

Positive Maternal Practices and Child Perceived Stress as Predictors of Child's Motor Persistence

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Abstract

Motor persistence is an indicator of executive functions that involve maintaining the components of intentional movement. Due to its all-or-none nature, motor persistence may be considered the most direct manifestation of inhibitory control as one of the executive functions. Previous studies have shown that stress in childhood predicts poorer executive functions, and the negative impact of perceived stress has been identified in samples of adolescents. Parental practices are also important factors in child development and play an essential role in the formation of executive functions. Positive parenting practices facilitate the internalization of the self-regulatory process. However, the relationship between perceived stress among preschoolers, parental practices, and motor persistence is still limited. This study investigates the relationship between motor persistence and maternal practices in the context of a child's stress. The sample of the study included 194 mothers and their children. Mothers were in the age range of 23 to 48 years old ($M = 34.91$, $SD = 6.52$), while children were in the age range of 5 to 8 years old ($M = 6.5$, $SD = 0.37$). Additionally, 49% of the children were male and 51% were female. Data collection was conducted using a subset of the NEPSY-II Statue, the Perceived Stress Scale for Children, and the Parenting Practices Survey. The current study found that perceived stress could decrease motor persistence, but warmth and maternal practices that demonstrate attachment and support might mitigate this negative effect. The results of the study could be applied in educational programs for parents and in the work of psychologists, teachers, and practitioners who interact with families with preschoolers.

Keywords: maternal practices, cognitive stimulation, warmth, executive functions, motor persistence, perceived stress of child.

Позитивные материнские практики и воспринимаемый ребенком стресс как предикторы сдерживающего контроля

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Аннотация

Физический сдерживающий контроль является одним из показателей исполнительных функций, предполагающих поддержание намеренного движения. Благодаря принципу «все или ничего» сдерживающий контроль можно считать наиболее прямым проявлением тормозного контроля. Предыдущие исследования показали, что снижение исполнительных функций связано с уровнем стресса в детском возрасте и с высоким воспринимаемым стрессом в подростковом. Родительские практики также играют существенную роль в формировании исполнительных функций. Установлено, что позитивные родительские практики (когнитивная стимуляция и теплота) способствуют интернализации процесса саморегуляции. Несмотря на имеющиеся результаты, данные о связи между воспринимаемым дошкольниками стрессом, материнскими практиками и сдерживающим контролем ограничены. Настоящее исследование направлено на выявление взаимосвязи между указанными показателями. Выборку составили 194 женщины и их дети. Возраст матерей – от 23 до 48 лет ($M = 34,91$; $SD = 6,52$), детей – от 5 до 8 лет ($M = 6,5$; $SD = 0,37$), 49% детей – мальчики, 51% – девочки. Сбор данных проводился с использованием субтеста NEPSY-II «Статуя», Шкалы воспринимаемого стресса для детей и анкеты с вопросами о родительских практиках. Текущее исследование показало, что воспринимаемый стресс может снизить сдерживающий контроль, но материнские практики, направленные на демонстрацию привязанности, принятия и поддержки, могут смягчить этот негативный эффект.

Ключевые слова: материнские практики, когнитивная стимуляция, теплота, исполнительные функции, сдерживающий контроль, воспринимаемый стресс.

Introduction

Modern researchers assume that self-regulation is one of the most significant markers of a child's development (Diamond, 2020; Oshchepkova & Shatskaya, 2023). Growing self-regulation during childhood reflects the increasing integration of cognitive, emotional, and behavioral processes, enabling children to control various aspects of their activities in various situations. In typical, familiar situations, a cognitive system of self-regulation is required to help solve emotionally neutral tasks (Willoughby et al., 2011).

However, emotional or stressful situations require so-called hot self-regulation (Gavrilova et al., 2023; Willoughby et al., 2011), and this type of situation may affect self-control and decision-making. Motor persistence as the maintenance of intentional movement could be the most illustrative indicator of hot regulation because of its all-or-no nature, especially in stressful situations such as unexpected and rapid changes here and now (Mahone et al., 2006).

