

Investigation of The Relationship Between Separation Anxiety, Self-Regulation And Executive Function Skills in Kindergarten Children

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Abstract

Separation anxiety, which occurs because kindergarten children are separated by entering a different environment, can result in not wanting to go to school, and it is important to have self-regulation and executive function skills in order to cope with this anxiety and ensure adaptation to school. This study aims to observe the relationship between kindergarten children's separation anxiety and their self-regulation and executive function skills. 79 kindergarten children were included in the study. The Separation Anxiety Scale for Kindergarten Children (SASKC), Self-Regulation Skills Scale for Children Aged 4-6 Years (SRSS), and Childhood Executive Functions Inventory (CHEXI) were used for collecting data. Between SASNC results SRSS's total ($r=-0,286$, $p=0,011$), inhibitory control ($r=-0,315$, $p=0,005$), and attention ($r=-0,249$, $p=0,027$) score a significant negative correlation was found. There was a positive correlation between SASNC and CHEXI total ($r=0,277$, $p=0,013$) scores. In our study, it was found that students with better self-regulation and executive function skills experienced less separation anxiety. Showing high performance in situations that require self-regulation and executive skills can have a positive effect on children being less depressed and experiencing less anxiety in the face of incidents than their peers. As found in previous studies, executive function skills in the preschool period were found to reflect school readiness. In addition, self-regulation skills are very important for children in regulating their behavior and coping with their anxiety. Because a child who struggles with behavioral control could not feel like a part of her friends' and the school's community and could not want to go to school. Therefore, before starting preschool education, it is important to develop self-regulation and executive function skills to both reduce anxiety and adapt to school.

Keywords: Anxiety, Self-control, Executive Functions, Kindergarten children, Separation



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GENİŞLETİLMİŞ TÜRKÇE ÖZET

Giriş

Çocukların dil, fiziksel, bilişsel, psikomotor ve sosyal gelişimleri, eğitimin ilk basamağı olan okul öncesi eğitiminde büyük oranda tamamlanmaktadır (Alisinanoğlu ve Kesicioğlu, 2010). Kaygı bozukluklarının alt kümesinde yer alan ayrılma kaygısı, okul öncesi dönemde sıklıkla karşılaşılan problemlerden biridir. Ayrılık kaygısı çocuklarda bağlandığı kişiden ayrılamama, bağlandığı nesnelerden uzaklaşamama, gelişim dönemine uygun olmayan şekilde aşırı kaygı ve korku yaşaması olarak tanımlanmaktadır (Yıldırım ve Yaşa, 2019). Kendi çevresinden farklı bir ortama girdiğinde annesi ile ilk kez ayrılığı yaşayan çocuk, uyumla ilgili sorunlar yaşamaktadır. Okula gitmeyi istememek bu sorunlardan ilki olarak karşımıza çıkmaktadır. Bu durum, problemin başlangıcı olarak çocuğun yoğun bir şekilde ayrılma kaygısı yaşadığını göstermektedir (Akman, 1994).

Öz-düzenleme becerisi; çocukların bilgiyi işleme, çevresel ipuçlarına ve içsel durumlara cevap verme, duygularını, düşüncelerini ve davranışlarını kontrol etme yollarını belirten kavramsal olarak geniş ve çok boyutlu bir dizi beceriyi içerir (Rothbart, Ellis, Rosario Rueda ve Posner, 2003). Öz-düzenleme becerileri gelişmiş olan çocuklar diğerlerine nazaran yaşadıkları olaylar sonucunda daha az depresyona girmekte ve minimum düzeyde kaygılanmaktadır.

Çalışmamızda incelediğimiz bir diğer konu olan yürütücü işlev becerileri ise sorun çözme, öz kontrol ve amaca uygun hareketi pekiştiren; bellek, dürtüsel tepkileri kontrol etme ve bilişsel esneklik gibi üç ana bilişsel süreci kapsayan bir terimdir (Camerota, Willoughby, Kuhn ve Blair, 2018; Diamond, 2016). Okul öncesi dönemdeki yürütücü işlev becerilerinin okula hazır bulunuşluğu yansıttığı tespit edilmiştir (Espy McDiarmid, Cwik, Stalets, Hamby ve Senn, 2004; Morrison, Ponitz ve McClelland, 2010). Daha yüksek yürütücü işlev becerisi olan çocukların, bu beceride daha düşük performans sergileyen akranlarına göre eğitimden daha fayda gördüklerine dair kanıtlar bulunmaktadır (Tuncer, 2018).

Kaygılı çocuklarda ise dikkatin yönlendirilmesi, bilginin yorumlanması ve tehlikeli durumların öngörülmesi gibi yürütücü işlev alanlarında problem yaşandığı görülmektedir (Rapee, Schniering ve Hudson, 2009). Yapılmış bir çalışmada kaygı bozukluğu olan çocukların akademik performansının daha düşük olduğu tespit edilmiştir ve bu bulgunun kaygıya bağlı yaşanan öğrenme güçlüğü, akıl yürütme, öz düzenleme yapabilme gibi bilişsel alanlardaki problemlerden kaynaklandığı tespit edilmiştir (Benjamin et al., 1990).

Amaç

Literatür incelendiğinde ayrılma kaygısı ile öz-düzenleme ve yürütücü işlev becerilerinin birlikte incelendiği herhangi bir çalışmaya rastlanılmamıştır. Bu nedenle çalışmamızda yaşam seyri için kritik bir öneme sahip olan okul öncesi dönemde eğitim gören öğrencilerde ayrılma kaygısı ile öz-düzenleme ve yürütücü işlev becerileri arasındaki ilişkinin incelenmesini amaçladık.

