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Original Article

COVID-19 Anxiety in Children and Its Relationship with Self-Related Skills of Executive Functions

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Abstract

Objective: Some children experience a significant deal of anxiety during the outbreak of COVID-19. Behavioral dimensions of the executive function appear to link to situational anxiety experience. Therefore, the primary aim of the present study is to investigate the relationship between self-related skills of executive functions and the level of anxiety in children (8-12-years-old) during the outbreak of COVID-19. Also, the secondary goal of this study is to predict the level of anxiety based on self-related skills of executive functions.
Method: Parents of 300 children filled out the Barkley Deficits in Executive Functioning Scale (BDEFS) and the COVID-19 anxiety scale. Data were analyzed using correlation and path analysis. A significance level of less than 0.05 was set for all tests. Data were analyzed using SPSS 22 software.
Results: Results demonstrated that self-related skills of executive functions can predict 28% of COVID-19 anxiety. The subscales of self-management ($P < 0.015$, $t = 5.56$), self-regulation ($P < 0.011$, $t = 6.37$), self-restraint ($P < 0.035$, $t = 4.29$) and emotional self-organization ($P < 0.042$, $P = 0.222$) predicted coronavirus anxiety, but self-motivation ($P < 0.05$, $P = 0.894$) did not.
Conclusion: Given that most subscales of executive function predict anxiety tied to critical situations such as the prevalence of the corona virus, it seems that greater attention should be allocated to the fostering and development of children's executive functions by teaching such skills at home by families.

Key words: *Anxiety; Children; COVID-19; Self-Management; Self-Regulation*

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Coronavirus represents a large family of viruses that can cause respiratory infections, ranging from common colds to severe respiratory illnesses. The new strain of this virus has been called COVID-19, which first broke out in Wuhan, China, in December 2019. This epidemic is not only a threat to physical health, but also to the mental health of people (1). Huang and Zhao (2020) reported that during the outbreak of the COVID-19, anxiety and depression increased in people under the age of 35 in China. These disorders positively correlate with age and the degree of exposure to news about the disease (2), but scant attention has been paid to children's anxiety during the Coronavirus outbreak. Children seem to be especially vulnerable to anxiety, as most families are in home quarantine and constantly listen and discuss coronavirus statistics, which can create a stressful situation for children (3). Recurrent negative thoughts are a source of anxiety for children, which can exert harmful effects on children in the long run.

Situation-specific anxiety describes the sense of fear and terror that one feels in a stressful situation (4). In our study, the anxiety induced by the outbreak of COVID-19 in children has been considered as situation-specific anxiety, as it bears the hallmarks of a stressful situation, such as perceived fear of the virus, preparation for the stressful event, uncertainty about outcomes, coping strategies and its consequences (4). Therefore, by identifying the differences in the underlying factors that lead to situation-specific anxiety, we can strengthen children better to control the level of anxiety in future events so that children will experience less situation-specific anxiety in the event of similar crises in life.

One of the factors that influence the level of situation-specific anxiety is Executive Function (EF) (5). EF is defined as several self-regulation skills such as emotional self-regulation, self-organization/problem-solving, self-restraint, self-motivation, and self-management to attain predefined goals (6). The following elaborates on the association between each of these related skills and anxiety.