According to the earlier studies, stress decreases the regulatory characteristics of adults and adolescents. Despite the number of studies, little is known about the association between children's perceived stress and regulation dimensions. Previously, researchers identified the role of parental stress (Plamondon et al., 2015) and neural aspects of stress (McEwen, 2013) for children's executive functions, but they did not investigate self-reported stress. One of the reasons is that it used to be thought that preschoolers under the age of eight lacked self-report skills. Whereas new research from different countries shows that children can identify and evaluate how stressed out they feel generally (Davis & Soistmann, 2022; Lynch et al., 2022). To fill the gap in the relationship between children's stress and self-regulation, the current study aims to identify an association between self-reported perceived stress and motor persistence as indicator of executive functions and self-regulation.

In the light of the increasing anxiety and stress among modern preschoolers and the presumed negative role of stress (Lynch et al., 2022; Willoughby et al., 2011), it is important to identify factors that may mitigate its destructive effect. Parental behavior, which has tremendous influence on child development (Yakupova et al., 2023), could be that factor. Previous studies have also demonstrated that parental behaviors, including cognitive stimulation and emotional support, are associated with the self-regulation indicators of children and play a crucial role in a child's stress experience (Spruijt et al., 2018). However, previous studies, both foreign and domestic, have not precisely identified the role of stress and parental behavior in motor control as a part of inhibition control. To address these issues, we will explore the relationship between motor persistence as a marker of executive function, parental practices, and child stress.

The current study's data expands current knowledge about children's stress as a factor in regulatory development at preschool age. This study also provides a more nuanced picture of how different maternal practices contribute to reducing children's stress and supporting the evolution of motor persistence as hot self-regulation.

Motor control as a dimension of self-regulation

Motor control is an integral component of inhibitory control, involving the regulation of intentions, including preparedness to respond. It is named "hot" regulation because it is a bottom-up process that has associations with affective aspects in an emotionally aroused or stressful context (Gavrilova et al., 2023; Willoughby et al., 2011). It occurs between perception and the execution of actions or movements. Motor control has two indicators: the first is motor inhibition, which includes the suppression of one dominant motor action in favor of another but more suitable movement, and the second is motor persistence, which includes the sustainment of components of intentional movement (Mahone et al., 2006). According to Rubia and colleagues, motor control, in contrast to control of emotions and thoughts, is "the most direct expression of inhibitory control, as it involves all-or-none decisions about action or nonaction" (Rubia et al., 2001, p. 251), so, motor persistence may be presented as one of direct indicator of executive functions. Motor persistence shows significant growth from the age 5 to the age 6 (Novik & Salmanova, 2022) but modest rise at the age 9.8 (Mahone et al., 2006). The age range of 6-7 years is a period characterized by the active development of motor control. Identifying the features

of motor persistence among children aged 5-8 years increases global knowledge about hot self-regulation in preschool ages. Moreover, identification of factors that have an effect on regulatory development may enrich the comprehension of motor persistence development in particular and executive functions in general.

Role of perceived stress and the development of motor persistence

Perceived stress is described as “the degree to which situations in one’s life are appraised as stressful” (Cohen et al., 1983, p. 385) and includes individual cognitive and emotional reactions to potential or real risky life events (Yılmaz Koğar & Koğar, 2024). Previous studies of children’s perceived stress faced the challenge of limited ability to distinguish thoughts and emotions among preschoolers, resulting in a broad definition of stress and searching for indirect measures of its assessment (Davis & Soistmann, 2022). Modern researchers evolved the theoretical concept of preschooler stress, which allowed them to develop empirical measures for overcoming this obstacle. Since it has been found that children can self-report about some experiences with stress and stress-related behaviors at preschool ages (e.g., Lynch et al., 2022), it has opened opportunities for new investigations of stressful factors in children’s development.

There is much evidence that perceived stress has a negative effect on cognitive skills and executive function development. For instance, stress in childhood predicts poorer development (Danilova, 2023), lower processing speed and working memory (Saleh et al., 2017) which may be explained by the disrupting effect of stress on the brain regions related to inhibitory control (Friedman & Robbins, 2022). Perceived stress demonstrated negative associations with executive function and inhibitory control (Cumming et al., 2022).

