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# The impact of yoga on self-regulation skills in 60-69 month-old children attending preschool education

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**Abstract**

This study investigates the impact of a yoga training program on the self-regulation skills of children aged 60 to 69 months who are enrolled in preschool education. The research utilizes a quasi-experimental design featuring pre-test and post-test control groups within a quantitative research framework. The participants of the study consist of a total of 36 children, including 13 boys and 23 girls, all aged between 60-69 months and enrolled in preschool classes. The selection of participants was made using a purposive sampling method. To obtain participation consent for the children involved in the study, an "Informed Consent Form" was presented to their families, and demographic information of the children and their families was gathered using a "Personal Information Form". The "Self-Regulation Skills Scale for 4-6 Year-Old Children (Teacher Form)", developed by İvrendi and Erol (2018), was employed to assess the self-regulation abilities of both the experimental and control groups.The scale has an internal consistency coefficient of 0.94 and a test-retest reliability coefficient of 0.81. The overall Cronbach's Alpha value of the scale is 0.96. For the analysis of the data, statistical software was utilized, and the pre-test and post-test data were analyzed using the t-test. The findings of the research indicate significant differences between the pre-test and post-test average scores of the experimental group in the sub-dimensions of inhibitory control, attention, and working memory related to self-regulation. Based on these results, it can be concluded that yoga has a positive impact on the development of children's self-regulation skills. Thus, it is suggested that yoga can be integrated into educational programs as an alternative method.

**Keywords:** Educational program, preschool period, self-regulation, yoga.

## *Okul öncesi eğitimde 60-69 aylık çocukların öz-düzenleme becerileri üzerinde yoga'nın etkisi*

***Öz***

*Bu çalışma, okul öncesi eğitime devam eden 60-69 ay arasındaki çocukların öz-düzenleme becerileri üzerindeki yoga eğitim programının etkisini araştırmaktadır. Araştırma, nicel araştırma çerçevesinde ön test-son test kontrol gruplu yarı deneysel bir desen kullanmaktadır. Çalışmanın katılımcıları, 60-69 ay yaş aralığında olup okul öncesi sınıflarına devam eden 13'ü erkek, 23'ü kız olmak üzere toplam 36 çocuktan oluşmaktadır. Katılımcılar amaçlı örnekleme yöntemiyle seçilmiştir. Araştırmaya katılan çocukların ebeveynlerinden izin almak amacıyla "Bilgilendirilmiş Onam Formu" sunulmuş, çocuklar ve ailelerine ait demografik bilgiler "Kişisel Bilgi Formu" ile toplanmıştır. Deney ve kontrol gruplarındaki çocukların öz-düzenleme becerilerini değerlendirmek için İvrendi ve Erol (2018) tarafından geliştirilen "4-6 Yaş Çocukları İçin Öz-Düzenleme Becerileri Ölçeği (Öğretmen Formu)" kullanılmıştır. Ölçeğin iç tutarlık katsayısı 0.94, test-tekrar test güvenirlik katsayısı ise 0.81 olarak belirlenmiştir. Ölçeğin genel Cronbach's Alpha değeri 0.96'dır. Verilerin analizi için istatistiksel yazılım kullanılmış ve ön test-son test verileri t-testi ile analiz edilmiştir. Araştırma bulguları, deney grubunun ön test ve son test ortalama puanları arasında öz-düzenleme ile ilişkili olan engelleyici kontrol, dikkat ve çalışma belleği alt boyutlarında anlamlı farklar olduğunu göstermektedir. Bu sonuçlara dayanarak yoganın çocukların öz-düzenleme becerilerinin gelişimi üzerinde olumlu bir etkisi olduğu sonucuna varılmıştır. Bu nedenle, yoga uygulamalarının eğitim programlarına alternatif bir yöntem olarak entegre edilmesi önerilmektedir.*