Yöntem

Araştırmaya Amasya'da 2022-2023 eğitim-öğretim yılında okul öncesi eğitim gören 5-6 yaş aralığındaki 79 öğrenci basit randomizasyon yöntemi ile seçilerek dâhil edildi. Bu bağlamda anaokulunda değerlendirilen 102 çocuk arasından araştırma kriterlerini karşılayan 93 çocuk seçilmiştir. Örneklem sayımız olan 79 kişi ise kura ile belirlenmiştir.

Tanımlayıcı ve kesitsel tipteki çalışmamızdaki verilerin toplanmasında Yuva Çocukları İçin Ayrılma Kaygısı Ölçeği (YÇİAKÖ), 4-6 Yaş Çocuklarına Yönelik Öz-Düzenleme Becerileri Ölçeği

(ÖDBÖ) ve Çocukluk Dönemi Yürütücü İşlev Envanteri (ÇDYİE) kullanıldı. Verilerin istatistiksel analizlerinde “IMB SPSS Statistics 29.0.1” programı kullanıldı. Elde edilen puanlar Pearson Korelasyon Analizi ile incelendi. İstatistiksel anlamlılık düzeyi $p<0,05$ olarak belirlendi.

Bulgular

Çalışmamıza katılan 79 öğrencinin yaş ortalaması $5,51\pm0,48$ olarak hesaplanmış olup; %50,6’sı kız ($n=40$), %49,4’ü ($n=39$) erkek katılımcılardan oluşmaktadır. Yuva Çocukları İçin Ayrılma Kaygısı Ölçeği (YÇİAKÖ), Öz-Düzenleme Becerileri Ölçeği (ÖDBÖ) ve Çocukluk Dönemi Yürütücü İşlev Envanteri (ÇDYİE) toplam ortalaması sırasıyla $2,49\pm0,5$, $55,19\pm19,87$ ve $87,54\pm15,99$ olarak tespit edildi.

Pearson Korelasyon Analizi sonuçlarına bakıldığında, okul öncesi çocuklarının ayrılma kaygısı ile öz düzenleme becerileri arasında negatif yönde ve orta büyüklükte bir ilişki bulunmuştur ($r=-0,286$, $p=0,011$). Bunun yanında, okul öncesi çocuklarının ayrılma kaygısı ile yürütücü fonksiyon becerileri arasında küçük büyüklükte anlamlı ve pozitif yönde ilişki saptanmıştır ($r=0,277$, $p=0,013$) (Cohen, 1988).

Tartışma & Sonuç

Çalışmamızda, okul öncesi dönem çocuklarında artan öz düzenleme ve yürütücü işlev becerileri ile azalan ayrılma kaygısı arasında ilişki olduğu görüldü. Öz-düzenleme ve yürütücü becerileri gerektiren durumlarda yüksek performans göstermek ve daha az kaygı yaşaması konusunda pozitif bir etkiye sahip olabilmektedir. Önceki araştırmalarda saptandığı gibi, okul öncesi dönemdeki yürütücü işlev becerilerinin okula hazır bulunuşluğu arttırdığı tespit edilmiştir. Ayrıca öz-düzenleme becerisi de çocukların davranışlarını düzenlemesi ve kaygılarıyla baş edebilmesi konusunda çocuklar için çok önemlidir. Çünkü davranış kontrolünde başarılı olamayan çocuk kendisini okul ortamına ve arkadaşlarına ait hissedemeyebilir ve okula gitmek istemeyebilir. Bu nedenle okul öncesi eğitime başlamadan önce kaygıyı azaltmak için öz-düzenleme ve yürütücü işlev becerilerinin geliştirilmesi önem arz etmektedir.

Okul Öncesi Eğitim Gören Çocuklarda Ayrılma Kaygısı ile Öz-Düzenleme ve Yürütücü İşlev Becerileri Arasındaki İlişkinin İncelenmesi

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Öz

Okul öncesi dönemde olan öğrenciler farklı bir ortama girerek ayrılık yaşadığı için oluşan ayrılık kaygısı, okula gitmede isteksizlik ile sonuçlanabilmektedir ve bu kaygıyla baş edebilmek ve okula uyumu sağlamak için öz-düzenleme ve yürütücü işlev becerilerine sahip olmak önem arz etmektedir. Bu çalışma, okul öncesi öğrencilerinin ayrılma kaygısının öz-düzenleme ve yürütücü işlev becerileri ile ilişkisini incelemeyi amaçlamaktadır. Araştırmaya okul öncesi eğitim gören 79 öğrenci dâhil edildi. Verilerin toplanmasında Yuva Çocukları İçin Ayrılma Kaygısı Ölçeği (YÇİAKÖ), 4-6 Yaş Çocuklarına Yönelik Öz-Düzenleme Becerileri Ölçeği (ÖDBÖ) ve Çocukluk Dönemi Yürütücü İşlev Envanteri (ÇDYİE) kullanıldı. Yapılan çalışmada YÇİAKÖ sonuçları ile ÖDBÖ toplam ($r=-0,286$; $p=0,011$), engelleyici kontrol ($r=-0,315$; $p=0,005$), dikkat ($r=-0,249$; $p=0,027$) puanlarının negatif yönde ilişkili olduğu bulundu. YÇİAKÖ ile ÇDYİE toplam ($r=0,277$; $p=0,013$) puanı arasında pozitif yönde ilişki vardı. Çalışmamızda, okul öncesi dönem çocuklarında öz düzenleme ve yürütücü işlev becerileri ile ayrılma kaygısı arasında ilişki olduğu görüldü. Öz-düzenleme ve yürütücü becerileri gerektiren durumlarda yüksek performans göstermek, çocukların olaylar karşısında yaşatlarına göre daha az depresyona girmesi ve daha az kaygı yaşamaması konusunda pozitif bir etkiye sahip olabilmektedir. Önceki araştırmalarda saptandığı gibi, okul öncesi dönemdeki yürütücü işlev becerilerinin okula hazır bulunuşluğu arttırdığı tespit edilmiştir. Ayrıca öz-düzenleme becerisi de çocukların davranışlarını düzenlemesi ve kaygılarıyla baş edebilmesi konusunda çocuklar için çok önemlidir. Çünkü davranış kontrolünde başarılı olamayan çocuk, kendisini okul ortamına ve arkadaşlarına ait hissedemeyebilir ve okula gitmek istemeyebilir. Bu yüzden okul öncesi eğitime başlamadan önce hem kaygıyı azaltmak hem de okula uyumu sağlamak adına öz-düzenleme ve yürütücü işlev becerisi geliştirmek önem arz eder.

