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Maternal Parenting Styles and Aggression in ADHD Children: The Mediating Role of Executive Function

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The family is the first environment in which children grow up and therefore has significant effects on children's behaviors. The present study aimed to test the aggression model among ADHD children based on maternal parenting styles with the mediation of executive function. This was a descriptive correlational study that was conducted on 200 primary school students with ADHD in Iran. Data collection tools included the Buss and Perry Aggression Questionnaire, Baumrind's Parenting Styles Questionnaire, and the Barkley Rating Inventory of Executive Function (BRIEF). The results of path analysis suggested the relationship between maternal authoritative and permissive parenting styles with aggression was mediated through executive function ($p<.05$). The maternal authoritative parenting style has a negative relationship with aggression ($p<.001$) and executive function problems ($p<.001$). Also, the maternal permissive parenting style has a positive relationship with aggression ($p<.001$) and executive function

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problems (p=.006). Maternal parenting styles can affect the cognitive and behavioral performance of ADHD children.

Keywords: ADHD, parenting styles, executive function, aggression.

Attention-Deficit Hyperactivity Disorder (ADHD), is one of the most common neurodevelopmental disorders in childhood characterized by developmentally inappropriate, pervasive, and impairing levels of inattention and, or hyperactivity/impulsivity (Cortese & Coghill, 2018). To meet diagnostic criteria for the disorder, individuals must have these symptoms before the age of 12 and at least six months before diagnosis. These symptoms must have significantly disrupted more than one area (e.g., home and school). Also, another disorder is not a better explanation for it. Epidemiological studies estimate from less than 1% up to around 20% , but on average, about 4-7% of the population has clinical diagnostic criteria for ADHD (Polanczyk, Willcutt, Salum, Kieling, & Rohde, 2014; Thomas, Sanders, Doust, Beller, & Glasziou., 2015). Similarly, in Iran, 5-12% of school-age children and 3-5 % of primary school children meet clinical diagnostic criteria for ADHD (Firouzkouhi Moghaddam, Nia., Rakhshani, Heidaripoor, & Travatmanesh., 2016).

ADHD has many negative consequences, and one of these negative consequences is behavioural problems such as aggression (Becker, Luebbe, Stoppelbein, Greening, & Fite., 2012; Evans, Fite, Hendrikson, Rubens & Mages., 2015; King & Waschbusch, 2010; Murray et al., 2018). Aggression, an overt response with the aim of to cause harm, is a physiological reaction with significant roles throughout evolution, both in defense and hunting. Humans sometimes express aggression in an inappropriate context; in this condition, aggression causes social dysfunction and crime (Franke & Reif, 2020). Aggressive

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behaviours in children have negative effects on the academic, emotional, and social functioning (Card & Little, 2006), such as school problems (Day, Bream & Pal, 1992), cognitive deficit (Jensen et al., 2007), peer victimization and rejection (Jensen et al., 2007) and antisocial behaviour (Tremblay et al., 2004). In addition to the simultaneous occurrence of aggression and ADHD appears to be more destructive compared with aggression that occurs without ADHD (Carlson, Tamm & Gaub, 1997). Therefore, it can be concluded that aggression is a serious problem in children with ADHD, and it should be an important research goal (Connor, Chartier, Preen & Kaplan, 2010).

There is a hypothesis that some of the aggressive behaviours observed in ADHD children are associated with impulsivity (King & Waschbusch, 2010). In addition, other researchers try to explain the relation between aggression and ADHD by suggesting that poor executive function (EF) in ADHD children plays an important role in the aggressive behaviours observed in this population (King & Waschbusch, 2010).

Common definitions of executive functions consist of goal-oriented abilities such as working memory, inhibition, initiation, mental flexibility, attentional control, emotional regulation, planning and, fluid intelligence (e.g., problem-solving and reasoning) (Séguin, Boulerice, Harden, Tremblay & Pihl, 1999). In other words, EF can be referred to as higher-order processes associated with the prefrontal cortex (Hughes & Ensor, 2008). Among the many functions of EF is the ability to inhibit behaviours forbidden by society, such as aggressive behaviours (Rohlf, Holl, Kirsch, Krahe & Elsner, 2018).

