
MATERNAL DEPRESSION, BURNOUT, AND PRESCHOOLERS' EXECUTIVE FUNCTION DEVELOPMENT¹

DEPRESIÓN MATERNA, AGOTAMIENTO Y DESARROLLO DE LAS FUNCIONES EJECUTIVAS EN PREESCOLARES

DEPRESSÃO MATERNA, ESGOTAMENTO E DESENVOLVIMENTO DAS FUNÇÕES EXECUTIVAS EM PRÉ-ESCOLARES

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ABSTRACT

Background. While maternal depression has been associated with child cognitive development, evidence of the parental burnout (PB) impact remains scarce. The aim of this study was to investigate the association of maternal depression and PB with preschoolers' executive functions (EFs).

Methods. Of 301 parent-child dyads, mothers completed an online survey, including Beck Depression Inventory-II and Parental Burnout Inventory. EF of their children from Moscow, Sochi, Tatarstan, and Yakutia were evaluated using Inhibition, Sentence repetition, and Card sorting tests. Spearman correlation, univariate, and multiple linear regression analyses assessed the associations.

Results. We found no significant associations between maternal depression and preschoolers' EF (p-values for all >0.50), while higher PB symptoms were associated with child better performance in the Sentence repetition task, even after adjustment for depression (B=0.047, p=0.005). Of the covariates, maternal level of education correlated significantly with all the EF scores (p-values for all <0.03).

Conclusions. PB has a unique impact on the preschoolers' EF development. Positive correlation between higher PB symptoms and better working memory tasks performance might reflect the trend of intensive parenting in Russia.

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RESUMEN

Antecedentes. Aunque la depresión materna ha sido asociada con el desarrollo cognitivo infantil, la evidencia sobre el impacto del agotamiento parental (AP) sigue siendo escasa. El objetivo de este estudio fue investigar la asociación entre la depresión materna y el AP con las funciones ejecutivas (FE) de niños en edad preescolar.

Métodos. De 301 díadas madre-hijo, las madres completaron una encuesta en línea que incluyó el Inventario de Depresión de Beck-II y el Inventario de Agotamiento Parental. Las FE de sus hijos de Moscú, Sochi, Tartaristán y Yakutia fueron evaluadas mediante pruebas de Inhibición, Repetición de oraciones y Clasificación de cartas. Se evaluaron las asociaciones mediante correlación de Spearman, análisis univariado y regresión lineal múltiple.

Resultados. No se encontraron asociaciones significativas entre la depresión materna y las FE de los niños en edad preescolar (valores de $p > 0.50$ en todos los casos), mientras que síntomas elevados de AP se asociaron con un mejor desempeño de los niños en la tarea de Repetición de oraciones, incluso tras ajustar por depresión ($B=0.047$, $p=0.005$). Entre las covariables, el nivel educativo materno se correlacionó significativamente con todas las puntuaciones de FE (valores de $p < 0.03$ en todos los casos).

Conclusiones. El AP tiene un impacto único en el desarrollo de las FE de los niños en edad preescolar. La correlación positiva entre síntomas elevados de AP y un mejor desempeño en tareas de memoria de trabajo podría reflejar la tendencia hacia una crianza intensiva en Rusia.

RESUMO

Antecedentes. Embora a depressão materna tenha sido associada ao desenvolvimento cognitivo infantil, as evidências sobre o impacto do burnout parental (BP) ainda são escassas. O objetivo deste estudo foi investigar a associação entre a depressão materna e o BP com as funções executivas (FEs) de crianças em idade pré-escolar.

Métodos. Em 301 díades mãe-filho, as mães responderam a uma pesquisa online, incluindo o Inventário de Depressão de Beck-II e o Inventário de Burnout Parental. As FEs de seus filhos de Moscou, Sochi, Tartaristão e Yakútia foram avaliadas usando testes de Inibição, Repetição de Sentenças e Classificação de Cartas. As associações foram avaliadas por correlação de Spearman, análise univariada e regressão linear múltipla.

Resultados. Não foram encontradas associações significativas entre a depressão materna e as FEs das crianças em idade pré-escolar (valores de $p > 0,50$ em todos os casos), enquanto sintomas elevados de BP foram associados a um melhor desempenho infantil na tarefa de Repetição de Sentenças, mesmo após o ajuste para depressão ($B=0,047$, $p=0,005$). Entre as covariáveis, o nível de escolaridade materna correlacionou-se significativamente com todas as pontuações de FE (valores de $p < 0,03$ em todos os casos).

Conclusões. O BP tem um impacto único no desenvolvimento das FEs de crianças em idade pré-escolar. A correlação positiva entre sintomas elevados de BP e um melhor desempenho em tarefas de memória de trabalho pode refletir a tendência de uma parentalidade intensiva na Rússia.

While parenthood is an important part of life, it is highly demanding and parents may suffer from depression during any stage of their parenthood (Harris & Santos, 2020). According to various estimates, depression affects from 3% to 60% of mothers worldwide, however, this issue disproportionately impacts women and children in low-income countries (Goeglein & Yatchmink, 2020). A recent study of 4,866 mothers revealed that 25% of mothers experienced high levels of depressive symptoms three years after childbirth (Putnick et al., 2020).