***Anahtar Kelimeler:*** *Eğitim programı, okul öncesi dönemi, öz-düzenleme, yoga.*

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## INTRODUCTION

Individuals acquire skills during childhood that impact their entire life cycle, with preschool being a critical period for the development of many skills (Yükselen, 2017). During this time, children develop physical skills such as motor abilities, cognitive skills including thinking and problem-solving, and key social-emotional skills like competence, communication, expressing feelings and thoughts, regulating emotions, forming emotional bonds, sharing, and establishing friendships (Ozana et al., 2015). Children experience various emotions in response to positive and negative experiences throughout their social life (Berk, 2013). Ural et al. (2020) define self-regulation as the ability of children to control their emotions in response to emotional stimuli, analyze emotions and exhibit appropriate behaviors, react correctly to events, and adapt to their environment. Self-regulation encompasses the skills to focus on specific stimuli, plan, control, manage, and regulate one's behaviors (Posner & Rothbart, 2009; Bauer & Baumeister, 2011). It can also be described as the effort to display appropriate behavior against impulsive responses, set personal goals and progress towards them, and employ effective strategies when necessary (Kauffman, 2004; Alper Çiltaş, 2011; Bauer & Baumeister, 2011). Self-regulation skills begin to develop from birth and continue to advance through adolescence, adulthood, and even old age (Bronson, 2019).

The early childhood period is recognized as the phase where self-regulation skills develop most rapidly (Bronson, 2019; Sezer, 2022). The development of self-regulation skills during childhood starts with the enhancement of fundamental abilities and remains dependent on the development of these basic skills. Self-regulation skills not only facilitate a child's development and independence but also influence future successes (McClelland & Tominey, 2011; Polnariev, 2006). Furthermore, self-regulation directly impacts children's social competence, self-control, communication with peers, teacher-child relationships, psychological and emotional health, academic achievement, and the ability to empathize and adapt (Yükselen, 2017; Ural et al., 2020). According to Blair and Raver (2012), self-regulation encompasses the skills for individuals to manage themselves and interpersonally, control their impulses, and keep inappropriate responses in check. Aydın and Ulutaş (2017) emphasize the continuous development of self-regulation skills as crucial for children to achieve their goals and comply with societal norms. Hence, supporting and enhancing self-regulation skills are key for boosting personal and academic success (Posner & Rothbart, 2009; Şahin, 2014; Bronson, 2019).

In the early years of early childhood, children's development is supported by families, and in later years, by preschool teachers. The Preschool Education Program (2013) offers multifaceted activities to support children's development, encompassing Turkish, Mathematics, Art, Music, Play, Drama, Science, Pre-literacy, Physical Activity, and Field trips. These activities, integrated into the curriculum by teachers in a balanced manner (Çelik & Daşcan, 2017), play a crucial role, especially physical activities, in supporting the physical development fundamental to all areas of growth and personality development (Hürmüz, 2011; Duman, 2014; Yavuz, 2018; Önal, 2019). Through physical activities, children explore their bodies, learn to balance, enhance movement skills, and advance in the socio-emotional domain (Oktay, 1999; Duman, 2014; Özyürek, 2015). Instilling lasting sports habits in preschoolers is comparatively easier than at other ages, generally achieved through activities like physical education, gymnastics, dance, sports, and active games (Günsel, 2004; Duman, 2014; Pepe, 2019).

In recent years, some preschool institutions have incorporated yoga into their physical activities (Ertem & Gürhan, 2018). Originating from India, yoga positively influences individuals mentally, physically, and spiritually and is utilized in various fields today (Büssing, 2012; Manaf, 2013). Yoga, a form of body art, refreshes the mind, enhances understanding of emotions, improves posture, boosts self-confidence and self-esteem, and facilitates recognizing the needs of the body and mind. Yoga training encompasses meditation (focus), correct breathing techniques (pranayama), and poses (asanas) that increase flexibility and positively impact health (Avt, 2005; Duyan, 2007; Birdee, 2008; Bozbıyık, 2018; Khalsa & Michon, 2020). Due to its significant benefits on cognitive, physical, and focusing skills, yoga is among the most preferred concentration techniques worldwide (Nanthakumar, 2018; Besant, 2022). Individuals of all ages can benefit from yoga training (Şener, 2018; Besant, 2022), with practices varying based on individuals' ages, personal differences, and health conditions. Currently, in addition to traditional yoga training, prenatal yoga, children's yoga, and yoga techniques adapted for individuals with special needs are being practiced frequently (Alkan, Özçoban, 2017; Khalsa & Michon, 2020; Bodur, 2020; Bafralı, 2021).

Through yoga training, children explore themselves, gain awareness of their environment, and learn to establish positive communication with others around them (Galantino, et al., 2008; Bodur, 2020). Additionally, yoga serves as a calming and relaxing exercise for children, offering them a safe and non-competitive environment. In such a setting, children can easily explore their identity and creativity, gain new perspectives, enhance their focusing skills, and learn to express their thoughts and manage their emotions (White, 2009; Şener, 2018).