Anahtar kelimeler: Anksiyete, Ayrılık, Okul öncesi, Öz-denetim, Yürütücü fonksiyon

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1. Introduction

The initial phase of education, preschool/kindergarten education, primarily completes a child's verbal, physical, cognitive, psychomotor, and social development (Alisinanoğlu & Kesicioğlu, 2010). During the preschool years, children experience school for the first time. It is crucial to assist kids in managing the issues they encounter during this phase because what they go through will have an impact on their lives in the future (Arabacıoğlu & Kahraman, 2021). Separation anxiety, which is a subset of anxiety disorders, is one of the problems frequently encountered in the preschool period. Separation anxiety is defined as the inability of children to separate from the person they are attached to, the inability to move away from the objects they are attached to, and experiencing excessive anxiety and fear that is inappropriate for their developmental period (Yıldırım & Yaşa, 2019). A child experiencing his first separation from his mother finds it difficult to adjust to new surroundings. The first of these issues is a lack of desire to attend school. This suggests that the root of the issue is the child's severe separation anxiety (AKMAN, 1994). As a result of a study, it was stated that there was a positive relationship between the separation anxiety of mothers and children (Peleg et al., 2006). Separation anxiety has been found to be more severe in children with an anxious-ambivalent attachment style (Manassis, 2001). It has been shown that children who have poor relationships with their parents have higher separation anxiety (Schlarb et al., 2016). One research indicates that kids with unsatisfactory parent-child connections experience higher levels of separation anxiety (Küçüködük, 2015).

Early childhood is a period that forms the basis of life, and developmental areas and skills begin to develop during this period. One of these skills is the self-regulation skill (Montroy et al., 2016). Self-regulation skills are a theoretically wide and multidimensional set of skills that specify the ways in which children process information, respond to environmental cues and internal states, and control their emotions, thoughts, and behaviors (Rothbart et al., 2003). Children with developed self-regulation skills are less depressed and experience minimal anxiety as a result of the events they experience, compared to others. Teachers expressed the behavioral problems of children with weak self-regulation skills as not following the rules, aggression, unwillingness to take responsibility, not fulfilling the responsibilities given, not following the instructions, and getting bored easily (Yaralı & Aytar, 2017).

Executive function skills, which encompass memory, inhibition, and cognitive flexibility, are three primary cognitive processes that we studied in our study. They are also skills related to problem-solving, self-control, and purposeful movement (Camerota et al., 2018; Diamond, 2016). It has been determined that executive function skills in the preschool period reflect school readiness (Espy et al., 2004; Morrison et al., 2010). Social skills and academic achievement have been found to be related to executive functions, which have been studied in a wide range of fields, including problem-solving, abstraction, planning, strategy building, and expression and regulation of emotional behaviors (Hughes & Ensor, 2011). There is evidence that children with higher executive function skills benefit more from education than their peers who perform lower in this skill (Tuncer, 2018).

It is known that anxiety experienced at any period of life significantly affects individuals' cognitive processes, including attention, memory, and executive functions (Puliafico & Kendall, 2006). Anxious children appear to have problems in executive function areas such as directing attention, interpreting information, and reasoning about the possibility of danger (Rapee et al., 2009). Children with anxiety disorders performed worse academically, according to a study, and the cause of this was found to be cognitive issues such as learning challenges, reasoning issues, and anxiety-related self-regulation issues (Benjamin et al., 1990).

Upon reviewing the literature, no research was found that jointly investigated executive function, self-regulation, and separation anxiety. Although many studies have examined these

variables separately or in smaller subsets, there is no study investigating the relationship between these three factors in kindergarten children. The literature emphasizes that executive function skills help children overcome emotional difficulties, especially anxiety (Fernandes et al., 2023). In addition, it is stated that children with anxiety disorders also have difficulties in executive functions, especially in areas such as attention and problem-solving, and that this negatively affects academic performance and emotional regulation skills (Blair & Razza, 2007). The strong correlation between early childhood and executive functions is crucial, particularly regarding the impact of executive functions on children's development. The significant impact of these functions on children's emotional regulation skills, social interactions, and learning processes supports children's academic and social success. (Jacobson et al., 2011)

No research has concurrently examined the correlation between self-regulation, executive functions, and separation anxiety, particularly in preschool children. By bridging this gap, the current study intends to get a more thorough knowledge of how self-regulation and executive function skills interact in the development of separation anxiety in preschool-age children. This study highlights that self-regulation and executive function skills are crucial for preschool children in managing anxiety and that enhancing these skills can establish a foundation for effective interventions to lower anxiety levels. Furthermore, prompt intervention for separation anxiety might enhance children's adaptation to new environments (e.g., school), thus bolstering their emotional well-being. This study helps us to understand the relationship between these three characteristics more fully, which can contribute to the establishment of effective solutions to improve children's school readiness and emotional development in the preschool period.