The evidence accumulated to date shows that maternal depression at later stages of parenthood, rather than perinatal depression, may adversely affect the child's development (Hentges et al., 2020; Rogers et al., 2020; Suarez, Shraibman, & Yakupova, 2023). Furthermore, existing research shows a negative correlation between maternal depressive symptoms and the child's executive function (EF) development (Gueron-Sela, Camerota, Willoughby, Vernon-Feagans, & Cox, 2018; Snyder, 2013; Wang & Dix, 2017). EFs play the most important role in the organization of educational activities, regulation of emotions and cognitive activity in general (Chichinina & GavriloVA, 2022; Kovyazina et al., 2021). The development of EFs in early childhood is important for children's subsequent cognitive and behavioral development. Higher levels of EFs at ages 4–6 years are associated with higher levels of social-emotional competence and emotional regulation skills at age 6 (Hughes &

Ensor, 2011). The level of EF development in preschool age is also a predictor of academic performance (Bierman, Torres, Domitrovich, Welsh, & Gest, 2009; Veraksa, Almazova, & Bukhalenkova, 2020). Moreover, poor EF development is associated with disruptive behavior manifestation (Monette, Bigras, & Guay, 2015), specific learning disorders (Operto et al., 2021), and child's externalizing and internalizing problems (De Cock et al., 2017).

While maternal depression is a prevalent disorder, parental burnout (PB) is becoming increasingly common among mothers (Roskam et al., 2021). Although PB is not considered a disorder like depression, it can significantly reduce the quality of life, and therefore, affect the behavior and emotional wellbeing of parents (Mikolajczak et al., 2020). PB is a state of severe emotional exhaustion related to the parental role, which includes emotional detachment from one's children and doubts about one's ability to be a good parent (Roskam, Raes, & Mikolajczak, 2017).

PB has been explored in relation to parents of children with chronic illnesses and/or special needs (Gerber, Davidovics, & Anaki, 2021; Lindström, Aman, & Norberg, 2011). However, there is accumulating evidence that parents of children without chronic medical conditions may also be vulnerable to burnout, during early childhood and preschool age (Piotrowski et al., 2023). The authors of the extensive cross-cultural study showed that PB is common in the countries with particularly high prevalence of individualistic cultural values, the trend for intensive parenting and with lack of extended family support (Roskam et al., 2021).

Unlike maternal depression, the effects of PB on child development remain unexplored. There is evidence of association between PB and internalizing and externalizing problems in adolescents (Chen, Qu, Yang, & Chen, 2022) and preschool children (Woine, Escobar, Panesso, Szczygieł, Mikolajczak, & Roskam, 2024). While a growing body of research is showing a significant correlation between poor academic performance and PB in adolescents and primary school children, the direction of this relationship is difficult to determine precisely (Hong, An, Thao, Thao, & Thanh, 2022; Li, Luo, Song, Li, & Shen, 2023; Zhang, Li, Wang, & Hu, 2023). Thus, there is still a lack of data regarding the impact of PB on child cognitive and EF development.

The purpose of this study was to investigate the effects of maternal depression and PB on the child's cognitive development, namely, on the development of EFs in preschoolers. The focus of this work is on preschool age, as this is a sensitive period for diagnosing the level of EFs development. At the same time, studying preschool age allows us to analyze the relation with maternal depression and PB which develop later than the postpartum period. Finally, the objective of this work is to highlight the unique influence of PB on the child's cognitive development distinct from depression.

MATERIALS AND METHODS

PROCEDURE AND PARTICIPANTS

The design of the present study included two parts: (1) maternal depression and burnout assessment and socio-demographic information collection and (2) evaluation of the preschoolers' EF development and emotion comprehension skills. The data was collected from February 2022 to June 2023 on the basis of ten kindergartens in four Russian regions (Sochi, Tatarstan, Yakutia, and Moscow). Children from three kindergartens from Yakutia, three from Tatarstan, two from Moscow, and two kindergartens from Sochi participated in the study. The participants received an invitation to take part in the study via the kindergarten's administration. The participation in the study was voluntary. Dyads were included in the study if the parent signed the written agreement to participate in the study and the permission to conduct their child's EF assessment. The inclusion criteria was also for the parent to be living together with the child and being able to speak and read in Russian.

ETHICAL CONSIDERATIONS

The design of the study was approved by the Ethical Committee of the Russian Psychological Society, Lomonosov Moscow State University, protocol number 2021/68. The study was conducted in accordance with the Declaration of Helsinki. All parents signed an informed consent using the online form before starting the completion of the parental survey and

participated in the study voluntarily. The parents also signed the agreement for their children to be included in the study. The assessments were carried out with the Testograph online platform. Children and parents' personal information was encrypted and the confidentiality of the responses was guaranteed to the participants.

MEASURES

THE DEMOGRAPHIC QUESTIONNAIRE

The participants reported their age at the time of testing, level of education (primary/secondary/tertiary), socio-economic (low/middle/high) and marital status (married/cohabiting with partner/single), mode of birth, and maternal and child medical complications during pregnancy and childbirth (reported by the parents). We also collected the data on the child's age, gestational age at birth, and sex.

MATERNAL DEPRESSION

The levels of maternal depression were assessed by the Russian version of the Beck Depression Inventory (BDI-II) (Zlobina & Pervushin, 2018). BDI-II is a self-report questionnaire measuring symptoms of depression (Beck, 1961). The participant is asked to rate 21 item on a scale from 0 to 3, e.g., 0: "I have not lost interest in other people" 1: "I am less interested in other people than I used to be" 2: "I have lost most of my interest in other people" 3: "I have lost all of my interest in other people.". The depression score is obtained by summing the 21 item scores, the cut-off point for mild depression is 14. For the Russian version Cronbach's coefficient is $\alpha = 0.87$ (Zlobina & Pervushin, 2018), in the present study Cronbach's coefficient was $\alpha = 0.90$.