But all the data about associations between children’s stress and features of self-regulation was identified in the samples of infants or adolescents (Danilova, 2023). Available data on preschoolers’ stress was received based on parental assessments or physiological markers of stress, e.g., level of cortisol or indicators of the functioning of brain regions (McEwen, 2013). Information about self-reported stress and its association with self-regulation among preschoolers was restricted previously. Based on all facts about associations between stress and self-regulation, it could be proposed that perceived stress at preschool age may have a decreasing effect on motor persistence.

Parental practices in the development of motor persistence

Parental behavior and attitudes toward children are the most crucial factors in child development (Yakupova et al., 2023). Some researchers suggest that parental involvement can be shown through both instructional and emotional engagement, which are reflected in cognitive stimulation and warmth practices (Lim, 2023). Parental involvement influences the different child’s cognitive features or emotional states and feelings. Parenting activities and their impact on the children’s perceived stress can be discussed via the lens of attachment theory (Ainsworth, 1973). Close and warm connections between parents and children can lead to lower anxiety and worry in children, allowing them to feel safe and explore their world boldly (Lam et al., 2018). Another reason for the strong connection between parental warmth and children’s perceived stress is the societal belief that “good parents” should exhibit warmth and support, leading to less anxiety and increased self-control in children (Lim, 2023). Thus, it might be proposed that positive parenting practices (especially warmth) lower the perceived stress of children.

Parental practices play the essential role in executive functions formation (e.g., Lim, 2023). Different ratios of parental practices were identified in previous studies, and some of these ratios have a negative child developmental outcome, while others may be

called positive (high warmth, low punishment practices, and medium behavior control) (Cumming et al., 2022). It was established that positive parenting practices facilitate the internalization of the self-regulatory process (Nigg, 2017), predicts increasing cognitive flexibility and inhibition control from 5 to 7.5 years (Rosen et al., 2020). Also, some indirect results may shed light on the association between parenting and motor self-regulation. First, the neurological evidence shows that an environment enriched with cognitive and motor tasks stimulates the formation of the prefrontal cortex, the cerebellum, and the basal ganglia, which are responsible for coordinating cognitive and motor development (e.g., Diamond, 2000). Second, in the sample of preschoolers, the success of motor performance tasks demands not only a high level of motor persistence, but also higher non-verbal intelligence, which in turn linked with positive parenting (Roebbers et al., 2014). Third, the study of the relationship between parenting practices and the motor development of preschoolers showed that responsiveness, warmth, and support, encourage the evolution of different physical skills, including motor control and motor persistence (Agard et al., 2021). Despite all these findings, the relationship between parental practices and motor persistence as hot self-regulation, which may be important for stress coping, is still limited. Based on available evidence, it may be proposed that parental practices (cognitive stimulation and warmth) promote increasing motor persistence, and the current study will test this hypothesis.

Current study

Despite the limitations of studies that explore perceived stress among preschool children and its role in the formation of self-regulation characteristics, there is much evidence that perceived stress has detrimental effect on cognitive and motor functioning (Friedman, Robbins, 2022; Saleh et al., 2017). On that basis, we may propose that motor persistence as a marker of both regulation and motor development might be influenced by the preschoolers' perceived stress. At the same time, parenting practices such as cognitive stimulation and parental warmth demonstrate a positive effect on executive function development. Involving parents through reading books, learning colors and new words, and showing warmth and support help children to improve their regulation and motor skills (Rosen et al., 2020). These studies' results allow us to suggest that parenting practices have an effect on children's development, which is reversed by the effect of perceived stress.

Thus, the current study aims to: 1) explore the association between perceived stress as self-reported characteristic and motor persistence among preschool children; 2) investigate the association between mother's parenting practices and perceived stress of children; 3) identify the incremental impact of positive parenting practices (cognitive stimulation and warmth) to child's motor persistence controlling for perceived stress of children; 4) explore differences in child perceived stress and motor persistence accounting the prevalence of cognitive stimulation or warmth in parental practices.

