, and motor development before age 7 between vaginally- and CB-born children (Zavez et al., 2021). Conversely, in a cohort of 3,666 children, Polidano and colleagues found that the vaginally-born children outperformed the CB-born ones in a national test of mathematical knowledge between ages 8 and 9 (Polidano et al., 2017). Based on our findings, we can assume that there may be separate CB effects on various cognitive functions. Accounting for medical complications during childbirth can be important because emergency CB is performed in case of life-threatening, while elective CB can be performed without it.

Our results also show that the mother's educational level is an important variable, influencing the child's EF development. The regression analysis shows that the mother's educational level adds 1.8 points to the overall EF performance and is a stronger factor than the mode of delivery. These results are consistent with previous research, suggesting that parental education is an important factor in the child's EF development (Waters et al., 2021). A large cohort study by Conway and colleagues revealed a strong relationship between the child's EF development and parents' educational level and socioeconomic status (Conway et al., 2018). Our present results suggest that a higher level of the mother's education may be a protective factor that can potentially compensate for the CB effects.

## Conclusion

The obtained results did not reveal any significant relationship between the child's EF performance and the mother's concomitant depression. They support the hypothesis that the mother's perinatal depression may have stronger adverse effects on the child's development than her concomitant depression.

In the present study we examined the differences in the impact of the mother's concomitant depression on the child's EF development depending on the mode of delivery. Only differences in working memory were associated with the mode of delivery. A significant relationship was found between EF performance and complications during pregnancy and childbirth and mode of delivery. Based on the presented results, we can assume that medical complications during pregnancy and childbirth can be a strong factor affecting the child's cognitive development, which should be taken into account when analyzing the effects of the mode of delivery.

Our present results suggest that a higher level of the mother's education may be a protective factor that can potentially compensate for the CB effects.

**Strengths and limitations.** The strengths of our study include the study design, experimental data on the child's EF development, the use of validated questionnaires, and the control for important covariates, such as the mode of delivery and mother's education. We have investigated the child's EF development in the context of the mother's concomitant depression, which can potentially have strong adverse effects on the child's development.

However, several limitations should be noted. The data obtained in the study may be skewed by social desirability bias, because they were collected through kindergartens. Despite guaranteed confidentiality, the parents could be worried about reporting their depressive symptoms, as they are socially stigmatized.

The data were collected only in big cities, and extension to smaller towns may be a prospect for further research.

Our findings lack objective medical information about medical complications during pregnancy and childbirth, as well as mental health conditions, and are based solely on self-reports, which is a common limitation in perinatal studies, especially in countries where registry data are unavailable. The present study has a cohort design, and information on birth experience is collected retrospectively.

Data on parental depression in fathers could improve the outcomes and, therefore, further research is needed that includes measuring fathers' mental health.

## References

- Abdollahi, F., Rezai Abhari, F., & Zarghami, M. (2017). Post-partum depression effect on child health and development. *Acta Medica Iranica*, 55(2), 109–114.
- Beck, A.T., Ward, C.H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, 4(6), 561–571. <https://doi.org/10.1001/archpsyc.1961.01710120031004>
- Belleau, E.L., Phillips, M.L., Birmaher, B., Axelson, D.A., & Ladouceur, C.D. (2013). Aberrant executive attention in unaffected youth at familial risk for mood disorders. *Journal of Affective Disorders*, 147(1–3), 397–400. <https://doi.org/10.1016/j.jad.2012.08.020>
- Beshanova, E.V. (2020). *Mediaeffects in Russian internet: Case of depression and anxiety discourse* (Bachelor in Advertising and Public Relations Thesis). Moscow: HSE University. (In Russ.)
- Бешанова Е.В. Медиаэффекты в российском интернет-пространстве на примере дискурса депрессии и тревожных расстройств: выпускная работа бакалавра по направлению «Реклама и связи с общественностью». М.: Высшая школа экономики, 2020.