PARENTAL BURNOUT

The level of PB in mothers was measured by the Russian version of the Parental Burnout Inventory (PBI) (Roskam, Raes, & Mikolajczak, 2017; Starchenkova, 2019). This questionnaire consists of 23 items, corresponding to the four core symptoms of PB: emotional exhaustion, contrast with previous parental self, loss of pleasure in one's parental role and emotional distancing from one's children, e.g. "I feel completely exhausted by my role as a parent". The participants were asked to assess the frequency of each statement using a 7-point scale from 0 to 6 (never, a few times a year, once a month or less, a few times a month, once a week, a few times a week, every day). Each item score is summarized: higher scores reflect higher PB levels. The cut-off point for PB is 74 (Brianda et al., 2023). The internal consistency of the Russian version of the scale was Cronbach's alpha $\alpha = 0.97$ (Starchenkova, 2019) and in the present study it was Cronbach's alpha $\alpha = 0.98$.

EXECUTIVE FUNCTIONS

EF assessment was conducted individually with every child in a separate quiet room. The experimenter presented the tasks using cards accompanied by oral instructions, except for the *Repetition of sentences task*, which was presented orally only.

Working memory

The auditory-speech working memory was assessed by the Russian version of NEPSY-II subtest "Sentence Repetition" (Korkman, Kirk, & Kemp, 2007; Veraksa, Almazova, & Bukhalenkova, 2020). The subtest consists of 17 progressively complicated sentences, which the child is asked to repeat after the experimenter. The sentences are pronounced distinctly and slowly. Each accurately repeated sentence is scored 2 points. 1 point is deducted for each error category (adding new words, skipping words, or replacing a word). The final score is obtained by the sum of accurately repeated sentences minus errors (maximum 34 points).

Inhibition

Cognitive inhibitory control was assessed by the Russian version of NEPSY-II "Inhibition" subtest (Korkman, Kirk, & Kemp, 2007; Veraksa, Almazova, & Bukhalenkova, 2020). The subtest consists of two sets of cards: a series of white and black figures (circles and squares) and a series of arrows with different directions (up and down). During the first series of trials the child is asked to name shapes on the card. During the second series the task is to name every shape inverse: for example, if he/she saw a square, he/she had to say "circle" and so on.

The experimenter records the number of mistakes in each trial as well as the number of corrected errors (when the child corrects himself), and the amount of time the child spent on the task. Based on the number of correct answers, mistakes, time of performance and the exact age of the child in months, complex scores for naming and inhibition are calculated (maximum 19 points).

Cognitive flexibility

Preschoolers' cognitive flexibility was measured by the Russian Version of Dimensional Change Card Sort (DCCS) task (Veraksa, Almazova, & Bukhalenkova, 2020; Zelazo, 2006). The tool consists of three sets of cards sorting exercises. In the first series of trials the child is to sort the cards by color. In the second series of trials the child is asked to sort the cards by shape. In the third series the task is to sort the cards by color if the card has a frame and by shape if it has no frame. Each successfully sorted card is evaluated as a score "1". The number of points for each try (maximum 6, 6 and 12 points, respectively) is summarized (maximum 24 points).

COVARIATES

Child age at testing, gestational age at birth, maternal age at testing, maternal level of education, family status, socioeconomic status (SES), mode of birth, and maternal and child complications during pregnancy and childbirth were included in the analysis as covariates.

STATISTICAL ANALYSIS

Spearman correlation analysis was used to explore the relations between BDI-II and parental depression scores, child cognitive development scores, child's age at testing, and gestational age at birth.

Multiple linear regression analysis examined the association between maternal depression, PB and cognitive development. Linear regression models were adjusted for the covariates listed above.

Univariate analysis was used to explore the relations between EF performance and mode of delivery, child sex, complications during pregnancy and childbirth, and level of maternal education.

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

RESULTS

The sample included 301 mother-child dyads, the characteristics of the sample are presented in Table 1. The majority of the participants had higher education (72.1%) and were legally married (82.1%). Among the participants, 8% of mothers reported clinically significant depression symptoms; 2.3% reached the cut-off point for PB. Depression and PB scores correlated significantly ($\rho = 0.56$, $p < 0.01$).

The mean age of the preschool children in the sample was 5.26 years.

Table 1.
Characteristics of the sample.

Characteristics Total N = 301		Mean/N	SD/%	Range
Parental characteristics				
Age (years)		34.84	5.12	22 - 49
Sex	Female	301	100%	
Education	Vocational/General secondary	84	27.9%	
	Higher education	217	72.1%	
Family Status	Married	247	82.1%	
	Has a Partner	24	8.0%	
	Single	30	9.9%	
SES	Low	44	14.6%	
	Middle	212	70.4%	
	High	45	15%	
Mode of birth	Vaginal	196	65.1%	
	Planned CB	55	18.3%	
	Emergency CB	50	16.6%	
Maternal complications during pregnancy and/or childbirth	None	231	76.7%	
	Minor	63	20.9%	
	Major	7	2.3%	
BDI-II score		5.47	7.2	0-54
Parental burnout score		11.87	21	0-138
Child characteristics				
Age at testing (years)		5.26	0.64	3 - 7
Gestational age at birth		38.96	2.02	28-43
Sex	Female	158	52.5%	
	Male	143	47.5%	
Child complications during pregnancy and/or childbirth	None	264	87.7%	
	Minor	32	10.6%	
	Major	5	1.7%	
Inhibition		10.69	3.24	1 - 19
Working memory (Sentence repetition task)		17.51	4.94	1 - 33
Cognitive flexibility (Card sorting test)		19.2	2.37	13 - 24

Note: SES - Socioeconomic Status; CB – Cesarean Birth; BDI-II - Beck Depression Inventory-II.