Self-regulation is defined as the ability of suppressing dominant impulses to moderate thoughts, behaviors, and emotions (7). Poor self-regulatory strategies will likely direct one's feelings toward other methods that are not effective, which will ultimately lead to elevated levels of anxiety (8, 9). The results of a meta-analysis suggested that high levels of self-regulation are associated with lower levels of anxiety in children (7). Another study reported that children with less emotional self-regulation are more likely to experience anxiety and depression than others (10). Self-organization or problem-solving is a high-order cognitive ability that helps an individual deal with life's challenges. It has been shown that impaired self-organization/problem-solving may lead to self-oriented rumination, which will eventually aggravate anxiety in individuals (11). Negative problem orientation and rational problem solving are assumed to be the sources of trait anxiety and depression (12). Gail, Thomas, and Dzurita (1998) revealed that disability in solving social problems is associated with state anxiety in the elderly (13). Studies have shown that people with poor problem-solving abilities experience higher levels of anxiety (12). Self-restraint is conceptualized as the ability to quickly suppress self-directed tendencies to promote one's long-term goals (14). People who are more socially compatible exhibit better self-restraint, because they engage in self-management practices to present a positive impression and are not overly inexorable or enlightened (15-17). Poor self-restraint has been found to increase the level of state anxiety in people (14). Self-motivation is defined as a stimulus that arises from one's inner tendency to fulfill one's needs (4). Chean and Gao (2014) argue that children experience anxiety when their self-motivation is impaired. On the other hand, Chen, Huang, and Shang (2016) have exhibited the relationship between self-motivation and mental health in the elderly (18). Self-management is described as the optimal use of the available time and reflects planning, goal setting, prioritization of goals and proper and effective execution of activities (19, 20). Self-management is a factor that plays a crucial role in anxiety. As a result of improper time management, a person would not have sufficient time to perform tasks such as social activities. This, in turn, lowers the person's self-satisfaction and amplifies anxiety states (19). Kaya *et al.* (2012) suggested that students' time management skills become undercut when they are stressed (20). Also, Ghiasvandi *et al.* reported that nurses with poor self-management suffer from more anxiety (19).

The impact of the environment on cognitive function is well established. Many studies have shown that social isolation during the COVID-19 lockdown affects the executive functions of individuals. In 2021, Hand and Maciejewski reported that social isolation undermined the cognitive function of people aged 18-72 (21).

Lavigne-Cervan, Costa-Lopez, Juárez-Ruiz de Mier, Real-Fernández, Sánchez-Muñoz de León, and Navarro (2021) studied the effect of lockdown during the COVID-19 pandemic on stress, sleep quality, and executive function in children and adolescents aged 6 to 18 in Spain. This study suggested that children in the age range of 9 to 12 years had the highest level of anxiety and that, irrespective of age, executive dysfunction was more severe in males than in females. There was also a positive association between state anxiety, sleep quality, and executive function. Also, in this study, path analysis exhibited that anxiety exerts the highest impact on executive dysfunction in all age groups (22). Another study revealed that state anxiety during the COVID-19 and home quarantine were associated with diminished executive function in 60-year-olds, so that aggravated state anxiety reduced their cognitive function (23).

Since Iran and some other countries still struggle with the COVID-19 pandemic and social distancing and home quarantines are in place, the impact of these

conditions on the mental health of children and adults should be taken into account. This is not only because the effect of these conditions on children has received scant attention compared to adults (23, 24), but also because children in the age range of 8 to 12 years are going through the fastest developmental changes in neural, physiological, and molecular connections of the anterior cortex of the brain, which will induce lasting effects until adulthood. A growing body of research has also demonstrated the effect of anxiety on executive function during the COVID-19, whereas very few studies have explored the effect of executive function on stress management in critical situations such as the outbreak of the infectious COVID-19 disease. Besides, this study seeks to examine the effect of environmental conditions on children's mental state of anxiety and to take a more in-depth look at the impact of these conditions on the physical states of children's anxiety. Accordingly, this study is designed to investigate the effect of children's executive function on their state anxiety (mental-physical) during the COVID-19 pandemic and home quarantine. Furthermore, a secondary goal of this study is to predict the relationship between executive function and anxiety in children using path analysis.

Materials and Methods

Participants

The study included 300 healthy children, including 103 girls (34.33%) and 197 boys (65.66%) between the ages of 8 and 12 (M = 10.7; SD: 1.95). The exclusion criteria were: 1- mental disorders such as autism, hyperactivity, anxiety, depression and developmental coordination disorder in the past or at present; 2- use of psychotropic drugs; 3- an IQ less than 85; 4- being above or below the study age range, and 5- physical disorders.