- Best, J.R., Miller, P.H., & Jones, L.L. (2009). Executive functions after age 5: Changes and correlates. *Developmental Review*, 29(3), 180–200. <https://doi.org/10.1016/j.dr.2009.05.002>
- Bierman, K.L., Nix, R.L., Greenberg, M.T., Blair, C., & Domitrovich, C.E. (2008). Executive functions and school readiness intervention: Impact, moderation, and mediation in the Head Start REDI program. *Development and Psychopathology*, 20(3), 821–843. <https://doi.org/10.1017/s0954579408000394>
- Bierman, K.L., Torres, M.M., Domitrovich, C.E., Welsh, J.A., & Gest, S.D. (2009). Behavioral and cognitive readiness for school: Cross-domain associations for children attending head start. *Social Development*, 18(2), 305–323. <https://doi.org/10.1111/j.1467-9507.2008.00490.x>
- Blair, C., & Razza, R.P. (2007). Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. *Child Development*, 78(2), 647–663. <https://doi.org/10.1111/j.1467-8624.2007.01019.x>
- Blake, J.A., Gardner, M., Najman, J., & Scott, J.G. (2021). The association of birth by caesarean section and cognitive outcomes in offspring: A systematic review. *Social Psychiatry and Psychiatric Epidemiology*, 56(4), 533–545. <https://doi.org/10.1007/s00127-020-02008-2>
- Blankson, A.N., O'Brien, M., Leerkes, E.M., Marcovitch, S., & Calkins, S.D. (2012). Differentiating processes of control and understanding in the early development of emotion and cognition. *Social Development*, 21(1), 1–20. <https://doi.org/10.1111/j.1467-9507.2011.00593.x>
- Bluett-Duncan, M., Kishore, M.T., Patil, D.M., Satyanarayana, V.A., & Sharp, H. (2021). A systematic review of the association between perinatal depression and cognitive development in infancy in low and middle-income countries. *PLOS ONE*, 16(6), e0253790. <https://doi.org/10.1371/journal.pone.0253790>
- Bull, R., Espy, K.A., & Wiebe, S.A. (2008). Short-term memory, working memory, and executive functioning in preschoolers: Longitudinal predictors of mathematical achievement at age 7 years. *Developmental Neuropsychology*, 33(3), 205–228. <https://doi.org/10.1080/87565640801982312>
- Chen, Y., Wu, L., Zhang, W., Zou, L., Li, G., & Fan, L. (2016). Delivery modes and pregnancy outcomes of low birth weight infants in China. *Journal of Perinatology*, 36(1), 41–46. <https://doi.org/10.1038/jp.2015.137>
- Clark, C.A.C., Pritchard, V.E., & Woodward, L.J. (2010). Preschool executive functioning abilities predict early mathematics achievement. *Developmental Psychology*, 46(5), 1176–1191. <https://doi.org/10.1037/a0019672>
- Conway, A., Waldfoegel, J., & Wang, Y. (2018). Parent education and income gradients in children's executive functions at kindergarten entry. *Children and Youth Services Review*, 91, 329–337. <https://doi.org/10.1016/j.chilyouth.2018.06.009>
- Cook, N., Ayers, S., & Horsch, A. (2018). Maternal posttraumatic stress disorder during the perinatal period and child outcomes: A systematic review. *Journal of Affective Disorders*, 225, 18–31. <https://doi.org/10.1016/j.jad.2017.07.045>
- Curran, E.A., Cryan, J.F., Kenny, L.C., Dinan, T.G., Kearney, P.M., & Khashan, A.S. (2016). Obstetrical mode of delivery and childhood behavior and psychological development in a British cohort. *Journal of Autism and Developmental Disorders*, 46(2), 603–614. <https://doi.org/10.1007/s10803-015-2616-1>
- Curran, E.A., Dalman, C., Kearney, P.M., Kenny, L.C., Cryan, J.F., Dinan, T.G., & Khashan, A.S. (2015). Association between obstetric mode of delivery and autism spectrum disorder: A population-based sibling design study. *JAMA Psychiatry*, 72(9), 935–942. <https://doi.org/10.1001/jamapsychiatry.2015.0846>
- Curran, E.A., Kenny, L.C., Dalman, C., Kearney, P.M., Cryan, J.F., Dinan, T.G., & Khashan, A.S. (2017). Birth by caesarean section and school performance in Swedish adolescents- a population-based study. *BMC Pregnancy and Childbirth*, 17(1), 121. <https://doi.org/10.1186/s12884-017-1304-x>