Among the covariates, Sentence repetition and Card sorting test performance positively correlated with child's age at testing ($\rho=0.14$, $p=0.01$, $\rho = 0.13$, $p = 0.02$, respectively). Sentence repetition task was also related to child gestational age at birth ($\rho = 0.13$, $p=0.03$). Inhibition test scores significantly associated with complications during pregnancy and childbirth ($F = 3.86$, $p = 0.03$).

All the cognitive development variables were significantly associated with the mother's educational level ($p < 0.03$). Children of mothers with higher education demonstrated higher average scores on Card Sorting Test, Inhibition and Sentence Repetition tasks.

There were no significant correlations between EF and maternal age, family and socioeconomic status, mode of birth, and child sex ($p > 0.11$).

Table 2.

Association between maternal depression, burnout and child cognitive and emotional development (Spearman correlation coefficient)

	Maternal Depression	Parental burnout
Cognitive flexibility (Card sorting test)	$\rho = -0.03$, $p = 0.56$	$\rho = 0.04$, $p = 0.50$
Inhibition	$\rho = -0.01$, $p = 0.80$	$\rho = 0.01$, $p = 0.82$
Working memory (Sentence repetition task)	$\rho = 0.01$, $p = 0.83$	$\rho = 0.14$, $p = 0.01$

Note: the significant associations are bolded

PB scores significantly correlated with Sentence repetition scores (see Table 2). After adjustment for covariates in the linear regression model the association with Sentence Repetition scores remained significant (see Table 3). This association remained significant after further adjustment for maternal depression ($B = 0.047$; 95% CI: 0.014, 0.080; $p = 0.005$).

The Spearman correlation analysis and linear regression analysis showed no significant associations between cognitive subtests and maternal depression scores (see Table 2 and Table 3).

Table 3.

Association between maternal depression, burnout and child cognitive development (Linear regression model)

Predictor:	Maternal depression			Parental Burnout		
	B	p	95% CI	B	p	95% CI
Cognitive flexibility (Card sorting test)	-0.012	0.56	-0.050, 0.028	0.003	0.70	-0.010; 0.016
Inhibition	-0.018	0.50	-0.072, 0.035	-0.001	0.88	-0.019; 0.016
Working memory (Sentence repetition task)	-0.007	0.87	-0.088, 0.075	0.030	0.03	0.003; 0.057

Note: B refers to unstandardized regression coefficient from linear regression model; 95% CI refers to 95% confidence interval.

DISCUSSION

The purpose of this study was to investigate the associations between maternal depression, PB and child's EF development at the preschool age. We found that depressive and PB symptoms correlated significantly. Nevertheless, their effects on child cognitive development were different: while there were no significant associations with maternal depression, PB was associated with child working memory reflected by the Sentence repetition scores. This association remained significant after adjustment for the covariates, among which maternal level of education, in turn, was also highly correlated with all the outcomes. Finally, we demonstrated that the effects of PB were independent of maternal depressive symptoms.

In the present study maternal depression did not show significant associations with any of the child EF outcomes. This result contradicts the notable body of literature that focuses on early exposure to maternal depression and its adverse effects on child cognitive development (Gueron-Sela et al., 2018; Snyder, 2013). Two recent longitudinal studies demonstrated that lower levels of maternal depressive symptoms during early years predicted higher levels of child EFs during middle childhood (Ku & Feng, 2023; Prado et al., 2021). Nevertheless, in line with our results, Nordenswan and colleagues showed that parental depression alone was not associated with child EFs development. However, when depressive symptoms were dichotomized to compare symptoms below and above cutoffs indicating clinically elevated levels, and they were summed up with other dichotomized parental distress variables, such as anxiety, insomnia, and poor couple relationship adjustment, this cumulative risk index of the number of concurrent clinically elevated distress domains was significantly associated with child EFs (Nordenswan et al., 2021). Thus, collecting data on cumulative maternal stress could enrich our understanding of depression effects on EF development.

Another possible explanation of our results that contradict the general trend may be due to high stigmatization of depression in general, and parental depression in particular, in the Russian society (Beshanova & Kashirskikh, 2020). This might have led to the data bias: the participants might have been prone to give more socially desirable answers. The data was collected via the kindergartens, and despite the confidentiality guarantees, parents could have been anxious about reporting their depressive symptoms. Further psychoeducation, normalization of seeking help, and development of programs that target mental health problems stigma are essential to support parents and improve the quality of life of families with children.