Materials and methods

1- Corona Disease Anxiety Scale: This Persian form of Coronavirus Anxiety Scale has been developed and validated to measure anxiety induced by the outbreak of the Coronavirus. The final version of this scale contains 18 items and two variables. Items 1 to 9 measure psychological symptoms, and items 10 to 18 measure physical symptoms. The instrument is scored on a 4-point Likert scale (never = 0, sometimes = 1, often = 2, and always = 3), so the scores will be in the range of 0 and 54. High scores in this scale indicate a greater level of anxiety in individuals. The Guttman's λ2 value for the whole questionnaire in the Iranian population was (λ = 0.922). Cronbach's alpha coefficient for psychological symptoms was (α = 0.879), for physical symptoms it was (α = 0.861) and for the whole questionnaire it was (α = 0.919). The reliability and validity of this questioner were confirmed in the Iranian population (25). In our study, the reliability of this tool was assessed using Cronbach's alpha method for the first (α = 0.879) and second (α = 0.861) variables and for the whole scale (α = 0.99). After selecting the questionnaire, confirmatory factor analysis was conducted to validate the Coronavirus anxiety scale before carrying out the study. The results of model fitness indicators in this study (NNFI = 0.98, NNFI = 0.99, CFI = 0.97, IFI: 0.99, GFI = 0.99, AGFI = 0.98, RMSEA = 0.052, df = 125, X2 = 36/227, $\chi 2/df$ = 1.81) suggested that the bivariate model of Coronavirus Anxiety was fit.

2- Barkley Deficits in Executive Functioning Scale (BDEFS): This scale was designed by Barkley (2012) to represent executive functions in non-clinical and clinical populations, especially children and adolescents. This 70-item scale is scored on a 4-point Likert scale ranging from never to always. It also contains 5 subscales that measure the executive functions of self-management (items 1-13), emotional self-regulation (items 14-27), self-restraint (item 28-40), self-motivation (item 41-54) and self-organization/problem solving (items 55 to 70). Seven scores are extracted from the scores of this scale: five are related to subscales, one is the total score, and another score is calculated from 11 items of this scale, which are considered as the list of executive functions. Scores between 70 and 140 denote deficits in executive functions, scores between 140 and 175 reveal a moderate deficit in executive functions, and scores above 175 suggest a severe deficit in executive functions (26). This scale has been translated into Persian, and its validity and reliability have been corroborated in many studies. Cronbach's alpha coefficient for the whole questionnaire is (α = 0.9). The reliability and validity of this questioner was confirmed in the Iranian population (27).

Research design

The present study is a cross-sectional, correlational research. We used a stratified sampling method for this study, and the sample was chosen from six schools that formed the study population. Parents of children aged 8-12 years in Mashhad were invited to participate in the study to assess their children's skills by contacting the first author of this study. An online session was arranged for participants. During the orientation session, the study's goals were explained to the participants, and the parents signed an informed consent form for participation in the study. Subjects were told that they had the right to withdraw from the study at any time. Parents also filled out the Barkley Deficits in Executive Functioning Scale and the Coronavirus anxiety questionnaire for their children. Finally, the information obtained from 300 participants was examined. This study was approved by the ethics committee of the biological research center of Ferdowsi university of Mashhad (IR.UM.REC.1399.014). The study was conducted in compliance with the principles of the Declaration of Helsinki.

Statistical analysis

Cohen's recommendations and criteria were used to confirm the sample size necessary to detect a medium population effect size at power = 0.80 for α = 0.05 for the number of variables in the study. The missing values were less than. 05% and were replaced by means (28). Before data analysis, the normality of data distribution was examined. The results manifested that all data was normally distributed. Pearson correlation method was recruited to investigate the relationship between executive functions and anxiety scores. Then, a model was developed to investigate the relationship between EF components and anxiety. For the model, the assumptions regarding the linearity of variables and the independence of errors were examined. Accordingly, the structural equation method was used to fit the model. A significance level of less than 0.01 and 0.001 was considered for the test. Multiple regression tests were also performed to assess the power of EF factors in predicting the prevalence of COVID-19 anxiety. A significance level of less than 0.05 was set for all tests. Data were analyzed using SPSS 22 software.

Results

Descriptive features of participants

In this study, data was collected from 300 participants in the age range of 8 to 12 years. Sociodemographic characteristics for the research participants are shown in Table 1. Also, Table 2 shows the descriptive indicators related to research variables, i.e., executive functions and anxiety.