Due to the vital importance of this relationship for the life course, we set out to investigate in our study how kindergarten children's executive function and self-regulation skills relate to separation anxiety. In this regard, the following are the study's hypotheses:

H(0): There is no relationship between separation anxiety and self-regulation skills in preschool students.

H(0): There is no relationship between separation anxiety and executive function skills in preschool students.

2. Method

2.1. Study Design

The research is a descriptive and cross-sectional study. Descriptive research aims to determine the current state, while cross-sectional research examines the relationship by collecting data at a single point in time.

2.2. Population and Sample of the Research

The population of the research consists of 79 pre-school students aged 5-6 receiving education at two kindergartens in the center of Amasya. Sample calculations were made for Pearson correlation analysis with the G*Power Version 3.1.9.4 package program. Using Cohen's medium size (0.60) for the effect size index Pearson correlation coefficient and a Type 1 error of 0.05 and 0.80 for power, the sample size was 79.

Inclusion criteria in the research; Volunteering to participate in the research, being between the ages of 5-6, and being in pre-school education. Exclusion criteria are; It was defined as having any psychiatric diagnosis or having one or more chronic conditions such as asthma, cancer, cystic fibrosis, cerebral palsy, chronic renal failure, diabetes, epilepsy and attention and hyperactivity disorder.

2.3. Data Collection Method

The simple random sampling method was used to select the children to be included in the study. In this context, 102 kindergarten children were evaluated and 93 children who met the research criteria were selected. Then, 79 children who met the research criteria were determined by lottery between April 03 - May 8, 2023 and the survey forms were applied face-to-face.

2.4. Data Collection Tools

The research data were collected with "the demographic information form, Separation Anxiety Scale for Kindergarten Children (SASKC), Self-Regulation Skills Scale (SRSS) and Childhood Executive Function Inventory (CEFI)".

The demographic information form consists of three questions that include information about children's age, gender, and the years they spent in preschool education.

The Separation Anxiety Scale for Kindergarten Children (SASKC) was created by Akman in 1987, and it has a high level of reliability due to its internal consistency coefficient of 0.96. Although the Separation Anxiety Scale for Kindergarten Children (SASKC), developed in 1987, has been widely used in recent studies with consistently high reliability and validity results, for example, studies by Çıkrıkçı (2020) have shown a Cronbach's Alpha reliability coefficient of 0.96 and studies by Nazlıoğlu (2019) have shown strong internal consistency reliability coefficients of .85 and .92 for the Parent and Teacher Forms, respectively. Additionally, Küçükköçük (year) reported Cronbach's Alpha coefficients of 0.925 for the Parent Form and 0.962 for the Teacher Form. These studies further support the reliability of the scale and its appropriate use in measuring separation anxiety in preschool children. There are two distinct versions of the scale: parent and teacher. There are 25 items on each form for a total of 50 items. The components of the scale are made up of 25 statements that represent observed actions that parents and teachers may interpret as a child's separation anxiety. Using a five-point Likert scale (1 being never, 2 seldom, 3 occasionally, 4 often, and 5 always), the survey is reviewed. The scores from the teacher and mother/father forms are totaled individually, and the total number of items in the forms (25 items) is then divided to determine the separation anxiety score for each form. The total score for separation anxiety is then obtained by adding the two separate calculated scores. The scale has a minimum of 2 and a maximum of 10 points. High levels of separation anxiety are correlated with higher scores (Çıkrıkçı, 2020).

The Self-Regulation Skills Scale (SRSS) (Teacher Form) was created in 2018 to assess children's abilities in self-regulation by Erol and İvrendi. The scale's overall score had an internal consistency coefficient of 0.90 in the study. Working memory, inhibitory control, and attention are the three sub-dimensions of the scale with the respective internal consistency coefficients of 0.87, 0.91, and 0.91. The reliability and internal consistency coefficients were found to be at acceptable levels (Erol & İvrendi, 2018). Since low reliability is indicated by internal consistency coefficients between 0.40 and 0.59, moderate reliability is indicated by coefficients between 0.60 and 0.80, and extremely high reliability is indicated by coefficients between 0.80 and 1.00 (Kalaycı, 2016). Moreover, in the study conducted by Astarlar in 2019, the SRSS was used, and a reliability coefficient of 0.94 was reported (Astarlar, 2019). Similarly, in 2023, Kısaoğlu and Cetin recalculated the internal consistency coefficient in their study involving children aged 5-6 years and found it to be 0.95 (Kısaoğlu & Çetin, 2023). The statistics demonstrate the validity and reliability of the SRSS. There are 22 items overall on the scale. Typically developing children's classroom teachers fill out the scale on an individual basis. Using a 5-point Likert scale, teachers rate students according to which category best fits them (1 being never, 2 being seldom, 3 being occasionally, 4 being frequently, and 5 being usually). The ability to regulate oneself is directly correlated with high scores on the scale (Saraç et al., 2021).