Contrarily, we found a significant association between PB and child EFs, namely, the sentence repetition task. This subtest evaluates the child's ability to repeat sentences of increasing complexity and length and allows to assess the verbal working memory capacities and child overall language abilities (Klem et al., 2015). Similarly, higher PB, but not maternal depressive symptoms were associated with child emotional development in the sample of 251 mother-child dyads in Russia (Yakupova & Suarez, 2023). Our finding further corresponds with the results of the scoping review, where the authors demonstrate that PB is a complex problem, distinct from other burnout cases, depressive symptoms and other mental health alterations (Paula et al., 2021). Sánchez-Rodríguez and colleagues also suggest that PB, depression and anxiety are distinct disorders, with feelings of guilt having an aggravating effect in the experience of burnout (Sánchez-Rodríguez et al., 2019). Another study from Norway showed that child EFs were associated with higher parental stress and psychological distress but not with general life stress (Håkansson et al., 2019).

Interestingly, the direction of the discovered association in our study was positive, i.e. the more pronounced were the PB symptoms, the better the child performed during the sentence repetition task. Importantly, this result remained statistically significant after adjustment for maternal depressive symptoms, indicating that the effects of PB were independent of maternal depression, despite their significant correlation. This finding might reflect the trend of intensive parenting and high social demands towards parents (Roskam et al., 2021). Parents with higher symptoms of PB might be continuously investing more effort into the child's development, which may lead to their exhaustion. Overall, sociological studies indicate that Russian society has experienced a critical shift in family structures and parenting strategies during the last decades, with families becoming more child-centered (Saraliev et al., 2014). Parents, and especially mothers, are socially encouraged to prioritize the needs of the children over their own (Миссюк & Khazova, 2021). As recent studies among preschool children in Russia show that higher levels of inhibitory control and working memory were associated with taking extra music classes and physical fitness (Bayanova et al., 2022; Veraksa et al., 2021), it is possible that even when Russian mothers might experience

the symptoms of PB, it may not affect their children, as they would try to prioritize activities targeted at child development until the critical stage of exhaustion. This suggestion is supported by the results of the other study from Russia, where higher PB symptoms were associated with better understanding of emotion comprehension in preschoolers (Yakupova & Suarez, 2023). Importantly, the tasks related to taking the kids to extracurricular activities are usually conducted by mothers, as in Russia in only 3-4% of households fathers take care of children (Rebrey, 2023), thus exacerbating the risks of PB in mothers. Therefore, psychoeducation among parents and providing social support for families with children are essential to minimize the burden of childcare on mothers and decrease the risk of PB.

This might seem to contradict the accumulated body of evidence where PB has been associated with child neglect and domestic violence, lower scores for EF tests, lower academic performance, and behavioral problems (Andrews et al., 2021; Guo et al., 2024; Mikolajczak, Gross, & Roskam, 2019; Paula et al., 2021). Furthermore, Komanchuk et al found that among 73 Canadian mothers of preschoolers higher working memory scores for children were associated with higher parental reflective functioning, e.g. for parents to correctly interpret the source of child's distress, which suffers in the presence of PB (Komanchuk et al., 2022). This contradiction might highlight some cultural differences at play both as factors contributing to development of PB symptoms and its impact on child development (Roskam et al., 2024). Another explanation suggested by Woine and colleagues is that it is unlikely for parental distress to have a direct impact on the child's behavior and development, but rather it must have indirect effects via parental behaviors (Woine, Escobar, Panesso, Szczygieł, Mikolajczak, & Roskam, 2024), which are much harder to measure using quantitative methods. Further qualitative cross-cultural studies are warranted in order to address the discovered contradictions.

Our results also indicate that the level of maternal education is an important variable as it was positively correlated with all child EF development variables. These results are in line with previous research, indicating that level of parental education is an important factor in a child's EF development (Conway, Waldfogel, & Wang, 2018). A twin modeling study demonstrated that there is a significant contribution of genetics to intergenerational transmission of EFs (Tomlinson, Hyde, Weigard, Klump, & Burt, 2022), which is also supported by the study of relationship between parental EFs and preschoolers' EFs (Kao et al., 2018). However, both of these studies also highlight the importance of parenting styles as important contributors to child cognitive development. In accordance with this, in our study the association between PB and Sentence repetition scores remained significant after adjustment for maternal level of education. Nevertheless, it is an important factor which should be considered as a potential mediator in the future studies of the association between PF and child EF development.

Strengths and Limitations

The strengths of our study include the study design, experimental data on child EF development collected by trained researchers and educators, use of validated questionnaires, and control for important covariates, such as mode of birth, socioeconomic status, and maternal education. Furthermore, the data was collected from ten kindergartens in four regions of Russia which represent a wide range of geographical, cultural, and religious characteristics of diverse Russian population: Moscow is the capital region, Sochi is the largest resort city in the south of the country, the Republic of Tatarstan, located in the Eastern European part of Russia is populated with ethnic Tatars along with ethnic Russians, with the most common faith of the republic being Islam, while the Republic of Sakha (or Yakutia) is the largest republic of Russia located in the Far East part of the country, populated by multiple ethnic minorities along with Russians. Moreover, our study is among the pioneering work that investigated the unique association between preschoolers' EFs and PB, independent of maternal depression.

However, several limitations should be noted.

As discussed above, our data might have been compromised by the social desirability bias, as it was collected via kindergartens. Despite the confidentiality guarantees, parents might have been anxious about revealing their depressive symptoms, as they are socially stigmatized.

Next, our findings lack objective medical information regarding the medical complications during pregnancy and childbirth as well as mental health state of the parents and rely solely on self-reports, which is a common limitation in cross-sectional studies, particularly in the countries without available registry-based data.

Finally, all the respondents among the parents were mothers, which is aligned with traditional gender roles in Russia (Gurieva et al., 2022). However, the emerging data suggests that paternal depression has its unique impact on child cognitive development (Jones et al., 2023; Roberts et al., 2022), therefore, further studies that include paternal mental health measures are warranted.