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Many studies have shown that EF is negatively correlated with aggression in preschool-aged and school-age children. For instance, a study has concluded that low levels of EF in preschool children are related to externalizing behaviours such as aggressive behaviours (Hughes & Ensor, 2008). Similarly, a longitudinal study revealed that deficit in EF predicated physical, relational, and reactive aggression after three years (Rohlf et al., 2018).

Studies have been reported that one of the influential factors for EF and aggression development in ADHD children is the family, especially the parenting styles (King & Waschbusch, 2010; Moghaddam, Assareh, Rakhshani & Broomand, 2014; Alaniz, 2015). Parenting styles play the most important and influential role in a child's social, cognitive, and emotional development. In essence, parenting style refers to a set of interactions governing parent-child relationships in different situations (Firouzkouhi Moghaddam et al., 2016). Different parenting styles based on the balance between high and low levels of parental responsiveness (i.e., support) and demands (i.e., control) were introduced by Maccoby & Martin (1983). Accordingly, there are three parenting styles: Authoritative (democratic), autocratic (despotic & dictatorial), and permissive. Baumrind (1991) explained that parents with an authoritative parenting style respect their children's personalities while controlling them a properly and inspiring their social values. Also, in this style, there is a high rate of intimacy between parents, and children (Mash & Johnston, 1983). In the authoritarian parenting style, parents strictly control their children and force their children to obey their orders (Papalia, Wendkos & Duskin, 2006). in addition, parents use direct punishment techniques (Querido, Warner & Eyberg., 2002).

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Finally, parents with a permissive parenting style have low control and high intimacy with their children (Papalia et al., 2006). In this style, parents' demands from their children are shallow, and there are few rules about children's behaviours (Querido et al., 2002).

Children with ADHD put extra pressure on the family due to poor EF and problems such as deficits in inhibition, self-control, planning, and working memory. ADHD children need more parental external feedback to regulate their behaviors (Barkley, 1997). Parents can provide situations for the child to improve and enhance abilities related to EF (Alaniz, 2015). Vygotsky's theory explains how parenting behaviors would affect EF in children. He suggested that interpersonal interactions in a family environment can organize thinking processes. First, children can learn from adults, then shape their behavior, and thought without their help. Vygotsky believed that during the growth process, these external structuring processes became internal. In other words, initially, parents have the task of setting their children in many areas (e.g., hunger, sleep, and emotions), and these created external scaffolds gradually become internalized and build EF in children (Meuwissen & Carlson, 2015).

In addition, the relationship between parenting styles, EF and aggression has been noted in some studies. For example, a study has shown that poorer EF in children was correlated to parental greater use of authoritarian and permissive parenting styles (Hutchison, Feder, Abar & Winsler, 2016). Alternatievely, research, studied the relationship between parenting styles in the family environment and EF of children 5 to 12 years old. The results showed a positive relationship between parental responsiveness and appropriate rules setting with children EF

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(Schroeder & Kelley, 2010). Also, the relation inhibition with parenting styles was studied in a longitudinal study with children between two to eight years old. The results showed that parenting styles could play an important essential role in developing of a child's inhibition (Roksam, Stievenart, Meunier & Noel, 2014). Furthermore, in another study, the relationship between the development of child EF with maternal parenting in middle childhood and adolescence was studied. The results of the study showed that positive parenting methods were associated with problem-solving and planning (Samuelson, Krueger, Wilson, 2012).

Firouzkouhi Moghaddam et al. (2018), showed that the relationship between aggression with permissive and authoritative parenting styles was negative, and also, the relationship between aggressions with authoritarian parenting style was positive in ADHD children. A meta-analyses study, showed that the authoritative parenting style leads to healthy psychological behaviour while authoritarian, and permissive parenting styles are associated with aggression and unhealthy psychological behaviours in children (Masud, Ahamd, Cho & Fakhr, 2019). In another study has been shown that the authoritative parenting style varies between mild, moderate, and severe levels of aggression. In fact, with an increase in aggression, authoritative parenting style scores decrease. However, there is no difference between permissive and autocratic parenting styles at different levels of aggression (Servatyari et al., 2018).