The Childhood Executive Function Inventory (CEFI) (Teacher Form) is developed by Thorell and Nyberg in 2008 (Thorell & Nyberg, 2008). It evaluates the executive function skills of children between the ages of 4 and 12. Çiftçi et al. conducted a reliability and validity research in Turkey (2020). The working memory subscale had an internal consistency coefficient of 0.95, whereas the inhibitory control subscale had an internal consistency coefficient of 0.91. In another study conducted with children aged 60-72 months, the CEFI Teacher Form was used, and the internal consistency coefficient for the total score was found to be very high (Cronbach's alpha = 0.98). When examining the subscales, the internal consistency coefficient was 0.97 for memory and 0.95 for inhibitory control (Şentürk Gülhan & BURAK, 2023). In another study in 2024, Cronbach's alpha value for the memory subscale was reported as 0.96, while it was 0.91 for the inhibitory control subscale (Aykaş, 2024). The findings showed that 48–72-month-old children's executive functions may be assessed using the Turkish version of the CEFI, which is a valid and reliable measuring tool. There are a total of 24 items on the scale. The instructor completes the 5-point Likert-type scale by selecting the scenario that is suitable for the child they are seeing (1 being certainly not true, 2 being not true, 3 being partially true, 4 being true, and 5 being definitely true). It turns out that children who score high on the test have problems in executive functions (Aydöner, 2022).

2.5. Data Analyses

"IMB SPSS Statistics 29.0.1" program was used in the statistical analysis of the data. Mean value and/or frequency \pm Standard Deviation ($X \pm SD$) scores were given according to suitability for descriptive data such as children's demographic characteristics, age (years), gender, and time spent in preschool education (years). The scores obtained for the Separation Anxiety Scale for Kindergarten Children (SASKC), the Self-Regulation Skills Scale (SRSS), and the Childhood Executive Function Inventory (CEFI) were examined with 'Pearson Correlation Analysis' as the data followed a normal distribution. The statistical significance level was determined as $p < 0.05$.

2.6. Ethical Considerations

Ethics committee approval dated 17.02.2023 and numbered E-68552689-000-00002697385 was received from the Hacettepe University Ethics Committee. The research was conducted under the guidelines related to the Helsinki Declaration of Human Rights. In order to obtain information about the students, the teachers and parents we included in the surveys were approved by the informed consent form stating the purpose and methods of the study. Parents were informed that their children's information would be kept confidential.

3. Findings

3.1.1. Demographic Information of the Participants

The average age of the 79 students participating in our study was 5.51 ± 0.48 , and 50.6% were girls ($n=40$) and 49.4% ($n=39$) were boys. 74.7% ($n=59$) are in their first year of pre-school education, and 25.3% ($n=20$) are in their second year of pre-school education. Demographic information is given in Table 1.

Table 1.

Demographic Information of the Participants.

Groups	n	%
Gender		
Girls	40	50.6
Boys	39	49.4
Year in Kindergarten	n	%
First year	59	74.7

Second year	20	25.3
Age		X±SS
		5.51±0.48

3.1.2. Descriptive Findings

Table 2 shows the averages (Mean ± SD) of the scales and their sub-dimensions. The overall mean of the Separation Anxiety Scale for Kindergarten Children (SASKC) is 2.49±0.57. The total mean of the Self-Regulation Skills Scale (SRSS) is 87.54±15.99. The average scores for the SRSS's inhibitory control, attention, and work memory sub-dimensions are, respectively, 31.77±5.87, 34.76±8.02, and 21.01±3.80. 55.19±19.87 is the mean score on the Childhood Executive Function Inventory (CEFI).

Table 2.

The mean scores of Separation Anxiety Scale for Kindergarten Children, Self-Regulation Skills Scale (Teacher Form), Childhood Executive Function Inventory (Teacher Form).

	X±SS
SASKC Total	2.49±0.57
SRSS Total	87.54±15.99
SRSS Inhibitory Control	31.77±5.87
SRSS Attention	34.76±8.02
SRSS Working Memory	21.01±3.80
CEFI Total	55.19±19.87

(SASKC: Separation Anxiety Scale for Kindergarten Children, SRSS: Self-Regulation Skills Scale, CEFI: Childhood Executive Function Inventory)

3.1.3. Comparison of Distributions in Demographic Data Groups

Based on the gender group; upon comparing the overall Self-Regulation Skills scale score with the mean scores of its sub-dimensions (Table 3), it was observed that the mean scores of the girls' SRSS inhibitory control, attention, and working memory sub-dimensions (93.75±12.17, 33.62, respectively) and the average of men (81.18±17.06, 30.10±5.79, 31.44±8.63, and 19.64±4.31) were statistically significantly higher ($p<0.001$, $p=0.007$, $p<0.001$, and $p=0.001$, respectively).

Upon comparing the overall Childhood Executive Function Inventory total score average was compared by gender group (Table 3), the mean score of boys (61.36±20.97) was found to be statistically significantly higher than the average score of girls (49.17±16.89) ($p=0.006$). Upon comparing the overall the Separation Anxiety Scale for Kindergarten Children was compared by gender group (Table 3), the mean score for boys and girls (2.51±0.60 and 2.47±0.54) did not demonstrate a statistically significant difference ($p=0.747$).

Based on the kindergarten year group; the Self-Regulation Skills Scale total score and sub-dimension mean scores were compared (Table 3). The results showed that the students who spent their second year in kindergarten had a mean inhibitory control sub-dimension score of 34.90±6.15, which was higher than the mean of the first-year students (30.86±5.53). This difference was statistically significant ($p=0.008$).