Research in literature indicates yoga positively affects children's development emotionally, physically, and cognitively (White, 2009; Aydın & Özgen, 2018; Pandya, 2018; Özgün, 2020). Halliwell et al. (2018) noted yoga training improves children's ability to manage negative emotions and decrease undesirable behaviors. It was highlighted that yoga could enhance children's social self-esteem and academic success (Gulati et al., 2019). Additionally, Özgün et al. (2020) found that yoga creates positive changes in the cognitive functions of preschool-aged children. Yoga training not only enhances children's abilities to manage anxiety and stress but also proves effective in the treatment of existing developmental disorders and positively influences physical development (Aydın & Özgen, 2018). Gulati et al. (2019) demonstrated that yoga positively affects self-esteem and cognitive skills in children aged 9-12 through experimental research. Froeliger et al. (2012) highlighted yoga as a beneficial method for improving emotion regulation capabilities. Bilmez (2023) found that yoga positively impacts children's emotion regulation skills, contributes positively to their emotional behaviors, and serves both a preventative and therapeutic role against negative behaviors in early childhood.

In their study, Aydın and Ulutaş (2017) discussed the stages and importance of the development of emotion regulation and self-regulation skills, concluding that preschool education positively affects children's self-regulation skills. They emphasized the necessity of including routine, comprehensive, rule-based activities in the curriculum to support the development of these skills, highlighting the importance of teaching children self-awareness, acceptance, and the ability to express emotions. Yaralı and Aytar (2017) noted that children with insufficient self-regulation skills tend to exhibit behavioral problems, disrupting group dynamics and not adhering to rules. The study suggests careful attention to practices that support self-regulation skills in early childhood. Arslan et al. (2021) found that children's self-regulation skills vary by gender, socioeconomic status, age, family income, school attended, and other demographic factors. Internationally, research on the impact of yoga during early childhood indicates positive effects on self-regulation and self-esteem (White, 2012; Razza et al., 2013; Eggleston, 2015; Cook-Cotone, 2017; Gulati, 2019). However, in Turkey, there appears to be a lack of studies investigating the influence of yoga on self-regulation skills in preschool children.

The research was conducted to examine the effect of yoga on the self-regulation skills of children aged 60-69 months attending preschool education. For this purpose, based on the "Self-

Regulation Skills Scale for 4-6-Year-Old Children," questions covering three sub-dimensions of self-regulation skills (inhibitory control, attention, and working memory) were developed.

These are:

1. Are there significant differences between the pre-test scores of the experimental and control groups in the subdimensions of self-regulation skills (inhibitory control, attention, working memory) among 60-69 month-old children?

2. Are there significant differences between the pre-test and post-test scores within the experimental group in the subdimensions of self-regulation skills (inhibitory control, attention, working memory) among 60-69 month-old children?

3. Are there significant differences between the pre-test and post-test scores within the control group in the subdimensions of self-regulation skills (inhibitory control, attention, working memory) among 60-69 month-old children?

4. Are there significant differences between the post-test scores of the experimental and control groups in the subdimensions of self-regulation skills (inhibitory control, attention, working memory) among 60-69 month-old children?

## METHOD

### The model of the study

The quantitative research aiming to investigate the effect of yoga on self-regulation skills of children aged 60-69 months attending preschool education was conducted using a pre-test-post-test control group quasi-experimental design. In quasi-experimental studies, control and experimental groups are randomly assigned, and the two groups are compared by applying pre-test and post-test measures against certain variables (Büyüköztürk, 2012; Erkuş, 2013; Kemiksiz, 2021). The ethical approval for the article was obtained from the Scientific Research and Publication Ethics Committee of Fatih Sultan Mehmet Foundation University with the decision dated 27.10.2022 and numbered 18/13. This article is derived from the master's thesis titled "The Effect of Yoga on Self-Regulation Skills of 60-69 Month-Old Children Attending Preschool Education," prepared by Vera SEVEN under the supervision of Assoc. Prof. Dr. İsa KAYA in the Department of Basic Education at the Graduate Education Institute, Fatih Sultan Mehmet Vakif University.

**Study group**

In an exclusive preschool located in the central district of Muş province, a total of 36 children, comprising 13 boys and 23 girls aged between 60-69 months, are participating in early childhood education, forming the study group. From the study group, 18 children were randomly assigned to the experimental group, and 18 children to the control group.