Table 1. Descriptive Statistics for Chronological Age, Intelligence, Gender, Parent Education of Participants

Variables	N = 300
Chronological Age (year), Mean (SD)	10.71(1.95)
Intelligence, Mean (SD)	99.23 (7.81)
Gender, n %	
Male	197 (65.66%)
Female	103 (34.33%)
Parent education, n %	
High school	11 (3.66%)
High school diploma	28 (9.34%)
Bachelor	174 (54%)
Master of art	59 (19.66%)
Ph.D.	28 (9.34%)

Table 2. Descriptive Characteristics of Executive Functions Subtests and Corona Disease Anxiety in Children

Variables	Mean (SD)	K-S (Z)	P
Executive Functions			
Self-management	30.14 (3.38)	1.62	0.14
Self-organization	36.16 (4.12)	1.48	0.21
Self-restraint	32.58 (3.52)	1.38	0.32
Self-motivation	37.70 (4.75)	1.55	0.18
Self-regulation	45.46 (6.83)	1.42	0.24
Total score	182.45 (16.67)	1.88	0.07
Anxiety			
Psychological symptoms	16.14 (3.08)	1.34	0.34
Physical symptoms	14.50 (2.96)	1.76	0.09
Total score	32.44 (6.82)	1.85	0.12

As shown in Table 1, the means and standard deviations for the executive functions and the coronavirus anxiety scales were 182.45(16.26) and 32.44(6.82), respectively. Also, the Kolmogorov-Smirnov statistic was not significant for the total score of the executive functions and the Coronavirus anxiety scales (P > 0.05). Hence, the executive functions and Coronavirus anxiety scales had a normal distribution.

The relationship between components of executive functions and anxiety

The correlation matrix of executive functions and anxiety scales is shown in Table 3.

Table 3. Pearson Correlation Coefficient of Executive Functions Subtests and Corona Disease Anxiety in Children

Variables	Self-management	Self-organization	Self-restraint	Self-motivation	Self-regulation	Total score	Anxiety
Self-management	1						
Self-organization	0.36*	1					
Self- restraint	0.28*	0.31*	1				
Self-motivation	0.33*	0.25*	0.27*	1			
Self-regulation	0.37*	0.23*	0.24*	0.29*	1		
Total score	0.53*	0.55*	0.49*	0.46*	0.51*	1	
Anxiety	-0.44*	-0.47*	-0.49*	-0.12	-0.48*	-0.53*	1

*P < 0.05

As displayed in the table above, the overall score of executive functions and its subscales, except for self-motivation, are negatively and significantly correlated with coronavirus anxiety at a level of P = 0.05.

Structural equation modeling

Structural equation modeling was used to corroborate the relationship between executive skills and coronavirus anxiety. The total score of the EF as the criterion variable and the total score of coronavirus anxiety as the predictor variable were entered in the model. The model path coefficients are significant in this method because if the model path coefficient is without a predictive value, then the regression method will be meaningless. Our model had desirable fitness, so the Comparative Fit Index (CFI) and the Tucker-Lewis index should be equal or greater than 0.95. In our study, these indices were 0.98 and 0.96, respectively. Standardized Root Mean Square Residual (SRMR) should be less than 0.08, and the Root Mean Square Error of Approximation (RMSEA) should be less than 0.06. In our study, these indices were 0.77 and 0.05, respectively. Figure 1 shows the pattern of predicting coronavirus anxiety fitted by EFs.