CONCLUSION

The results obtained in the study show that PB, but not maternal depression, were associated with child cognitive development. Our findings further support the evidence that PB is distinctive from depression and can have its unique impact on the development of child EFs at preschool age. The lack of significant associations between maternal depression and any of the EFs assessment tasks might be attributed to high stigmatization of maternal depression in Russia and biased, more socially acceptable answers. Questions about PB, on the other hand, might not elicit a similar reaction. However, the positive correlation between higher burnout symptoms and better performance in sentence repetition tasks might reflect a socially approved trend of intensive parenting in Russia, where parents, and especially mothers, are encouraged to prioritize the needs of the children, e.g. extracurricular activities, over their own. Therefore, psychoeducation among parents and providing social support for families with children are essential to minimize the burden of childcare on mothers and decrease the risk of PB.

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REFERENCIAS

- Andrews, K., Dunn, J. R., Prime, H., Duku, E., Atkinson, L., Tiwari, A., & Gonzalez, A. (2021). Effects of household chaos and parental responsiveness on child executive functions: A novel, multi-method approach. *BMC Psychology*, 9(1), 147. <https://doi.org/10.1186/s40359-021-00651-1>
- Beck A.T. et al. (1961). An Inventory for Measuring Depression. *Arch Gen Psychiatry*, 4(6).
- Beshanova, E. V., & Kashirskikh, O. N. (2020). Media effects in the Russian mediascope on the example of depression and anxiety narratives. [Higher School of Economics]. <https://www.hse.ru/en/edu/vkr/366242220>
- Bierman, K., Torres, M., Domitrovich, C., Welsh, J., & Gest, S. (2009). Behavioral and Cognitive Readiness for School: Cross-Domain Associations for Children Attending Head Start. *Social Development*, 18, 305–323. <https://doi.org/10.1111/j.1467-9507.2008.00490.x>
- Bayanova, L., Chichinina, E., Veraksa, A., Almazova, O., & Dolgikh, A. (2022). Difference in Executive Functions Development Level between Two Groups: Preschool Children Who Took Extra Music Classes in Art Schools and Children Who Took Only General Music and Dance Classes Offered by Preschools. *Education Sciences*, 12(2), Article 2. <https://doi.org/10.3390/educsci12020119>
- Brianda, M. E., Mikolajczak, M., Bader, M., Bon, S., Déprez, A., & others. (2023). Optimizing the assessment of parental burnout: A multi-informant and multimethod approach to determine cutoffs for the Parental Burnout Inventory and the Parental Burnout Assessment. *Assessment*, 30(7), 2234–2246. <https://doi.org/10.1177/10731911221141873>
- Chen BB, Qu Y, Yang B, Chen X. (2022). Chinese mothers' parental burnout and adolescents' internalizing and externalizing problems: The mediating role of maternal hostility. *Dev Psychol*, 58(4), 768-777. <https://doi.org/10.1037/dev0001311>. Epub 2021 Dec 23. PMID: 34941305.
- Chichinina EA, Gavrilova MN. (2022). Growth of Executive Functions in Preschool-Age Children During the COVID-19 Lockdown: Empirical Evidence. *Psychol Russ*, 15(2), 124-136. <https://doi.org/10.11621/pir.2022.0209>. PMID: 36699709; PMCID: PMC9833618.
- Conway, A., Waldfogel, 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.childyouth.2018.06.009>
- De Cock, E., Henrichs, J., Klimstra, T., Maas, A. J. B. M., Vreeswijk, C., Meeus, W., & Bakel, H. (2017). Longitudinal Associations Between Parental Bonding, Parenting Stress, and Executive Functioning in Toddlerhood. *Journal of Child and Family Studies*, 26. <https://doi.org/10.1007/s10826-017-0679-7>
- Freedman SA, Reshef S, Weiniger CF. (2020). Post-traumatic stress disorder and postpartum depression and their reported association with recent labor and delivery: A questionnaire survey cohort. *Int J Obstet Anesth*, 43, 18-24. <https://doi.org/10.1016/j.ijoa.2020.04.009>. Epub 2020 May 11. PMID: 32498004.
- Gerber, Z., Davidovics, Z., and Anaki, D. (2021). The relationship between self-compassion, concern for others, and parental burnout in child's chronic care management. *Mindfulness*, 12, 2920–2928. <https://doi.org/10.1007/s12671-021-01752-z>
- Goeglein, S. K., & Yatchmink, Y. E. (2020). Maternal Depression Is a Public Health Crisis: The Time to Act Is Now. *Pediatrics*, 146(3), e2020010413. <https://doi.org/10.1542/peds.2020-010413>
- Gueron-Sela, N., Camerota, M., Willoughby, M. T., Vernon-Feagans, L., & Cox, M. J. (2018). Maternal Depressive Symptoms, Mother-Child Interactions and Children's Executive Function. *Developmental Psychology*, 54(1), 71–82. <https://doi.org/10.1037/dev0000389>
- Guo, X., Hao, C., Wang, W., & Li, Y. (2024). Parental Burnout, Negative Parenting Style, and Adolescents' Development. *Behavioral Sciences*, 14(3), Article 3. <https://doi.org/10.3390/bs14030161>
- Gurieva, S. D., Kazantseva, T. V., Mararitsa, L. V., & Gundelakh, O. E. (2022). Social Perceptions of Gender Differences and the Subjective Significance of the Gender Inequality Issue. *Psychology in Russia*, 15(2), 65–82. <https://doi.org/10.11621/pir.2022.0205>
- Håkansson, U., Watten, R. G., Söderström, K., & Øie, M. G. (2019). The association between executive functioning and parental stress and psychological distress is mediated by parental reflective functioning in mothers with substance use disorder. *Stress and Health*, 35(4), 407–420. <https://doi.org/10.1002/smi.2868>
- Harris RA, Santos HP Jr. (2020). Maternal depression in Latinas and child socioemotional development: A systematic review. *PLoS One*, 15(3), e0230256. <https://doi.org/10.1371/journal.pone.0230256>. PMID: 32163494; PMCID: PMC7067456.
- Hentges, R., Graham, S., Fearon, R., 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. <https://doi.org/10.1002/da.23039>
- Hong VTP, An NH, Thao TTP, Thao LN, Thanh NM. (2022). Behavior problems reduce academic outcomes among primary students: A moderated mediation of parental burnout and parents' self-compassion. *New Dir Child Adolesc Dev*, 2022(185-186), 27-42. <https://doi.org/10.1002/cad.20482>. Epub 2022 Sep 7. PMID: 36070880.