Methodology

Sample

The study sample included 194 mothers and their children. Mothers were in the age range from 23 to 48 years ($M=34.91$, $SD = 6.52$). Fifty-five percent of the women have a university degree, 68% have a full-time job, and 70% are married. Children were in the age range of 5-8 years ($M = 6.53$, $SD = 0.37$). 49% of children were male and 51% were female, all of them were tested in kindergarten.

The researchers received written consent for mothers and their children's participation in the study. Participation in the study was voluntary, and individually, all instructions

and materials were presented to respondents in their native language. The pen-and-pencil format of data collection was used for mothers; data from children was obtained by specially trained researchers. All research procedures were performed according to the ethical standards of the Russian Psychological Society.

Method

Statue is a subtest of NEPSY-II (Veraksa et al., 2020) that aims to access motor persistence and inhibition. Children were asked to stay immobile with closed eyes for 75 seconds despite distractions (knocking, coughing from the researcher, etc.). Children received from 0 to 2 points for each 5 seconds of performance. The number of points depended on the success of the following instructions.

The Perceived Stress Scale - Children (Kornienko et al., 2024) is a questionnaire that aims to evaluate the relevant level of stress that a child feels. Data collection was organized as a structural interview. In the beginning, researchers presented a special mold with five increasing columns to children and asked them which column was bigger. If the child demonstrated understanding of the question and could give the right answer, the test was continued.

The Parenting Practices Survey (Cumming et al., 2022) has eight items designed to identify the cognitive stimulation (reading, singing, etc.) and warmth (e.g., “Child and I often have warm, close times together”) that mothers demonstrate to their children. Mothers ranged their answers on Likert’s scale from 1 “never” to 7 “every day” for cognitive stimulation and from 1 “not at all true” to 4 “completely true”.

Moreover, mothers were asked about their age, education, job and some other social-demographic characteristics.

Results

Descriptive statistics were conducted to expand knowledge about the motor persistence and perceived stress of preschool children, as well as mothers’ parenting practices. These results could be the basis for further cross-cultural comparative studies. According to the results, preschool children in the age range of 5-8 years demonstrate quite a high level of Motor persistence (mean is 27.10 out of maximum 30), mothers showed a high level of Warmth (mean is 3.67 out of maximum 4). Perceived stress and Cognitive stimulation displayed moderate values as compared to the maximum (Table 1). In general, a preliminary analysis revealed that the current sample may be described as “mother-child” dyads with favorable characteristics. In particular, children exhibit a high level of motor persistence and moderate stress in the context of a high level of maternal warmth, which may create favorable conditions for beneficial development.

Table 1. *Descriptive statistics (N = 194)*

	<i>Mean</i>	<i>Std. Deviation</i>	<i>Minimum</i>	<i>Maximum</i>
Age (children)	6.53	0.369	5.17	7.67
Age (mothers)	34.91	6.521	16	61
Motor persistence	27.10	3.737	10	30
Perceived stress	17.79	5.332	8	32
Warmth	3.67	0.413	1.75	4
Cognitive stimulation	3.23	1.47	0	7

Although the current study did not have a special task for identifying differences between girls and boys, as well as mothers of boys and girls, comparative analysis was run. The data did not correspond to the normal distribution (the p-value for the Shapiro-Wilk test was below 0.01), and the Mann-Whitney test was conducted. The control of differences between Motor persistence and Perceived stress in boys and girls and Warmth of their mothers has not demonstrated significant results. But mothers of girls ($M = 3.47$; $SD=1.47$) showed a significantly higher level of Cognitive stimulation than mothers of boys ($M = 2.48$; $SD=1.49$) ($U = 3874.5$, $p < 0.05$). These additional data could be taken into account for the discussion of the results of the further study of parenting practices.