- De Cock, E.S.A., Henrichs, J., Klimstra, T.A., Janneke B.M. Maas, A., Vreeswijk, C.M.J.M., Meeus, W.H.J., & van Bakel, H.J.A. (2017). Longitudinal associations between parental bonding, parenting stress, and executive functioning in toddlerhood. *Journal of Child and Family Studies*, 26(6), 1723–1733. <https://doi.org/10.1007/s10826-017-0679-7>
- Erickson, N., Julian, M., & Muzik, M. (2019). Perinatal depression, PTSD, and trauma: Impact on mother – infant attachment and interventions to mitigate the transmission of risk. *International Review of Psychiatry*, 31(3), 245–263. <https://doi.org/10.1080/09540261.2018.1563529>
- Faleschini, S., Rifas-Shiman, S.L., Tiemeier, H., Oken, E., & Hivert, M.-F. (2019). Associations of prenatal and postnatal maternal depressive symptoms with offspring cognition and behavior in mid-childhood: A prospective cohort study. *International Journal of Environmental Research and Public Health*, 16(6), 1007. <https://doi.org/10.3390/ijerph16061007>
- Gagne, J.R. (2017). Self-control in childhood: A synthesis of perspectives and focus on early development. *Child Development Perspectives*, 11(2), 127–132. <https://doi.org/10.1111/cdep.12223>
- Garon, N., Bryson, S.E., & Smith, I.M. (2008). Executive function in preschoolers: A review using an integrative framework. *Psychological Bulletin*, 134(1), 31–60. <https://doi.org/10.1037/0033-2909.134.1.31>
- Gergely, G., & Unoka, Z. (2008). The development of the unreflective self. In F.N. Busch (Ed.), *Mentalization: Theoretical Considerations, Research Findings, and Clinical Implications* (pp. 57–102). New York: Routledge. <https://doi.org/10.4324/9780203927250>
- Gluck, O., Tairy, D., Bar, J., & Barda, G. (2021). The impact of mode of delivery on neonatal outcome in preterm births. *The Journal of Maternal-Fetal & Neonatal Medicine*, 34(8), 1183–1189. <https://doi.org/10.1080/14767058.2019.1627319>
- Goodman, S.H., Rouse, M.H., Connell, A.M., Broth, M.R., Hall, C.M., & Heyward, D. (2011). Maternal depression and child psychopathology: A meta-analytic review. *Clinical Child and Family Psychology Review*, 14(1), 1–27. <https://doi.org/10.1007/s10567-010-0080-1>
- Gueron-Sela, N., Camerota, M., Willoughby, M.T., Vernon-Feagans, L., Cox, M.J., & The Family Life Project Key Investigators (2018). Maternal depressive symptoms, mother-child interactions, and children’s executive function. *Developmental Psychology*, 54(1), 71–82. <https://doi.org/10.1037/dev0000389>
- Hentges, R.F., Graham, S.A., Fearon, P., Tough, S., & Madigan, S. (2020). The chronicity and timing of prenatal and antenatal maternal depression and anxiety on child outcomes at age 5. *Depression and Anxiety*, 37(6), 576–586. <https://doi.org/10.1002/da.23039>
- Hughes, C., & Ensor, R. (2011). Individual differences in growth in executive function across the transition to school predict externalizing and internalizing behaviors and self-perceived academic success at 6 years of age. *Journal of Experimental Child Psychology*, 108(3), 663–676. <https://doi.org/10.1016/j.jecp.2010.06.005>
- Hughes, C., Roman, G., Hart, M.J., & Ensor, R. (2013). Does maternal depression predict young children’s executive function? – A 4-year longitudinal study. *Journal of Child Psychology and Psychiatry*, 54(2), 169–177. <https://doi.org/10.1111/jcpp.12014>
- Huot, R.L., Brennan, P.A., Stowe, Z.N., Plotsky, P.M., & Walker, E.F. (2004). Negative affect in offspring of depressed mothers is predicted by infant cortisol levels at 6 months and maternal depression during pregnancy, but not postpartum. *Annals of the New York Academy of Sciences*, 1032(1), 234–236. <https://doi.org/10.1196/annals.1314.028>
- Khadem, N., & Khadivzadeh, T. (2010). The intelligence quotient of school aged children delivered by cesarean section and vaginal delivery. *Iranian Journal of Nursing and Midwifery Research*, 15(3), 135–140.
- Khalaf, S.Y.A., O’Neill, S.M., O’Keeffe, L.M., Henriksen, T.B., Kenny, L.C., Cryan, J.F., & Khashan, A.S. (2015). The impact of obstetric mode of delivery on childhood behavior. *Social Psychiatry and Psychiatric Epidemiology*, 50(10), 1557–1567. <https://doi.org/10.1007/s00127-015-1055-9>
- Korkman, M., Kirk, U., & Kemp, S. (2007). *NEPSY II: Administrative manual* (2nd ed.). San Antonio, TX: Harcourt Assessment, PsychCorp.