Although the relationship between aggression in ADHD children, EF, and maternal parenting styles has been studied in pairs, no previous study has considered this combination of variables. Therefore, this study aimed to examine the

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relationship between aggression in ADHD children and parenting styles with mediation EF. It was hypothesized that (1) There is a causal model between aggression in ADHD children and maternal parenting styles that are mediated by EF. (2) Maternal parenting styles are associated with aggression in children with ADHD (3) Maternal parenting styles are correlated with EF. (4) EF is correlated with aggression in ADHD children.

Method

Participants

This was a descriptive correlational study conducted on primary school students with ADHD in the six and seven districts of Mashhad. Based on educational information, 410 students had ADHD in these two areas in the school year 2019-2020. These students had been previously diagnosed with ADHD by psychiatrists at educational counselling centres, and their names and numbers were registered in the education system. Among these students, based on Morgan's table, 200 students were required. 250 students were randomly selected, considering the possibilities such as lack of parental cooperation or lack of definitive diagnosis. The mothers were then called and requested to complete questionnaires and participate in a diagnostic interview. In addition to the diagnosis of ADHD, inclusion criteria included these items: conscious consent of the parent to participate in research, absence of significant sensory and motor defects. The final sample comprised 200 ADHD students aged 8 to 12 years.

Initially, the research proposal was approved by the research committee at the Shandiz Institute of Higher Education. Then

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the ethics committee of the educational department in Mashhad approved the research. After explaining the purpose of the study, questionnaires were distributed among the students' mothers.

Instruments

DSM Diagnoses

The Diagnostic Interview Schedule for children (DISC) was used to obtain childhood psychiatric diagnoses. The DISC is an assessment tool based on the Diagnostic and statistical manual of mental disorders from the American Psychiatric Association. The version employed in this study was based on DSM-IV-TR criteria. Nine ADHD Hyperactivity/Impulsivity symptoms and nine ADHD inattentive symptoms form part of this scale. A symptom is counted as present if mothers endorse it as problematic either at home or at school or both, for the previous 6 months.

Aggression Questionnaire

The Buss and Perry Aggression Questionnaire (1992) is one of the most widely used questionnaires to assess aggression. This questionnaire has 29 items and includes 4 subscales: Physical Aggression, verbal aggression, anger, and Hostility. Questionnaire scoring based on a 5-point Likert scale of I Completely disagrees to agree completely. Buss and Perry (1992) reported the Cronbach's alpha coefficient for the total questionnaire of 0.89. In the study of Buss and Perry (1992), the anger factor is highly correlated with three other factors that indicate the validity of test convergence. In an Iranian study, validity (convergence) was confirmed and its reliability was .88 using Cronbach's alpha coefficient (Mohammadi, 2007). In this study, Cronbach's alpha coefficient was used to examine the

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internal consistency of the questionnaire. The Cronbach's alpha coefficient for the whole questionnaire was .81.

Behavior Rating Inventory of Executive Function (BRIEF): BRIEF was developed by Gioia, Isquith, Guy, and Kenworthy (2000) evaluate behavior related to executive function in school-aged children in the home and school environments. This questionnaire is used for ages 5 to 18 and includes a Parent Form and Teacher Form, each containing 86 items. This questionnaire has eight subscales: Inhibit, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, Organization of Materials and Monitor, along with a Metacognition Index (MCI), Behavior Regulation Index (BRI), and a Global Executive Composite (GEC). In the present study, the parent form was used. The respondent is asked to answer questions about the child's performance over the past 6 months. The respondent is instructed to circle an 'N' For never a problem, "S" for sometimes a problem, and "O" for often a problem. Higher ratings are indicative of more significant perceived impairment. Factor analytic studies of the normative sample support the existence of two underlying factors, which have been used to develop the MCI and BRI (Gioia et al., 2000). Reliability studies are satisfactory, the Cronbach's alpha coefficient measure of internal consistency ranged from .8 to .98 for parent and teacher form and clinical and normative samples (Gioia et al., 2000). In an Iranian study, the validity (construct validity) was confirmed and GEC's reliability was 0.89 using Three-week test-retest correlations for clinical populations on parent form (Abdolmohamadi, Akizadeh, Ghadiri Taiebli & Fathi, 2018). In the present study, the reliability of the whole questionnaire was calculated .79 by Cronbach's alpha method.