- Hughes, C., & Ensor, R. (2011). Individual differences in growth in Executive Function across the transition to school predict externalizing and internalizing behaviors and children's self-perceived academic success at age 6. *Journal of Experimental Child Psychology*, 108, 663–676. <https://doi.org/10.1016/j.jecp.2010.06.005>
- Jones, S. L., Caccese, C., Davis, K. P., Lew, J., Elgbeili, G., Herba, C. M., Barnwell, J., Robert, C. H., Gavanski, I., Horsley, K., Fraser, W. D., Da Costa, D., Séguin, J. R., Nguyen, T.-V., & Montreuil, T. C. (2023). Longitudinal associations between paternal mental health and child behavior and cognition in middle childhood. *Frontiers in Psychology*, 14, 1218384. <https://doi.org/10.3389/fpsyg.2023.1218384>
- Kao, K., Nayak, S., Doan, S. N., & Tarullo, A. R. (2018). Relations between parent EF and child EF: The role of socioeconomic status and parenting on executive functioning in early childhood. *Translational Issues in Psychological Science*, 4(2), 122–137. <https://doi.org/10.1037/tps0000154>
- Klem, M., Melby-Lervåg, M., Hagtvet, B., Lyster, S.-A. H., Gustafsson, J.-E., & Hulme, C. (2015). Sentence repetition is a measure of children's language skills rather than working memory limitations. *Developmental Science*, 18(1), 146–154. <https://doi.org/10.1111/desc.12202>
- Komanchuk, J., Dewey, D., Giesbrecht, G. F., Hart, M., Anis, L., Ntanda, H., Cameron, J. L., & Letourneau, N. (2022). Association between maternal reflective function and preschool children's cognitive abilities. *Frontiers in Psychology*, 13, 995426. <https://doi.org/10.3389/fpsyg.2022.995426>
- Korkman, M., Kirk, U., & Kemp, S. L. (2007). NEPSY II: Administrative manual (2nd ed.). Harcourt Assessment, PsychCorp.
- Kovyazina, M. S., Oschepkova, E. S., Airapetyan, Z. V., Ivanova, M. K., Dedyukina, M. I., & Gavrilova, M. N. (2021). Executive functions' impact on vocabulary and verbal fluency among mono- and bilingual preschool-aged children. *Psychology in Russia: State of the Art*, 14(4), 65-77. <https://doi.org/10.11621/pir.2021.0405>
- Li, Z., Luo, J., Song, F., Li, J., & Shen, Y. (2023). The relationship between parental burnout and children's learning burnout: A moderated chain mediation model. *Psychological Reports*. <https://doi.org/10.1177/00332941231156810>
- Lindström, C., Aman, J., & Norberg, A. L. (2011). Parental burnout in relation to sociodemographic, psychosocial, and personality factors as well as disease duration and glycaemic control in children with type 1 diabetes mellitus. *Acta Paediatrica*, 100(7), 1011-1017. <https://doi.org/10.1111/j.1651-2227.2011.02198.x>
- Brianda, M. E., Mikolajczak, M., Bader, M., Bon, S., & Déprez, A. (2023). Optimizing the assessment of parental burnout: A multi-informant and multimethod approach to determine cutoffs for the Parental Burnout Inventory and the Parental Burnout Assessment. *Assessment*, 30(7), 2234-2246. <https://doi.org/10.1177/10731911221141873>
- Martucci, M., Aceti, F., Giacchetti, N., & Sogos, C. (2021). The mother-baby bond: A systematic review about perinatal depression and child developmental disorders. *Rivista di Psichiatria*, 56(5), 223–236. <https://doi.org/10.1708/3681.36670>
- Mikolajczak, M., Roskam, I., & Gross, J. J. (2020). Is parental burnout distinct from job burnout and depressive symptoms? *Clinical Psychological Science*, 8(4), 673–689. <https://doi.org/10.1177/2167702620917447>
- Mikolajczak, M., Gross, J. J., & Roskam, I. (2019). Parental burnout: What is it, and why does it matter? *Clinical Psychological Science*, 7(6), 1319–1329. <https://doi.org/10.1177/2167702619858430>
- Misiyk, Y., & Khazova, S. (2021). Study of the expression of attitudes on intensive parenting in Russian women. *Vestnik of Kostroma State University. Series: Pedagogy. Psychology. Sociokinetics*, 27, 91–98. <https://doi.org/10.34216/2073-1426-2021-27-3-91-98>
- Monette, S., Bigras, M., & Guay, M.-C. (2015). Executive functions in kindergarteners with high levels of disruptive behaviours. *British Journal of Developmental Psychology*. <https://doi.org/10.1111/bjdp.12105>
- O'Hara, M. W., & Wisner, K. L. (2014). Perinatal mental illness: Definition, description and aetiology. *Best Practice & Research Clinical Obstetrics & Gynaecology*, 28(1), 3-12. <https://doi.org/10.1016/j.bpobgyn.2013.09.002>
- 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>
- Parfitt, Y., Pike, A., & Ayers, S. (2014). Infant developmental outcomes: A family systems perspective. *Infant and Child Development*, 23(1), 4-22. <https://doi.org/10.1002/icd.1830>
- Putnick, D. L., Sundaram, R., Bell, E. M., Ghassabian, A., Goldstein, R. B., Robinson, S. L., Vafai, Y., Gilman, S. E., & Yeung, E. (2020). Trajectories of maternal postpartum depressive symptoms. *Pediatrics*, 146(5), e20200857. <https://doi.org/10.1542/peds.2020-0857>
- Rogers, A., Obst, S., Teague, S. J., Rossen, L., Spry, E. A., Macdonald, J. A., Sunderland, M., Olsson, C. A., Youssef, G., & Hutchinson, D. (2020). Association between maternal perinatal depression and anxiety and child and adolescent development: A meta-analysis. *JAMA Pediatrics*, 174(11), 1082–1092. <https://doi.org/10.1001/jamapediatrics.2020.2910>
- Roskam, I., Aguiar, J., Akgun, E., Arikan, G., Artavia, M., Avalosse, H., et al. (2021). Parental burnout around the globe: A 42-country study. *Affective Science*, 2, 58–79. <https://doi.org/10.1007/s42761-020-00028-4>