Predictors of motor persistence

According to the first and second study aims, correlation analysis was run to identify correlations between Perceived Stress and Motor persistence, Perceived stress and mothers' parenting practices (Warmth and Cognitive stimulation). Moreover, correlation analysis provided an overview of associations between other study variables (Table 2). The results demonstrated that Child Perceived Stress has a negative correlation with Motor persistence ($r = -0.131$, $p < 0.05$) and do not have a correlation with parenting practices. Additional results show a negative association between Motor persistence and the Age of mothers ($r = -0.143$, $p < 0.01$), and a positive association with Warmth ($r = 0.115$, $p < 0.05$). Further, Cognitive stimulation demonstrates a positive association with Education level of mothers ($r = 0.121$, $p < 0.05$) and Gender ($r = 0.128$, $p < 0.05$), the last association confirms the results of the comparative analysis described above. Gender was considered to be a quasicontinuous variable for the correlation analysis.

Table 2. Results of correlation analysis

Variable	1	2	3	4	5	6	7
1. Motor persistence	—						
2. Gender	0.083	—					
3. Age (children)	0.032	-0.004	—				
4. Age (mothers)	-0.143**	-0.029	0.034	—			
5. Education (mothers)	-0.029	0.094	0.067	0.187**	—		
6. Perceived stress	-0.111*	-0.014	0.077	0.008	-0.016	—	
7. Warmth	0.115*	-0.082	-0.032	-0.044	-0.096	-0.058	—
8. Cognitive stimulation	-0.037	0.128*	0.040	-0.010	0.121*	-0.034	0.040

Note. * $p < 0.05$, ** $p < 0.01$

The study results of correlations allow for a hierarchical regression analysis where Motor persistence was a dependent variable. The regression analysis for the identification of Motor persistence predictors was conducted in two steps (Table 3). Perceived stress and Age of mothers were included in the model in the first step. Warmth and Cognitive stimulation were included in the second step. Gender and Age of children have not demonstrated a significant correlation with other variables, so they were not added to the model. The proportion of explained variance in both models is not high: Model 1 describes only 5% of the variance, and Model 2 describes only 9%.

Table 3. Results of regression analysis

	<i>b</i>	Standard Error	Beta	<i>t</i>	<i>p</i>
Model 1 R ² = 0.05 Adjusted R ² = 0.04 F (2 191) = 5.048, p<0.01					
(Intercept)	32.381	1.698		19.070	< .001
Age (mothers)	-0.099	0.040	-0.173	-2.447	0.015
Perceived stress	-0.103	0.049	-0.146	-2.075	0.039
Model 2 R ² = 0.09 Adjusted R ² = 0.07 F (4 189) = 4.556, p<0.01					
(Intercept)	25.841	3.049		8.474	< .001
Age (mothers)	-0.092	0.040	-0.161	-2.318	0.022
Perceived stress	-0.090	0.049	-0.128	-1.827	0.069
Warmth	1.747	0.634	0.193	2.756	0.006
Cognitive stimulation	-0.101	0.177	-0.040	-0.572	0.568

According to the regression analysis results, in Model 1, Age of mothers ($b=-0.099$, $p<0.05$) and Perceived stress ($b=-0.103$, $p<0.05$) were identified as significant negative predictors of Motor persistence. In Model 2, Age of mothers saved a negative effect for the self-regulation variable ($b=-0.092$, $p<0.05$), while Perceived stress lost significance and demonstrated only a marginal effect. Warmth demonstrated a significant effect with a positive contribution ($b=1.747$, $p<0.01$), but Cognitive stimulation did not make a significant contribution. In general, the regression analysis data corresponds to the correlation analysis results.

Differences in children's motor persistence in relation to maternal parenting practices

The groups of mothers with varying parenting practices were identified using cluster analysis (neighborhood-based clustering method). Cognitive stimulation and Warmth were considered to be quasicontinuous variables for the cluster analysis. A three-clusters model demonstrated better indexes base on the elbow method, silhouette index, and the likelihood-based information criteria (AIC and BIC). Three clusters that correspond to the three groups of mothers were identified (Figure 1).