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Baumrind's Parenting Styles Questionnaire (PSQ): In 1972, Baumrind first designed the scale, which includes 30 items (authoritarian, authoritative, and permissive parenting style consists of 10 statements). PSQ is typically scored using a Likert-type format from 1 (strongly disagree) to 5 (strongly agree). Parents are asked to respond to the items based on their opinions. Buri (1991) indicated the reliability of .81 for permissive, 0.92 for authoritative, and .92 for authoritarian parenting styles using the test-retest method. Moreover, an Iranian study reported the reliability of .69 for permissive style, .73 for authoritative, and .77 for authoritarian by the test-retest method (Moshtaghi, Mirhashemi & Sharifi, 2013). To assess the validity of this instrument, Buri (1991) showed the association between permissive and authoritarian at -.50, and between authoritative and authoritarian at -.52. Also, in the Iranian study, the validity (Construct validity) was confirmed (Moshtaghi et al., 2013). In this study, Cronbach's alpha coefficient was used to examine the internal consistency of the questionnaire. The Cronbach's alpha coefficient for permissive, authoritative, and authoritarian parenting styles was .82, .84, and .80, respectively.

Data Analysis

Data analysis was performed using SPSS V. 24 and AMOS V. 24. Descriptive statistics were used to explore variable means and standard deviations. Next, bivariate correlations were conducted to explore associations among variables. Finally, path analysis was used to examine the mediator model. It is important to note that all of the statistical tests were done with a level of confidence of 95%.

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Result

158 of participants were boys, and 42 of them were girls. The results of multivariate variance analysis showed that parent styles and aggression between girls and boys did not differ significantly. Furthermore, 75 mothers received the highest authoritative parenting style, 33 mothers in the authoritarian parenting style, and 92 mothers in the permissive parenting style. Table 1 shows the means, and standard deviation in the research variable.

Table 1

The Mean and Standard Deviation of the Research Variable

Variable	Mean	SD
Aggression	48.408	12.75
Executive function	102.79	28.73
authoritarian parenting style	17.2	4.23
authoritative parenting style	30.87	4.44
Permissive parenting style	32.19	4.32

There must be a statistically significant connection between the variables in order to test the mediator model statistically (Beshlideh, 2012). A correlation study was performed in order to determine the relationship between all of the variables, and the resulting correlation matrix is displayed in Table 2.

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Table 2

The Correctional Matrix between Aggression, Executive Function, Authoritarian Parenting Style, Authoritative Parenting Style, Permissive Parenting Style

Variables	1	2	3	4	5
1.aggression	1				
2. Executive function problems	.63**	1			
3. Authoritarian parenting style	.08	-.09	1		
4 authoritative parenting style	-.55**	-.48**	-.48**	1	
5. Permissive parenting style	.32**	.25**	-.67**	-.34**	1

** p<.01, *p<.05

Table 2 showed that aggression was positively related to EF (r=.63, p<.01) and permissive parenting style (r = .32, p<.01). Aggression was negatively correlated with the authoritative parenting style (r =-.55, p<.01). Furthermore, EF problems were positively related to the permissive parenting style (r =0.25, p<0.01) and negatively correlated with the authoritative parenting style (r = -.48, p<.01). However, the correlation between authoritarian parenting style with EF (r = -.09, p >.05) and aggression (r = .08, p > .05) was insignificant.

According to the theoretical basis of prior research and the correlation matrix of the present study, permissive and authoritative parenting styles were considered independent variables, whereas aggression was designated the dependent variable. EF was taken as the mediating variable. Due to the lack of a significant relationship

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between the authoritarian parenting style with aggression and executive function; the authoritarian parenting style did not enter the model. Path analysis was used to conduct the mediation model (Figure 1).