- Roskam, I., Aguiar, J., Akgun, E., Arena, A. F., Arikian, G., Aunola, K., Besson, E., Beyers, W., Boujut, E., Brianda, M. E., Brytek-Matera, A., Budak, A. M., Carbonneau, N., César, F., Chen, B. B., Dorard, G., Dos Santos Elias, L. C., Dunsmuir, S., Egorova, N., Favez, N., ... Mikolajczak, M. (2024). Three reasons why parental burnout is more prevalent in individualistic countries: A mediation study in 36 countries. *Social Psychiatry and Psychiatric Epidemiology*, 59(4), 681–694. <https://doi.org/10.1007/s00127-023-02487-z>
- Roskam, I., Raes, M. E., & Mikolajczak, M. (2017). Exhausted parents: Development and preliminary validation of the Parental Burnout Inventory. *Frontiers in Psychology*, 8, 163. <https://doi.org/10.3389/fpsyg.2017.00163>
- Shorey, S., Chee, C. Y. I., Ng, E. D., Chan, Y. H., Tam, W. W. S., & Chong, Y. S. (2018). Prevalence and incidence of postpartum depression among healthy mothers: A systematic review and meta-analysis. *Journal of Psychiatric Research*, 104, 235–248. <https://doi.org/10.1016/j.jpsychires.2018.08.001>
- 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>
- Starchenkova, E. S. (2019). Social-psychological factors of parental burnout. *Psychology of Stress and Coping Behavior: Challenges, Resources, Well-Being*. Kostroma: Kostroma State University, 109–113.
- Suarez, A., Shraibman, L., & Yakupova, V. (2023). Long-term effects of maternal depression during postpartum and early parenthood period on child socioemotional development. *Children*, 10(3), 1718. <https://doi.org/10.3390/children10101718>
- Tomlinson, R. C., Hyde, L. W., Weigard, A. S., Klump, K. L., & Burt, S. A. (2022). The role of parenting in the intergenerational transmission of executive functioning: A genetically informed approach. *Development and Psychopathology*, 34(5), 1731–1743. <https://doi.org/10.1017/S0954579422000645>
- 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, A., Tvardovskaya, A., Gavrilova, M., Yakupova, V., & Musálek, M. (2021). Associations Between Executive Functions and Physical Fitness in Preschool Children. *Frontiers in psychology*, 12, 674746. <https://doi.org/10.3389/fpsyg.2021.674746>
- 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, 672–685. <https://doi.org/10.1037/dev0000373>
- Woine, A., Escobar, M. J., Panesso, C., Szczygieł, D., Mikolajczak, M., & Roskam, I. (2024). Parental burnout and child behavior: A preliminary analysis of mediating and moderating effects of positive parenting. *Children*, 11(3), 353. <https://doi.org/10.3390/children11030353>
- 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>
- Zhang, H., Li, S., Wang, R., & Hu, Q. (2023). Parental burnout and adolescents' academic burnout: Roles of parental harsh discipline, psychological distress, and gender. *Frontiers in Psychology*, 14, 1122986. <https://doi.org/10.3389/fpsyg.2023.1122986>
- Zlobina, M. V., & Pervushina, O. N. (2018). Analysis of two depression questionnaires PHQ-9 and BDI-II. *Reflexio*, 11, 83–98. <https://doi.org/10.25205/2658-4506-2018-11-1-83-98>