- Ku, S., & Feng, X. (2023). Maternal depressive symptoms and the growth of child executive function: Mediation by maternal sensitivity. *Journal of Family Psychology*, 37(4), 421–431. <https://doi.org/10.1037/fam0000832>
- Minguez-Milio, J.A., Alcázar, J.L., Aubá, M., Ruiz-Zambrana, Á., & Minguez, J. (2011). Perinatal outcome and long-term follow-up of extremely low birth weight infants depending on the mode of delivery. *The Journal of Maternal-Fetal & Neonatal Medicine*, 24(10), 1235–1238. <https://doi.org/10.3109/14767058.2011.552990>
- Miyake, A., & Friedman, N.P. (2012). The nature and organization of individual differences in executive functions: Four general conclusions. *Current Directions in Psychological Science*, 21(1), 8–14. <https://doi.org/10.1177/0963721411429458>
- Miyake, A., Friedman, N.P., Emerson, M.J., Witzki, A.H., Howerter, A., & Wager, T.D. (2000). The unity and diversity of executive functions and their contributions to complex “Frontal Lobe” tasks: A latent variable analysis. *Cognitive Psychology*, 41(1), 49–100. <https://doi.org/10.1006/cogp.1999.0734>
- Monette, S., Bigras, M., & Guay, M.-C. (2015). Executive functions in kindergarteners with high levels of disruptive behaviours. *British Journal of Developmental Psychology*, 33(4), 446–463. <https://doi.org/10.1111/bjdp.12105>
- Nolvi, S., Pesonen, H., Bridgett, D.J., Korja, R., Kataja, E.-L., Karlsson, H., & Karlsson, L. (2018). Infant sex moderates the effects of maternal pre- and postnatal stress on executive functioning at 8 months of age. *Infancy*, 23(2), 194–210. <https://doi.org/10.1111/infa.12206>
- Nordenswan, E., Deater-Deckard, K., Karrasch, M., Laine, M., Kataja, E.-L., Holmberg, E., Eskola, E., Hakanen, H., Karlsson, H., Karlsson, L., & Korja, R. (2021). Maternal executive functioning, emotional availability and psychological distress during toddlerhood: A FinnBrain birth cohort study. *Frontiers in Psychology*, 12, 735734. <https://doi.org/10.3389/fpsyg.2021.735734>
- Operto, F.F., Smirni, D., Scuoppo, C., Padovano, C., Vivenzio, V., Quatrosi, G., Carotenuto, M., Precenzano, F., & Pastorino, G.M.G. (2021). Neuropsychological profile, emotional/behavioral problems, and parental stress in children with neurodevelopmental disorders. *Brain Sciences*, 11(5), 584. <https://doi.org/10.3390/brainsci11050584>
- Pearson, R.M., Bornstein, M.H., Cordero, M., Scerif, G., Mahedy, L., Evans, J., Abioye, A., & Stein, A. (2016). Maternal perinatal mental health and offspring academic achievement at age 16: The mediating role of childhood executive function. *Journal of Child Psychology and Psychiatry*, 57(4), 491–501. <https://doi.org/10.1111/jcpp.12483>
- Polidano, C., Zhu, A., & Bornstein, J.C. (2017). The relation between cesarean birth and child cognitive development. *Scientific Reports*, 7(1), 11483. <https://doi.org/10.1038/s41598-017-10831-y>
- Posner, M.I., & Rothbart, M.K. (1998). Summary and commentary: Developing attentional skills. In J.E. Richards (Ed.), *Cognitive Neuroscience of Attention: A Developmental Perspective* (1st ed.) (pp. 317–323). New York: Psychology Press. <https://doi.org/10.4324/9781410603906>
- Power, J., van IJzendoorn, M., Lewis, A.J., Chen, W., & Galbally, M. (2021). Maternal perinatal depression and child executive function: A systematic review and meta-analysis. *Journal of Affective Disorders*, 291, 218–234. <https://doi.org/10.1016/j.jad.2021.05.003>
- Priel, A., Zeev-Wolf, M., Djalovski, A., & Feldman, R. (2020). Maternal depression impairs child emotion understanding and executive functions: The role of dysregulated maternal care across the first decade of life. *Emotion*, 20(6), 1042–1058. <https://doi.org/10.1037/emo0000614>
- Robson, S.J., Vally, H., Abdel-Latif, M.E., Yu, M., & Westrupp, E. (2015). Childhood health and developmental outcomes after cesarean birth in an Australian cohort. *Pediatrics*, 136(5), e1285–e1293. <https://doi.org/10.1542/peds.2015-1400>
- Roman, G.D., Ensor, R., & Hughes, C. (2016). Does executive function mediate the path from mothers’ depressive symptoms to young children’s problem behaviors? *Journal of Experimental Child Psychology*, 142, 158–170. <https://doi.org/10.1016/j.jecp.2015.09.022>