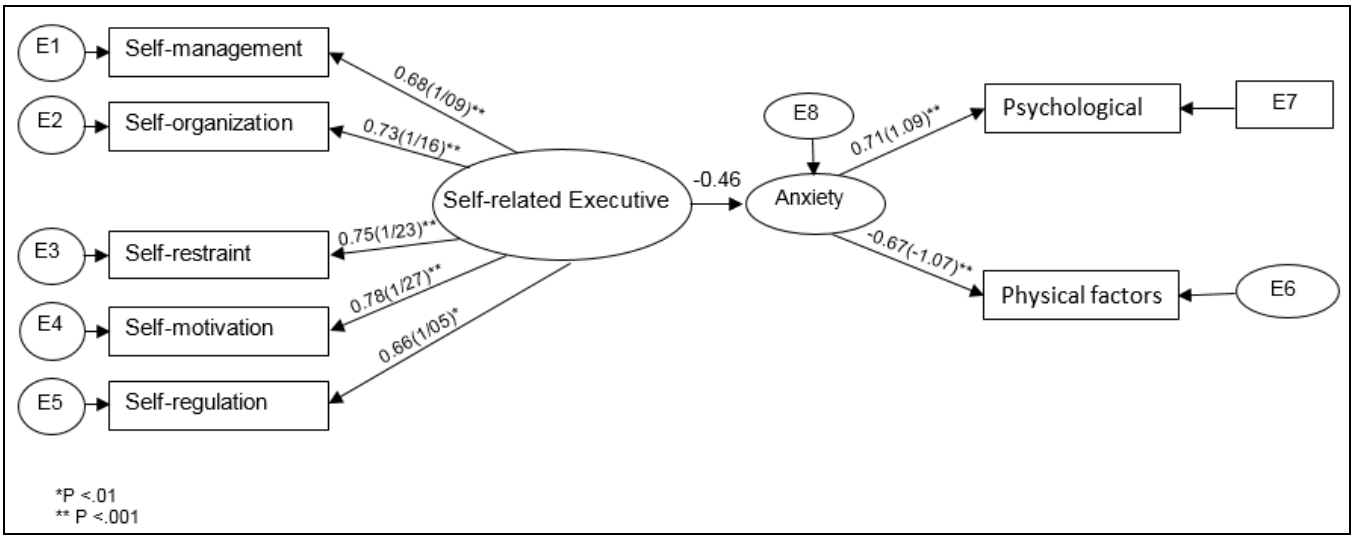

Figure 1. Path Coefficient Concerning the Relationship between Executive Function and Coronavirus Anxiety in Children. The Numbers Inside the Parentheses Indicate the Standard Path Coefficient, and the Numbers Outside the Parentheses Exhibit the Non-Standard Path Coefficient.

The path coefficients between self-management (β = 0.68, P ≥ 0.001), self-regulation (β = 0.73, P ≥ 0.001), self-restraint (β = 0.75, P ≥ 0.001), emotional self-organization (B = 0.66, P = 0.01), and EF are positive and statistically significant. On the other hand, the path coefficient between mental factors and anxiety is positive and statistically significant (β = 0.71, P ≥ 0.001), and the path coefficients between physical factors and anxiety are negative and statistically significant (β = -0.67, P ≥ 0.001). In general, Figure 1

shows that the path coefficient between executive functions and anxiety is negative and statistically significant (β = -0.46, P ≥ 0.01). Since this effect is negative, it can be stated that higher levels of executive functions reduce coronavirus anxiety in individuals.

Predicting coronavirus anxiety as a component of executive functions

To answer the research hypothesis, multiple regression was used, the results of which are shown in Tables 4 and 5. The results of multiple regression analysis (Table 4) show that coronavirus anxiety can be predicted through executive function components F (4.295) = 8.55, P < 0.01.

Table 4. Results of Multiple Regression to Predict Coronary Anxiety based on Executive Functions Subtests in Children

Source of changes	Total squares	Degree of freedom	Mean of squares	F	Significant
Predictor	3254.762	4	325.762	8.55	0.01**
Left over	157421.325	295	380.24		
total	160676.086	299			

The results show that the square of the multiple correlation coefficient is significant (R2 = 0.28, Fchange: 8.55, sig. F change: 0.01). This indicates that the predictor variables (the components of executive functions) can explain 28% of the changes in coronavirus anxiety.

The results of multiple regression coefficients are reported in Table 5 to investigate which of the components of executive functions can predict the variable of coronavirus anxiety. Results showed that only four components of EF significantly predicted coronavirus anxiety. Self-management (β = -0.42, t = -5.56, P = 0.015), self-regulation (β = -0.25, t = -3.22, P = 0.04), self-restraint (β = -0.37, t = -4.29, P = 0.035) and self-organization (β = -0.45, t = -6.37, P = 0.011) were significant predictors of coronavirus anxiety. These results suggest that participants who had a poor performance in these components were more likely to suffer from anxiety induced by crises such as coronavirus outbreaks.