The demographic characteristics of the children participating in the study are presented in Table 1. The data in the table aim to provide a more comprehensive understanding of the characteristics of the study group, even if some variables are not included in the analysis results.

**Table 1. Frequency and percentage distributions of demographic characteristics of the study group.**

| | | f | % |
|---|---|---|---|
| Children's gender | Girl | 23 | 63.9 |
| | Boy | 13 | 36.1 |
| Previous school/preschool experience | Yes | 22 | 61.1 |
| | No | 14 | 38.9 |
| Experiences of trauma or negative events since birth | Yes | 3 | 8.3 |
| | No | 33 | 91.7 |
| Presence of physical ailments | Yes | 0 | 0 |
| | No | 36 | 100 |
| Attitude of the child's family towards sports activities | Sufficient | 28 | 77.8 |
| | Insufficient | 8 | 22.2 |
| Child's sports habits | Yes | 22 | 61.1 |
| | No | 14 | 38.9 |
| Allocation of time for physical activities during the day for children | Yes | 23 | 63.9 |
| | No | 13 | 36.1 |

According to the demographic characteristics presented in Table 1. it is observed that 23 (63.9%) girls and 13 (36.1%) boys participated in the research. While 22 (61.1%) children had previous school or preschool experience. 14 (38.9%) children had not received any school or preschool education. Out of the total. 33 (91.7%) children had not experienced any trauma or negative events since birth. while 3 (8.3%) children reported experiencing trauma or negative events. None of the children participating in the research had any physical ailments. Regarding the attitude of children's families towards sports activities. it was noted that 28 (77.8%) considered their attitude to be adequate. while 8 (22.2%) considered it inadequate. Of the children. 22 (61.1%) reported having sports habits. while 14 (38.9%) stated that they did not have any sports habits. In response to the question "Does the child allocate time for physical activities during the day?". 23 (63.9%) children answered yes. while 13 (36.1%) children answered no.

**Data collection tools**

Before starting the research, the researcher obtained ethical approval from the Fatih Sultan Mehmet Foundation University's ethics committee and necessary permissions from the

Ministry of National Education. Prior to the implementation, detailed information about the purpose of the research was provided to the parents by the researcher, and necessary permissions were obtained from the families through an "Informed Consent Form". Demographic information of the children and families was obtained through a "Personal Information Form". To measure the self-regulation skills of the experimental and control groups, the "Self-Regulation Skills Scale for 4-6 Year Old Children (Teacher Form)" developed by İvrendi and Erol (2018) was utilized.

**Personal information form**

"Personal Information Form" has been developed by the researcher to collect various demographic information related to the child.

**Self-regulation skills scale for 4-6 year old children (Teacher form)**

Ivrendi and Erol (2018) developed the 'Self-Regulation Skills Scale for 4-6 Year Old Children (Teacher Form),' consisting of 22 items. Among these, 8 items address inhibitory control, 9 items focus on attention, and 5 items assess working memory skills. The internal consistency coefficient of the scale was found to be 0.94, and the internal consistency coefficients for the sub-dimensions ranged from 0.91 to 0.87. The test-retest reliability coefficient was calculated as 0.90. The reliability analysis results using Guttman Lambda (Li) method showed coefficients ranging from 0.90 to 0.96. Additionally, the test-retest reliability coefficient was found to be 0.81. Cronbach's Alpha values for the sub-dimensions of the scale are as follows: 0.92 for Inhibitory Control, 0.94 for Attention, 0.96 for Working Memory, and 0.96 for the entire scale. These findings indicate that the scale used to measure self-control skills in 4-6 year old children is reliable.

**The child yoga program**

The child yoga training program commenced on March 20, 2023, and was conducted three times a week, with each session lasting 20 minutes. The enrollment into the program was based on voluntary participation. Consequently, prior to the initiation of the training, the yoga instructor elucidated the benefits of yoga to the children and provided information regarding the exercises that would be performed during the sessions. This approach ensured the voluntary participation of the children. Throughout the child yoga training process, the participants were introduced to restorative and stretching-based postures (asanas), proper breathing techniques, and methods for calming and focusing. Rather than adhering to a strict regimen, the program was structured around fun and games. The yoga training spanned a total of 10 weeks, concluding on June 3, 2023.