The first group include mothers who have demonstrated a high level of warmth but a low level of cognitive stimulation of children (42% of the sample). These mothers may be called emotional mothers because of their emotional closeness with their child without intensive instructional intentions. The second group describes mothers with a high level of both — warmth and cognitive stimulation (33% of the sample). This group of mothers may be called actively involved mothers; they are involved in both emotional support for their children and cognitive stimulation of child development. The third group consists of mothers with a low level of warmth and a moderate level of cognitive stimulation (25% of the sample). Such mothers could be called formal mothers because they fulfill their parental obligations but do not demonstrate emotional closeness or active involvement in child development.

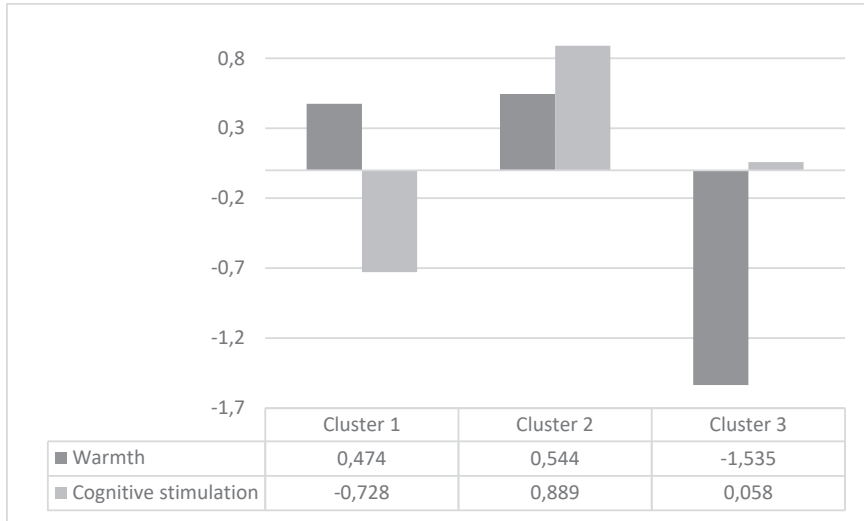


Figure 1. Results of the cluster analysis on parenting practices. Indicators of Cognitive stimulation and Warmth presented in z-scores

A comparative analysis was conducted to identify the differences between children whose mothers demonstrated a different ratio of parenting practices. According to the results (Kruskal-Wallis = 5.907, $p < 0.05$), children of emotional mothers, who often practice warmth and rarely stimulate the cognitive development of children, demonstrated the lowest level of Perceived stress ($M = 16.61$; $SD = 4.34$), children of formal mothers, who rarely demonstrated both warmth and cognitive stimulation, showed the highest one ($M = 19.44$; $SD = 5.87$) ($U = 1068.5$, $p < 0.01$). Children of mothers with a moderate emotional support and cognitive stimulation of child development demonstrated a medium level of Perceived stress ($M = 18.40$). The differences in the motor persistence were not identified among children.

Discussion

The purpose of this study was to identify associations between motor persistence and maternal practices in the context of perceived stress.

The preschool age is a critical period in the formation of self-regulation abilities and executive functions (Chichinina & Gavrilova, 2022; Veraksa et al., 2023). During preschool ages, self-regulation indicators grow, and this is supported by our data. The current study's comparison of the level of motor persistence with data from previous works (Mahone et al., 2006; Novik & Salmanova, 2022), permits us to conclude that older preschool children have a higher level of motor persistence than preschoolers in the age range of 5 to 6 years and a lower level than younger teenagers.

The study findings showed that perceived stress of children linked with motor persistence and might decrease the success of hot regulation. The negative role of stress on the self-regulation process and executive functions at different ages of childhood and adolescence was presented by many researchers (Zhang et al., 2019). Children in the current study have a moderate level of perceived stress in contrast to the previous findings where this level was quite low (White, 2014). It may be attributed to the transition from one educational system to another, moving from kindergarten to school. Although children do not typically demonstrate an anticipatory stress reaction to school (Leblond

et al., 2022), all preparation processes might increase cognitive and emotional tension, which, in turn, might increase the level of perceived stress (Davis & Soistmann, 2022). Also, it may be speculated that children with a lower level of perceived stress might not have such an association between stress and self-regulation characteristics. Moreover, the significant role of perceived stress as a predictor of motor persistence disappeared in the regression model when the mothers' warmth indicator was included.