Upon comparing the overall Self-Regulation Skills Scale of the students who spent their second year in kindergarten was below the mean score of the attention and working memory sub-dimensions (92.85±18.76, 36.10±9.26 and 21.85±4.22, respectively) in the first year. It was found to be statistically significantly higher than the average of the students (85.75±14.69, 34.30±7.59 and 20.73±3.65, respectively) ($p=0.086$, $p=0.391$ and $p=0.257$, respectively).

Upon comparing the overall Childhood Executive Function Inventory total score mean was compared according to the year group in kindergarten (Table 3), the mean score of the second year students (58.27 ± 18.36) was statistically significantly higher than the first year students' average (46.10 ± 21.77). It was found to be significantly higher ($p=0.017$).

Upon comparing the overall Separation Anxiety Scale for Kindergarten Children total score mean was compared according to the year group in kindergarten (Table 3), it was observed that there was no statistically significant difference ($p=0.695$) between the first and second year student means (2.50 ± 0.55 and 2.44 ± 0.64).

In addition to the self-regulation skills scale's overall score, the relationship between working memory, inhibitory control, and attention, as well as separation anxiety, was also investigated when examining the relationship between separation anxiety and executive function and self-regulation. In the Childhood Executive Function Inventory, only the relationship between total executive function score and separation anxiety was examined.

Considering our findings, it was determined that the total separation anxiety score was negatively related to the SRSS total score, attention, and inhibitory control sub-scores ($p<0.05$).

The total separation anxiety score and the Childhood Executive Function Inventory total score were shown to be strongly correlated ($p<0.05$). Table 4 provides the parameter correlations.

Table 3.

The Separation Anxiety Scale for Kindergarten Children, Self-Regulation Skills Scale (Teacher Form), Childhood Executive Function Inventory (Teacher Form) mean scores. Comparison of Distributions in Demographic Data Groups.

N=79		SRSS-Inhibitory Control (Mean \pm SS)	SRSS-Attention (Mean \pm SS)	SRSS-Working Memory (Mean \pm SS)	SRSS-Total (Mean \pm SS)	CEFI-Total (Mean \pm SS)	SASKC Total (Mean \pm SS)
Gender	Boys n=39	30.10 \pm 5.79	31.44 \pm 8.63	19.64 \pm 4.31	81.18 \pm 17.06	61.36 \pm 20.97	2.51 \pm 0.60
	Girls n=40	33.62 \pm 5.59	38.00 \pm 5.86	22.35 \pm 2.67	93.75 \pm 12.17	49.17 \pm 16.89	2.47 \pm 0.54
	Test Statistics	t=2.751 p=0.007	t=3.964 p<0.001	t=3.367 p=0.001	t=3.778 p<0.001	t=2.847 p=0.006	t=0.324 p=0.747
Year in Kindergarten	First year n=59	30.86 \pm 5.53	34.30 \pm 7.59	20.73 \pm 3.65	85.75 \pm 14.69	46.10 \pm 21.77	2.50 \pm 0.55
	Second year n=20	34.90 \pm 6.15	36.10 \pm 9.26	21.85 \pm 4.22	92.85 \pm 18.76	58.27 \pm 18.364 6,10 \pm 21.77	2.44 \pm 0.64
	Test Statistics	t=2.740 p=0.008	t=0.863 p=0.391	t=1.141 p=0.257	t=1.739 p=0.086	t=2.442 p=0.017	t=0.394 p=0.695

t= Student's t test value.

The significance level was taken as 0.05.

3.1.4. Investigating the Correlation Between Variables

The total separation anxiety score and the Childhood Executive Function Inventory total score were shown to be strongly correlated ($p<0.05$). Table 4 provides the parameter correlations.

Table 4.

The Separation Anxiety Scale for Kindergarten Children, Self-Regulation Skills Scale, Childhood Executive Function Inventory correlation table.

		SRSS- Inhibitory Control	SRSS- Attention	SRSS- Working Memory	SRSS-Total	CEFI-Total	Age
SASKC-Total	r	-.315**	-.249*	-.188	-.286*	.277*	.177
	p	0.005	0.027	0.096	0.011	0.013	.19

Pearson Correlation Analysis (r=correlation efficient; p=statistical significance value) $p < 0,05$; SASKC: The Separation Anxiety Scale for Kindergarten Children, SRSS: Self-Regulation Skills Scale, CEFI: Childhood Executive Function Inventory.

4. Discussion, Conclusion & Suggestions

In this research, which we conducted to examine the relationship between kindergarten students' separation anxiety with self-regulation and executive function skills, it was determined that there is a significant relationship between them. These findings support the hypothesis that as self-regulation and executive function abilities grow and improve, separation anxiety will decline. The psychological and behavioral effects of separation anxiety, which is common in kindergarten settings, might vary across children based on a range of environmental factors, including age, gender, socioeconomic situation, parent-child relationship, and family attitude (Pepito & Montalbo, 2019). For instance, there is no consensus among researchers on the numerous studies that have been done on the impact of gender parameters on separation anxiety in the literature. While some research has indicated that girls are more likely than boys to experience separation anxiety (Alisinanoğlu & Ulutaş, 2003; Wichstrøm et al., 2012), other research has found no difference between the two genders (Bosquet & Egeland, 2006; Else-Quest et al., 2006). In our study, there was no significant difference in separation anxiety scores according to gender parameters.

Another variable that may affect separation anxiety is the age group in kindergarten, that is, the year in kindergarten. As a result of a study conducted with 468 children, it was observed that the anxiety level in children decreased as the duration of attendance at kindergarten increased. Because the process of getting used to the environment, trust, and continuing development has a positive effect on managing anxiety (Bora & Ünüvar). The results of our study support this conclusion. Among the children included in our study, those in their second year of kindergarten had a lower separation anxiety score than those in their first year.