Table 5. Standardized Multiple Regression Coefficients of Executive Function Subtests in Predicting Coronavirus Anxiety in Children

Predictors	Regression coefficients (B)	Standard Deviation error	Standardized regression coefficients (β)	T	significant
Constant value	93.02	6.25		13.16	0.0001
Self-management	-1.02	0.086	-0.42	-5.56	0.015*
Self-regulation	-0.98	0.092	-0.25	-3.22	0.042*
Self-restraint	-1.08	0.065	-0.37	-4.29	0.035*
Self-motivation	-0.13	0.96	-0.06	-0.894	0.675
Self-organization	-1.13	0.074	-0.45	-6.37	0.011*

Discussion

The main goal of this study was to investigate whether the self-related skills of EFs were associated with situation-specific anxiety induced by the outbreak of the COVID-19 in children. According to the findings, there is a 53% negative correlation between the total score of EF and Coronavirus anxiety, and given that this effect is negative, it can be contended that a higher level of self-related skills of EFs in children will reduce their anxiety in the face of a stressful situation like the coronavirus outbreak. In addition, our results exhibited that skills related to self-executive functions were generally able to explain 28% of coronavirus stress. Our results suggested that coronavirus anxiety was negatively and significantly associated with emotional self-regulation, self-organization/problem-solving, self-restraint, self-motivation, and self-management.

The results of our study, consistent with Lavigne-cervan *et al.* (2021), revealed a negative relation between anxiety and EF during the COVID-19 pandemic in 6-18-year-old children and adolescents (22). Also, our results were in line with studies that show the relation between anxiety and cognitive function during the pandemic in different population ages (21, 23). Psychological reactions to the pandemic are usually acute, and long-term emotional consequences can be observed (29). In addition, in regards to EF, Lavigne-cervan *et al.* (2021) found in their study that male children and adolescents showed more alterations in planning and organizing and a higher ability to self-regulate their emotions, manage

time well, solve problems, be motivated, adapt to different circumstances, and inhibit inappropriate behaviors (22).

In all studies, it has been assumed that the coronavirus pandemic triggers psychological disorders in individuals, impairing cognitive function in different age groups (21-24, 30-35). Even though this view of the current situation seems rational, this study attempts to investigate the effect of different components of executive function on the level of physical and mental stress in children. Therefore, given the strong negative relationship between executive function and children's stress, the development of children's executive function can probably be considered a way to overcome and manage stress in critical situations. In this regard, the results of a study showed that executive function is associated with caring and health behaviors during the COVID-19 pandemic, and people with executive dysfunction tend to display self-care behaviors to a lesser degree. Subsequently, their mind is preoccupied with negative thoughts and they lead a more sedentary lifestyle characterized with over-indulgence on digital media (36). The results highlight the importance of high levels of executive function, which embrace goal-oriented cognitive behaviors in people's lives.

On the other hand, Ensenberge *et al.* (2010) exhibited a negative relationship between emotional self-regulation and anxiety in children. In the context of the global epidemic crisis, it appears that probably children with a high level of EFs can moderate negative thoughts, understand the situation and respond appropriately so that they might endure lower anxiety. Although the development of self-regulatory skills is a process linked to cognitive development (executive functions) and genetics (37), the role of the environment in developing this skill should not be overlooked. Therefore, as an environmental factor, family plays a crucial role in developing children's self-regulatory skills (38). Research has shown that parents who are sensitive to and responsible for their children's emotions will improve the growth of emotional self-regulation in their children (39-41). When parents talk to their children about emotions, they teach the meaning of a wide array of emotions to their children under diverse circumstances, which is indirectly related to the development of emotional regulation skills in children. During the emotional self-regulation of children, they must be capable of self-organization or addressing the problem at hand.