- Sandall, J., Tribe, R.M., Avery, L., Mola, G., Visser, G.H., Homer, C.S., Gibbons, D., Kelly, N.M., Kennedy, H.P., Kidanto, H., Taylor, P., & Temmerman, M. (2018). Short-term and long-term effects of caesarean section on the health of women and children. *The Lancet*, 392(10155), 1349–1357. [https://doi.org/10.1016/s0140-6736\(18\)31930-5](https://doi.org/10.1016/s0140-6736(18)31930-5)
- Smithers, L.G., Mol, B.W., Wilkinson, C., & Lynch, J.W. (2016). Implications of caesarean section for children's school achievement: A population-based study. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 56(4), 374–380. <https://doi.org/10.1111/ajo.12475>
- Snyder, H.R. (2013). Major depressive disorder is associated with broad impairments on neuropsychological measures of executive function: A meta-analysis and review. *Psychological Bulletin*, 139(1), 81–132. <https://doi.org/10.1037/a0028727>
- Snyder, H.R., Miyake, A., & Hankin, B.L. (2015). Advancing understanding of executive function impairments and psychopathology: Bridging the gap between clinical and cognitive approaches. *Frontiers in Psychology*, 6, 328. <https://doi.org/10.3389/fpsyg.2015.00328>
- Sulik, M.J., Blair, C., Mills-Koonce, R., Berry, D., Greenberg, M., & Family Life Project Investigators (2015). Early parenting and the development of externalizing behavior problems: Longitudinal mediation through children's executive function. *Child Development*, 86(5), 1588–1603. <https://doi.org/10.1111/cdev.12386>
- Swingler, M.M., Perry, N.B., & Calkins, S.D. (2015). Neural plasticity and the development of attention: Intrinsic and extrinsic influences. *Development and Psychopathology*, 27(2), 443–457. <https://doi.org/10.1017/s0954579415000085>
- Tikhomirova, T.N., Malykh, A.S., Lysenkova, I.A., & Malykh, S.B. (2021). Cross-cultural analysis of models of the relationship between the cognitive abilities and academic achievement in primary school education. *Psychology in Russia: State of the Art*, 14(4), 94–110. <https://doi.org/10.11621/pir.2021.0407>
- Tran, T.D., Biggs, B.-A., Tran, T., Simpson, J.A., Hanieh, S., Dwyer, T., & Fisher, J. (2013). Impact on infants' cognitive development of antenatal exposure to iron deficiency disorder and common mental disorders. *PLoS ONE*, 8(9), e74876. <https://doi.org/10.1371/journal.pone.0074876>
- Utendale, W.T., Hubert, M., Saint-Pierre, A.B., & Hastings, P.D. (2011). Neurocognitive development and externalizing problems: The role of inhibitory control deficits from 4 to 6 years. *Aggressive Behavior*, 37(5), 476–488. <https://doi.org/10.1002/ab.20403>
- Van Ee, E., Kleber, R.J., & Jongmans, M.J. (2016). Relational patterns between caregivers with PTSD and their nonexposed children. *Trauma, Violence, & Abuse*, 17(2), 186–203. <https://doi.org/10.1177/1524838015584355>
- Veraksa, A., Almazova, O., & Bukhalenkova, D. (2020). Studying executive functions in senior preschoolers. *PsyCh Journal*, 9(1), 144–146. <https://doi.org/10.1002/pchj.310>
- Veraksa, N.E., Almazova, O.V., & Tarasova, K.S. (2022). Dialectical and formal-logical thinking in senior preschoolers. *Russian Psychological Journal*, 19(2), 129–149. (In Russ.) <https://doi.org/10.21702/rpj.2022.2.10>
- Веракса Н.Е., Алмазова О.В., Тарасова К.С. Диалектическое и формально-логическое мышление старших дошкольников // Российский психологический журнал. 2022. Т. 19. № 2. С. 129–149. <https://doi.org/10.21702/rpj.2022.2.10>
- Wang, Y., & Dix, T. (2017). Mothers' depressive symptoms in infancy and children's adjustment in grade school: The role of children's sustained attention and executive function. *Developmental Psychology*, 53(9), 1666–1679. <https://doi.org/10.1037/dev0000373>
- Waters, N.E., Ahmed, S.F., Tang, S., Morrison, F.J., & Davis-Kean, P.E. (2021). Pathways from socioeconomic status to early academic achievement: The role of specific executive functions. *Early Childhood Research Quarterly*, 54, 321–331. <https://doi.org/10.1016/j.ecresq.2020.09.008>
- Welsh, M.C., Friedman, S.L., & Spieker, S.J. (2006). Executive functions in developing children: Current conceptualizations and questions for the future. In K. McCartney & D. Phillips (Eds.). *Blackwell Handbook of Early Childhood Development* (pp. 167–187). Oxford: Blackwell Publishing Ltd. <https://doi.org/10.1002/9780470757703.ch9>