The results of the study on kindergarten students' self-regulation skills and the kindergarten year they studied reveal that children in their second year of kindergarten have far more developed self-regulation skills than first-year students in the lower grades. In other words, it has been noted that children's abilities to regulate themselves also develop better as they get older. Age-related maturation occurs in the cerebral, physical, social, and emotional domains of learning. Age is therefore a crucial factor in the development of self-regulation (Wesarg-Menzel et al., 2023). In this context, we can state that as kids become older, the growing experiences they receive from their families and close friends, along with their attempts to monitor, foresee, and plan their way through challenges, can all actively contribute to the development of their self-regulation skills.

After analyzing the self-regulation skills of kindergarten children and taking gender factors into consideration, it was found that the females in our study have more advanced self-regulation abilities. Our study's findings are consistent with previous research. Numerous studies demonstrate that girls are more adept at self-regulation than boys are (Denham et al., 2012; Tetering et al., 2020). It is thought that the reason why girls' self-regulation skills are at a

better point than boys' is due to cultural factors and family attitudes toward raising children (Tutkun & TEZEL ŞAHİN, 2016). In a study, it was stated that boys are more active than girls and therefore girls may have higher self-regulation skills than boys (Aksoy & Yaralı, 2017). Girls are observed to have better self-regulation skills than boys, based on the literature and our research findings. However, we believe that a variety of factors, including cultural elements, parental attitudes, and personal characteristics, may play a significant role in the development of self-regulation skills.

Analyzing and comprehending the aspects affecting adaption to school might contribute to development. Early childhood is a period that forms the basis of life, and developmental areas and skills begin to develop during this period. One of these skills is the self-regulation skill. Self-regulation skills; emotional, such as being aware of emotions, being able to control them, mitigating being affected by a negative situation, and controlling anger; It can be defined as the ability to control cognitive features and behaviors such as maintaining attention, preventing distraction, and shifting attention to another direction when necessary (Montroy et al., 2016). Children who struggle to adjust to school may frequently engage in avoidance behavior as a way to avoid going. Children who exhibit distinct habits to avoid school find it increasingly difficult to adapt. A child who struggles with self-control and lacks knowledge about appropriate behavior at school may also face negative responses from his peers. Because of this, a child who struggles with behavioral control might not feel like he fits in with his peers or the school environment and might even refuse to go. As a result, developing self-regulation abilities is crucial for adjusting to school (Şepitci Sarıbaş & Gültekin Akduman, 2019). Children who perform well in situations that require self-regulation skills are less depressed and experience less anxiety in the face of events than their peers. Children who had higher levels of self-regulation also reported lower levels of anxiety and despair, according to a study by Buckner et al. (Buckner et al., 2009). The results of our study support this relationship. In our study, we think that one of the reasons why children with high self-regulation skills have lower separation anxiety levels is that when children gain self-control and regulation skills, they can more easily find regulatory actions that they can use to guide themselves in unpredictable environments. In this way, the child's need or dependency on his/her mother/father will decrease, as he/she will be able to cope with difficulties much better (Bronson, 2019). Related to this, it is expected that the anxiety level will decrease in the child who gains self-control and regulation skills. Separation anxiety decreases when the parents do not have a dependent personality structure. Because children who have not had the opportunity to manage their activities and are not used to this, want to see the family with them all the time. This causes serious anxiety about separation from their parents (Pepito & Montalbo, 2019).

When the literature is examined, school avoidance behaviors of children like anxiety, and shyness, exhibiting these behaviors negatively affect their attention and motivation over time (Ladd & Burgess, 2001; Rubin & Burgess, 2001). Similarly, in our study, when the relationship between the attention parameter, which is a sub-dimension of self-regulation skills, and separation anxiety was examined, it was observed that children who experienced less separation anxiety had better attention skills. Considering the reverse correlation, high self-regulation and attention skills may also be a factor that reduces separation anxiety. The literature emphasizes that the academic success of children whose attention level increases due to better self-regulation skills is also positively affected. Because it is stated that children who can regulate their behavior have better cognitive processes and academic success than those who cannot regulate their behavior effectively (Trainin & Swanson, 2005). In this context, we think that self-regulation skills training sessions given through daily life activities to be added to the curriculum within the scope of occupational therapy in early childhood, when children are just starting their preschool education, will improve their attention and motivation. When children with high levels of self-regulation and attention can restructure their expectations in line with social demands, they will be less disappointed in the difficulties they experience and

experience less withdrawal from participating in academic and social processes (De La Riva et al., 2015). This will cause less anxiety.

Apart from the attention parameter, another self-regulation skill subdimension is inhibitory control. Inhibitory control, a type of self-regulation, plays a role in the development of executive functions, especially in the preschool period. It has been determined that children with better attention and inhibitory control skills are more successful in their academic lives (Blair & Razza, 2007; Sektnan et al., 2010).

With inhibitory control skills, children can suppress their desires that do not comply with the rules and engage in the desired adaptive behaviors (Blair & Razza, 2007). When the relationship between the inhibitory control parameter and separation anxiety was examined in our study, less separation anxiety was observed in children with better inhibitory control skills. The underlying reason for this result may be the confidence created in children by the inhibitory control sub-dimension, which includes skills such as adjusting reactions to new situations, preventing negative reactions, exhibiting appropriate behavior, and planning. Schunk and Zimmerman (2001) emphasized in their study that developing self-regulation skills that will help children find ways to cope with the problems and stress they will encounter in early childhood can be very important in building children's self-confidence (Zimmerman & Schunk, 2001). Therefore, it can be said that an inhibitory control skill that can plan behavior and thoughts in the face of events and control impulses can increase confidence and reduce anxiety.