In our study, the self-organization/problem-solving skill was negatively and significantly associated with anxiety levels in children. This means that probably a higher level of self-organization/problem-solving skills in children is associated with a lower perception of anxiety. People with advanced problem-solving skills are less likely to experience anxiety in the face of stressful events in their life. Self-organization/problem-solving skills are directly linked to competence, productivity, and positivity (42). It has been suggested that to solve a problem, we need first to define the problem or issue, identify the solutions, make a decision, and finally execute that decision (43). It seems that since COVID-19 has triggered a new deadly disease, posing a tremendous challenge to all families, it is imperative to implement these four activities to relieve anxiety in children. In some cases, it is observed that people need self-restraint skills to deal with problems to suppress personal desires and wishes that are not conducive to the resolution of the issue.

An individual with poor self-restraint is unable to suppress her/his desires. Hence, observing the deterioration of a problem intensifies stress. The results of our study manifested that self-restraint has an inverse and significant relationship with anxiety, which aligns with the study by Farell and Sullivan (2000), according to which poor self-restraint raises the level of state anxiety in the individual (14). Although high self-restraint exhibits the ability to refrain from impulsive behaviors, it is also associated with a desire to align yourself with the majority of people in the society and a controlled style of coping (44). It seems that under stressful situations, children should first be informed of the intra-personal factors of this problem. They should then be assisted to manage their anger and show regard for the health of other people in the society while their sense of social responsibility is stimulated. When a child figures out the reasons for her/his self-restraint, which might be in line with her/his long-term goals in life, she/he may be able to tolerate lower-level anxiety. At this time, when the child has to give up her/his desires, self-management comes to the fore to avoid squandering time and to start educational processes.

Our study revealed that time management had an inverse relationship with anxiety. This is in line with a study by Ghiasvandi *et al.* (2008), according to which stronger self-management in nurses reduced their anxiety (19). People with excellent time management do not focus on a particular subject for a long time but divide their time among different activities such as work, personal life, and performance of favorite activities (20). In this regard, we need to plan the time available to reach our goals in the shortest time possible. Lack of efficient planning in children's lives may interfere with their academic success. Therefore, it seems that during home quarantine, special planning is required for spending time so that children can engage in educational activities along with other activities at home. The stress inherent in learning educational materials, in addition to the risk of disease, can build up anxiety in children.

On the other hand, the results of our study revealed that there was no significant relationship between self-motivation and coronavirus anxiety. Barkely and Morphy (2011) demonstrated a negative relationship between self-motivation and anxiety in adults with attention deficit hyperactivity disorder. Chen, Huang, and Shang (2016) also reported a negative and

significant association between self-motivation and anxiety in the elderly. As mentioned earlier, the statistical population of these studies consisted of adults, while our statistical population comprised of children, and we did not find a significant relationship between self-motivation and anxiety. Although self-motivation has a positive and significant relationship with mental health, it is at work when the goal is sufficiently captivating, important, and compatible with the person's other goals (45). It appears that children cannot set proper goals, due to their undeveloped cognitive abilities, or organize their activities to achieve a goal. Because of the lack of behavioral regulation strategies to achieve their goals, they may grow anxious. On the other hand, children cannot internally reinforce their positive behaviors and use positive self-talk techniques to guide their behavior toward the selected goals.

Limitation

The current study has some limitations, one of which is that the measures used are based on reports by the participants' parents who are subject to over or under-reporting. Also, self-report about daily EF may not index the same construct as laboratory EF tests. Future studies may be conducted using laboratory EF tests. Additionally, the study was cross-sectional, and we used path analysis and statistical probabilistic stochastic terms that do not mean a cause and effect relationship. Another limitation of this study was that our aim was not to compare pre-pandemic and post-pandemic results. Because anxiety may be correlated in general (and not specifically about the COVID-19 pandemic) with EF, future studies are required to compare this issue. Despite the limitations described above, this study has some strengths. We explored children's anxiety under the coronavirus crisis, while other studies have mainly focused on adults or medical staff.

Conclusion

Given that most components of EFs can predict anxiety tied to critical situations such as the prevalence of the Coronavirus, it seems that families should utilize the methods as mentioned earlier to reinforce each element of their executive functions and to pay greater attention to the growth and development of children's executive functions; since, anxiety is the underlying cause of other mental disorders in later life. Lack of coordination in these skills prevents individuals from reacting correctly to anxiety-inducing situations, and consequently, they may endure mounting anxiety.

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Conflict of Interest

None.

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