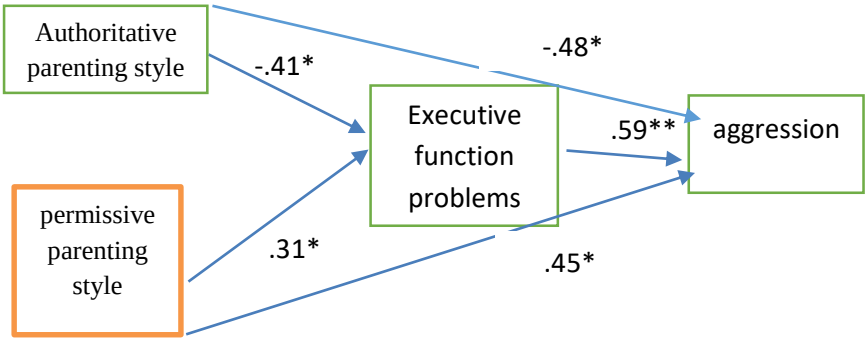

Figure 1. Path analysis to conduct the mediation model

** p<0.001

In order to evaluate the fit of the model, the Good Fit Index (GFI) was used to evaluate its justification power, and the Adjusted Good Fit Index (AGFI) was used to plot its stability. In addition, the Comparative Fit Index (CFI), and Root-Mean-Square Error of Approximation (RMSEA) were used as indicators of comparative fitness. Values indicating the acceptability of a model were previously specified as ≥ .9 for GFI, AGFI, and CFI, and ≤ .08 for RMSEA. The model fit indices are presented in Table 3. The RMSEA was .05, which is are smaller than the criterion value (.08); furthermore, other model fit indices were all larger than the criterion value (Table 3).

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Table 3

GFI, AGFI, RMSEA, and CFI Indices of Model Fit

	acceptable domains	Observed values	Evaluating fit indices
GFI	> .9	.899	Good fit
AGFI	> .9	.908	Good fit
RMSEA	< .08	.051	Good fit
CFI	> .9	.91	Good fit

Overall, considering the sum of the calculated fit Indies, the fit of the causal model between the authoritative parenting style and the permissive parenting style with aggression mediated executive function was confirmed. Based on the results presented in Table 4, the relationship between authoritative parenting style and aggression was negative and significant (p <.05). Also, the relationship between the permissive parenting style and aggression was positive and significant (p < .05). The relationship between executive function problems with aggression and permissive parenting style was positive and significant (P <.05) and with authoritative parenting style was negative and significant (P <.05).

Table 4

A Direct Path Coefficient between Research Variables in the Model

Path		Standardized coefficient	Unstandardized coefficient	Test statistics	Sig
authoritative style with	parenting executive	-.41	.37	9.11	P<.001

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function				
permissive parenting style with executive function	.31	-.28	8.2	.006
authoritative parenting style with aggression	-.48	-.45	8.4	P<.001
permissive parenting style with aggression	.45	.38	7.3	P<.001
Executive function with aggression	-.59	.49	10.12	P<.001

The Bootstrap method was used to determine the significance of intermediate relationships. Given the obtained results in table 5, the indirect coefficient related to the relationship between the authoritative parenting style and aggression mediated by executive function was significant (p<.05). Also, the indirect coefficient related to the relationship between permissive parenting style and aggression mediated by executive function was significant (p<.05). Therefore, it can be said that the executive function mediates the relationship between authoritative and permissive parenting styles and aggression.

Table 5

The Indirect Path Coefficient between Research Variables

Path	Standardized coefficient	sig
authoritative parenting style- executive function-aggression	-.25	.002
permissive parenting style - executive function- aggression	.22	P<.001

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Discussion

The current study showed that 75 (37.5%) mothers of children with ADHD had the highest score in the authoritative parenting style, 92 (46 %) had the highest score in the permissive parenting style, and 33 (16.5 %) had the highest score in the authoritarian parenting style. It is shown, Similar to the current study, that permissive parenting was observed more often among parents of children with ADHD in comparison with the control group (Buri, 1991). Indeed, it is often difficult for parents of children with behavior problems to engage in ideal authoritative parenting (Hutchison et al., 2016). Furthermore, the present study was done to investigate the causal link between parenting styles and aggression in ADHD children, which is mediated by EF. The findings demonstrated a significant negative relationship between the authoritative parenting style and aggression and EF problems. Also, the permissive parenting style was positively correlated with aggression and EF problems. However, there is no correlation between authoritarian parenting style with aggression and EF. Furthermore, the current study showed that EF is positively correlated with aggression. Eventually, the results showed that executive function is a mediator in the relationship between maternal authoritative and permissive parenting styles with aggression in children with ADHD.