Contrary to expectations, in our study, no significant relationship was found between separation anxiety and working memory, which is a sub-dimension of self-regulation skills. We think that this is due to the fact that there are fewer items assessing the working memory subscale compared to the number of items assessing the other subdimensions. We recommend that future studies examine the relationship between separation anxiety and a scale that evaluates working memory in more detail.

In recent years, studies have focused on the idea that the role of cognitive processes, including individuals' attention, memory, and executive functions, is very important in the development and maintenance of anxiety and anxiety disorders. The literature emphasizes that anxious children and young people (those with generalized anxiety disorder, social phobia, and/or separation anxiety disorders, as well as subclinical low-level and high-level anxiety symptoms) have very low attention spans, which is an executive function skill. (Eysenck & Calvo, 1992; Rebega & Benga, 2013).

Children with anxiety performed poorly on executive function tests, according to research (Murphy et al., 2018). Considering the studies, it has been revealed that anxious children and teenagers may perform differently in executive functions. Similar to previous research, our study found a strong correlation between separation anxiety and executive function skill scores. We think that one of the reasons for this is that when executive function skills are less sufficient, the individual's ability to manage himself and his behavior is affected, resulting in anxiety. Studies also indicate that behavioral problems and executive function skills are related (Cole et al., 1993; Jahromi & Stifter, 2008). Executive functions are high-level cognitive skills that include many skills such as behavioral regulation and cognitive flexibility that enable a person to display his or her behavior correctly (Diamond, 2013). Cognitive flexibility, which forms a part of executive functions, is essential for development both at school and in every aspect of daily life. As cognitive flexibility increases, the ability to adapt to new situations and solve problems develops (Cox, 1980).

A decline in cognitive flexibility is predicted to lower the risk of acquiring anxiety disorders, according to studies in the literature (Lee & Orsillo, 2014; Yu et al., 2020). There are studies in the literature predicting that a decrease in cognitive flexibility will reduce the likelihood of developing anxiety disorders (Geronimi et al., 2016). In addition, Wang et al. stated

in their study that cognitive flexibility had a high negative correlation with depression findings (Wang et al., 2019). In summary, it is known that individuals who can better cope with stress and anxiety by managing anxiety have lower anxiety levels. It is thought that individuals with more developed executive skills, which serve to adapt to and manage problematic, stressful, and anxious situations, have a lower risk of developing separation anxiety (Saarni, 2011). In this context, improving executive function skills, which are a very important skill for early childhood, through cognitive skill training may be beneficial in the process of managing anxiety. Of course, the year of starting preschool education, age, and gender differences may also affect executive function skills in managing the adaptation process. For instance, in our study, it was observed that the executive function skill scores of children in the second year of kindergarten were higher compared to those who had just started preschool education and were in their first year. This result supports the literature. It is emphasized in the literature that the brain development process continues rapidly in early childhood and the brain is shaped and developed by environmental experiences. Studies have shown that there is a strong relationship between age and experience, and executive functions (Saarni, 2011; Zelazo & Frye, 1998).

Although the findings of this study add critical information to the paucity of literature, there are some limitations that should be taken into account. Children's separation anxiety, self-regulation skills, and executive function skills were indirectly evaluated by the children's teacher (SRSS and CEFI) and parents (SASKC). This may have been insufficient to determine the examined data objectively. Therefore, we recommend that the data should be evaluated directly through applications conducted with children. Cronbach Alpha values used in this study were taken from previous studies in the literature and were not confirmed by our own analyses. This may constitute a limitation in terms of the reliability of the measurements. In future studies, it is recommended that these data be confirmed with their own analysis methods and that the measurement tools be tested more thoroughly. The cultural and environmental characteristics of the region of study may influence the development of children, hence a lack of research across different geographical areas could be a limitation. Apart from this, not examining other variables that may affect the relationship between self-regulation / executive function skills and separation anxiety appears as another limitation of our study. Designing future studies with a longitudinal design that can further elucidate the directionality of the relationships found here may be a meaningful step toward the generalizability of the study findings. Moreover, in order to fully evaluate self-regulation and executive function skills and to support children with various intervention methods, studies with more variables are needed, taking into account individual differences such as socioeconomic level, family age, education level, parental attitudes, and attachment styles.

As a result, it was observed that children with better self-regulation skills tended to have lower separation anxiety scores, whereas children with higher executive function scores experienced more severe separation anxiety. This indicates that while better self-regulation is associated with less separation anxiety, higher executive function may be linked to higher levels of separation anxiety, or conversely, a reverse relationship may exist. Therefore, when assessing school readiness in kindergarten children, we recommend that self-regulation and executive function (cognitive) skills related to separation anxiety be evaluated in detail and that educational programs and occupational therapy interventions be implemented accordingly. In addition, choosing meaningful and purposeful activities with sensory content facilitates the process, especially in the preschool period, when sensory development is still continuing. The use of the sensory integration approach by occupational therapists, which will provide emotional and behavioral self-management and increase sensory regulation, can give very positive results in terms of managing anxiety and providing adaptive responses.

Ethics Committee Approval

Ethical permission was obtained from Hacettepe University (17/02/2023- E-68552689-000-00002697385) for this research.

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Author Contributions

The authors contributed equally to the research, authorship, and publication of this article.

Conflict of Interest

The authors declare that there is no conflict of interest with any institution of person within the scope of the study.

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