Despite the proposed suggestion, both warmth and cognitive stimulation as parenting practices and perceived stress did not show significant associations. It could mean that mothers choose cognitive and emotional practices independently from their children's stress, and these parenting practices, in turn, are not a source of children's stress. We could also speculate that warmth and cognitive stimulation as some features of mothers' behavior and children's stress influence motor persistence independently. Suggesting that the harmful effects of children's perceived stress on motor self-regulation may be reduced as a result of the constant, but not situational, warm and supportive emotional relationships between mothers and children. A trusting mother-child relationship could create a stable environment (Ali et al., 2021), and children can train and develop their own self-regulation and motor control in this secure circumstance. Similar results were obtained in some previous studies (Menon et al., 2020).

The three groups of mothers with different ratio of warmth and cognitive stimulation were identified – group of emotional mothers, group of actively involved mothers, and group of formal mothers. A group of emotional mothers with a pronounced warmth level is the largest one (42% of the sample). In the current study, mothers in general demonstrated a moderate level of cognitive stimulation and a high level of warmth as parental practices, the latter is consistent with the previous findings (Yaffe, 2023). Cumming and colleagues (2022) also found differences in the ratio of cognitive stimulation and warmth, but the result was the opposite. Our findings together with those of Cumming and colleagues (2022) suggest that different parenting styles may have different ratios of cognitive stimulation and warmth. Differences in the results may also depend on the sample. The current study involved only mothers, while Cumming's study included both mothers and fathers. Moreover, the current study showed that children of mothers with a high level of warmth demonstrate the lowest perceived stress, supporting speculation about the positive role of mother-child warm relations for investigated characteristics (stress and motor persistence in children).

Additionally, the age of mothers is revealed as a significant predictor that decreases child motor persistence. Previously, demographic characteristics (Almazova & Mostinets, 2023), parental higher education, were associated with the development of children's self-regulation and executive function (Halse et al., 2019). Most early studies either did not test mothers' age as a factor in children's self-regulation or did not find a significant association between mother's age and self-regulation of children (Narine, 2023). Our findings indicate that children of older mothers demonstrate worse motor inhibitory control. The explanation for this result may be that older mothers may not concentrate attention on the development of motor persistence and prefer to train the cognitive skills and abilities of their children, but this suggestion needs further investigation.

Conclusion and limitation

Current research has shown that preschool-age children may experience perceived stress and respond to it. Theoretical review has demonstrated that stress may damage the typical formation of cognitive, regulation, and motor skills. The current study found that perceived stress could hinder the development of motor persistence, which serves as an indicator of inhibitory control. However, this study confirmed the importance of

maternal emotional support for a child's healthy and typical development. Warmth as a demonstration of attachment, acceptance, support, and other aspects of emotional closeness between a mother and a child might mitigate the negative effect of children's stress on the development of motor persistence. The results of the study could be applied in educational programs for parents and in the work of psychologists, teachers, and practitioners who interact with families with preschoolers.

The current study follows international research on self-reported stress among preschoolers and contributes to the understanding of the influence of stress and parenting practices (warmth and cognitive stimulation) on motor persistence. Despite important findings, this study has some limitations that may be improved in future investigations. First, the sample may be extended by involving fathers or increasing the number of respondents. Second, cross-sectional design and self-report measures do not allow for the observation of the dynamic of the investigated indicators of development and drawing cause-and-effect conclusions. Future exploration could use a longitudinal design and add other measures, such as observation or structured interviews. The study of child perceived stress and parenting practices seems promising when considering other indicators of child development, such as cognitive flexibility and working memory, as well as factors like the family's socioeconomic status.

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Conflicts of Interest

The authors declare no conflict of interest.

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