The result of current research about the relationship between a permissive and authoritative parenting style with aggression has been found in other studies (Azimi, Vaziri & Kashani, 2012; Kawabata, Alink, Tseng, Van Ijzendoom & Crick, 2011; Firoozkhani Moghadam et al., 2018; Servatyari et al., 2018). Mothers who use authoritative parenting styles have intimate

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and safe relationships with their ADHD children. An environment like this allows children with ADHD to develop appropriate social skills such as empathy and prosocial behaviour, and at the same time, inhibit inappropriate behaviors such as aggression (Kawabata et al., 2011). As a result, children raised by authoritative parents have confidence in themselves and others, developing their positive social skills. These children have a greater chance of developing a secure attachment and, as a result, an optimistic cognitive representation of the relationship. Children with such a positive scheme of relationships do not react with anger in ambivalent social situations because they are less likely to perceive ambivalent social information negatively (Sroufe, 2005). In addition, mothers who use authoritative parenting style are flexible in their attitude, and therefore they have the ability to exert psychological control, which in turn is helpful in reducing aggression and dysfunctional behavior in children (Kawabata et al., 2011)

This study showed that children who have permissive mothers are more likely to be aggressive. They had a strong tendency toward self-government and disobedience, and they exhibited no indicators of good autonomy or personal accountability (Alizadeh & Andries, 2002). In the early socialization setting, parents who are indulgent and do not establish suitable boundaries and regulations for their children provide negative reinforcement for their children's disruptive behavior, including violence. In other words, many permissive parents may be unable to transmit a sufficient amount of cognitive and behavioral control or supervise/monitor their children's hostility. (Kawabata et al., 2011).

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Similarly, to current research, some studies concluded that there is no relationship between maternal authoritarian parenting style and aggression levels. (Servatyari et al., 2018; Kawabata et al., 2011; Bardina & Wilson, 1997). The non-significant relationship between authoritarian parenting style and aggression may have occurred because only a few participants received the highest scores in this category. Another reason for this finding is that the study's mothers may have selected socially acceptable replies to the parenting style questionnaires. In addition, mothers may also have a less authoritarian parenting style.

It is shown in some studies similar to the current study that authoritative parenting is associated with child EF (Distefano, Galinsky, MacClelland, Zelazo & Carlson, 2018; Schroeder & Kelley, 2009). Authoritative parenting behaviors such as support and legislation seem to play a vital role in the growth of EF in young children (Bernier, Carlson & Whipple, 2010). An authoritative parenting style consists of the following parenting behaviors: (1) providing an appropriate level of assistance for the challenges that children face (2) encouraging and rewarding children based on their performance; (3) viewing the world through the eyes of children; and (4) providing different options for children and respecting their choices (Grolnick, Gurland, DeCourcey & Jacob, 2002; Whipple, Bernier & Mageau., 2011). The authoritative parenting style may improve EF by assigning challenging tasks, but not those that are extremely difficult and reinforce EF (Diamond & Ling, 2016). Mother’s legislation support operates within the children’s zone of proximal development. The gap between what a learner can do without aid and what he or she can accomplish with instruction and encouragement from a more competent social partner is

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referred to as the zone of proximal growth (Vygotsky, 1987). EF is developed during challenging and goal-directed tasks, and authoritative mothers give their children this opportunity (Distefano et al., 2018). Mothers who use an assertive parenting style assist their children develop autonomy by listening to them, respecting their pace, and ensuring that they contribute positively to the job at hand. In this style, mothers give their children the opportunity to choose instead of making decisions. Furthermore, parents provide questions to their children that attract their attention to all parts of the difficult tasks. Over time, the child internalizes this process, which can lead to self-regulation (Meuwissen & Carlson, 2015).

Furthermore, Hutchison et al. (2016), similar to the current study, demonstrated a negative relationship between permissive parenting and EF in ADHD children. Permissive parents have few demands from their children and have little control over them. Such families lack structure, rules, and expectations. Parents with permissive styles are responsive rather than demanding. Permissive parents do not behave maturely and do not develop self-regulation in children because they are easy-going. (Firouzkouhi Moghaddam et al., 2018). Permissive mothers fail to build appropriate inhibitory/self-regulatory abilities in their children.