- Yakupova, V.A. (2018). The impact of psychological and physiological conditions of motherhood on postnatal depression. *Russian Psychological Journal*, 15(1), 8–23. (In Russ.) <https://doi.org/10.21702/rpj.2018.1.1>
- Якупова В.А. Роль психологических и физиологических условий материнства в развитии послеродовой депрессии // Российский психологический журнал. 2018. Т. 15. № 1. С. 8–23. <https://doi.org/10.21702/rpj.2018.1.1>
- Zavez, A., Thurston, S.W., Rand, M.D., Mruzek, D.W., Love, T., Smith, T., Shamlaye, C.F., & van Wijngaarden, E. (2021). Delivery mode and child development at 20 months of age and 7 years of age in the Republic of Seychelles. *Maternal and Child Health Journal*, 25(12), 1930–1938. <https://doi.org/10.1007/s10995-021-03239-8>
- Zelazo, P.D. (2006). The Dimensional Change Card Sort (DCCS): A method of assessing executive function in children. *Nature Protocols*, 1(1), 297–301. <https://doi.org/10.1038/nprot.2006.46>
- Zelazo, P.D., Müller, U., Frye, D., Marcovitch, S., Argitis, G., Boseovski, J., Chiang, J. K., Hongwanishkul, D., Schuster, B.V., & Sutherland, A. (2003). The development of executive function in early childhood. *Monographs of the Society for Research in Child Development*, 68(3), vii–viii. <https://doi.org/10.1111/j.0037-976x.2003.00260.x>
- Zhang, T., Luo, Z.-C., Ji, Y., Chen, Y., Ma, R., Fan, P., Tang, N., Li, J., Tian, Y., Zhang, J., & Ouyang, F. (2023). The impact of maternal depression, anxiety, and stress on early neurodevelopment in boys and girls. *Journal of Affective Disorders*, 321, 74–82. <https://doi.org/10.1016/j.jad.2022.10.030>

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Исследовательская статья

## Развитие регуляторных функций ребенка и опыт родов матери: моделирующая роль депрессии и способа родов

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**Аннотация.** Развитие регуляторных функций в раннем возрасте является предиктором когнитивного и поведенческого развития ребенка. Учитывая, что мать, как правило, – главный заботящийся взрослый ребенка, материнское поведение может быть важным фактором, который либо способствует, либо препятствует его когнитивному развитию, особенно если мать страдает депрессией. Важно анализировать влияние состояния матери на развитие регуляторных функций ребенка, принимая во внимание опыт родов. Исследование посвящено оценке уровня развития регуляторных функций ребенка, текущей депрессии матери и ее опыта родов, включая способ родов. Полученные результаты показали отсутствие значимой связи между развитием регуляторных функций ребенка и сопутствующей материнской депрессией. Выявлены значимые связи между уровнем развития регуляторных функций ребенка, осложнениями во время беременности и родов и способом родов. Регрессионный анализ показывает, что кесарево сечение снижает общий балл по методикам оценки регуляторных функций на 1 балл, в то время как анализ модерации, включая способ рождения и родительскую депрессию, не является статистически значимым. Уровень развития регуляторных функций ребенка значимо связан с уровнем образования родителя. Материнская перинатальная депрессия может оказывать более сильное неблагоприятное воздействие на развитие ребенка, чем актуальная материнская депрессия. Более высокий уровень материнского образования может выступать защитным фактором, который потенциально способен компенсировать влияние кесарева сечения.

**Ключевые слова:** регуляторные функции, родительская депрессия, опыт родов, развитие ребенка, когнитивное развитие, способ родов

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