Similar to the current study, Harrison (2006) found no correlation between authoritarian parenting style and EF. As previously stated, we relied on self-reporting of parenting behavior in our research, which has the disadvantage that women tend to underreport the usage of parenting techniques that are seen as undesirable. Furthermore, EF skills develop when parents react flexibly to their children's errors. To reduce

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the error rate in subsequent activities, the children should have the opportunity to learn from their past mistakes (Sosic-Vasic et al., 2017). Strict parents do not give their children the opportunity to make mistakes and are constantly guiding and directing.

It is shown in some studies similar to the current study that in boys with physical aggression, EF skills were impaired (Séguin, Pihl, Harden, Tremblay & Boulerice, 1995). Similarly, younger children labeled "difficult to manage" had more EF problems than groups "easily managed" (Hughes, 1998). Furthermore, according to some studies, EF has a strong negative effect in predicting physical aggression (Rohlf et al., 2018), and EF and relational aggression have a significant negative association (Waller, Hyde, Baskin-Sommers & Olson, 2017). The link between EF and aggression may be viewed from several perspectives. From a neuropsychological perspective, EF problems and emotion regulation have common structures in the brain (prefrontal cortex). EF has also been found to help people control their emotions on a behavioral level (Zelazo and Cunningham, 2007). The association between inhibition and emotion regulation in early childhood has been supported by empirical research (Carlson & Wang, 2007). Additionally, from the standpoint of social-information-processing (SIP), lower EF has been associated with an interruption of social-information processes, which might result in violent behaviour (Fontaine, 2010). Children with poor EF cannot respond appropriately despite the presence of social cues (Hoaken, Shaughnessy & Pihl, 2003; Mullin & Hinshaw, 2007). In the same way, impaired memory and attention abilities result in misunderstanding of social signals, which may be a significant component in the development of violence in children

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(Arsenault & Foster, 2012). Further, working memory plays a vital role in socially adaptive behavior. Working memory stores and processes relevant information and enables movement towards the goal. Inhibition is necessary for managing unwanted and impulsive social activities that may seem attractive at the time but have long-term harmful implications. Individuals with poor EF (children with ADHD) are more aggressive because of their inability to prevent impulsive behaviors (Hoaken et al., 2003). Similar to the current study, past research has found that authoritative parenting gives children with a socializing setting that improves their emotion regulation and social adjustment (Zhou et al., 2002), and that lower levels of aggressive behaviour may be associated with these variables (Eisenberg et al., 2001; Eisenberg et al., 2001). Children who don't know how to control their emotions, think before they act, and interact with others may be unable to keep their anger or hostility under control when they're angry with their peers. This can lead to aggressive behaviour toward others.

Limitations of the Study

Several limitations should be noted. First, we only used the mother's report to assess aggression and parenting style. Although other informants (as teacher's report for aggression and executive function, children's report for parenting styles and observation for both of them) have their unique limitations (e.g., observations can only be made for a relatively limited period of time; teacher' reports may be influenced by social environment effects and children's reports may not be accurate enough). It is possible that the integration of more information broadened our conclusions. The second limitation of the current study was subjective EF measures, as the use of the objective test was

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time-consuming and costly. Third, it is a cross-sectional study that focuses on relations between variables. A longitudinal study is necessary to determine whether parenting styles during the years can affect the EF and aggression in ADHD children. Furthermore, it was impossible to perform independent statistical analyses between the two sexes and compare the results, because the number of girls was much lower than boys. Finally, the results of this study are limited to the effect of maternal parenting style on executive performance and aggression.

The findings of this research show that paying attention to the parents of children with special needs is just as essential as paying attention to the children themselves and their issues. It's important for parents of children with disabilities to get help. They can also learn about the long-term effects of non-authoritative parenting styles and how to avoid them. They also need more specific help on how to be more effective parents when their kids are difficult and aggressive. Indeed, one of the behavioural parent training interventions is to improve parenting skills and correct bad parenting habits. In addition, based on the clinical findings of this research, evaluating EFs is an important part of planning to intervene in aggressive behaviours, particularly in children with ADHD.

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