The child yoga program was designed by the instructor as a holistic approach aimed at supporting children's self-regulation skills. It seeks to establish a foundation that would enable children to better handle balance, concentration, and emotional awareness in their daily lives. The program consists of 5 modules, each incorporating specific outcomes and spanning a two-week period of practice. The main topics of these modules are presented in Figure 1. Each module is structured to facilitate the children's learning of various yoga postures and breathing exercises, enhance their awareness of their bodies and emotional states, and calm their minds through meditation. Furthermore, the program aims to strengthen children's emotional and mental health by teaching them techniques for coping with stress and relaxation.

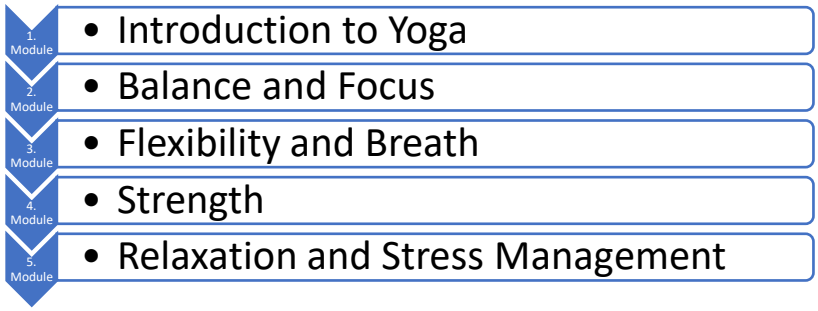


**Figure 1. Modules of the children's yoga program**

**Data collection**

The data collection process of the study began on March 13, 2023. The "Personal Information Form" was completed by the parents of the children participating in both the control and experimental groups, while the "Self-Regulation Skills Scale for Children Aged 4-6 (Teacher Form)" was completed by their preschool teachers. Following the initial analysis of the collected data, a 10-week children's yoga training program was provided to the experimental group by the yoga instructor. The yoga training for the experimental group was completed on June 3, 2023, and on June 4, 2023, the teachers completed the "Self-Regulation Skills Scale for Children Aged 4-6 (Teacher Form)" for children in both the experimental and control groups.

**Data analysis**

In the research, the collected data was analyzed using the SPSS 20.00 (Statistical Package for the Social Sciences) software in a computerized environment. The numerical distributions of the data were determined using SPSS, and frequency analysis was conducted. The Shapiro-Wilk test was applied to ascertain whether the data had a normal distribution, and the results indicated that the data were normally distributed. When evaluating the study data, variables such as the child's gender, mode of birth, prior school/nursery experience, any trauma or

adverse experiences since birth, severe illnesses endured, physical ailments, the family's attitude towards sports activities, the child's sports habits, whether the child allocates time for physical activities during the day, frequency of play, engagement in pretend play, and level of mathematical skill were identified using percentage and frequency values. The t-test was employed for comparing pre-test and post-test variables.

The results were deemed statistically significant within a 95% confidence interval, with p-values less than 0.05.

## FINDINGS

**Table 2. t-test findings for pre-test scores of self-regulation subdimensions for the experimental and control groups**

| Group | Subdimension | $\bar{X}$ | N | SS | T | P |
|---|---|---|---|---|---|---|
| Pre-test experimental | Inhibitory control | 2.64 | 18 | 0.70 | -0.29 | **0.77** |
| Pre-test kontrol | | 2.70 | 18 | 0.92 | | |
| Pre-test experimental | Attention | 2.57 | 18 | 0.82 | -2.04 | **0.57** |
| Pre-test kontrol | | 3.20 | 18 | 0.86 | | |
| Pre-test experimental | Working memory | 2.80 | 18 | 1.01 | -1.40 | **0.17** |
| Pre-test kontrol | | 3.34 | 18 | 1.08 | | |

P<0.05

In Table 2., the mean pre-test scores for the self-regulation inhibitory control subdimension are observed to be $\bar{x}$=2.64, $\bar{x}$ =2.64 for the experimental group and $\bar{x}$ =2.70, $\bar{x}$ =2.70 for the control group. No statistically significant difference is found between the pre-test scores of the experimental and control groups (t=-0.29; p>0.05).

When examining the mean pre-test scores for the attention subdimension, the experimental group scored $\bar{x}$ =2.57, $\bar{x}$ =2.57, whereas the control group scored $\bar{x}$ =3.20, $\bar{x}$ =3.20. No statistically significant difference has been found between the scores obtained by both groups (t=-2.04; p>0.05).

For the working memory subdimension, the mean pre-test scores are $\bar{x}$ =2.80, $\bar{x}$ =2.80 for the experimental group and $\bar{x}$ =3.34, $\bar{x}$ =3.34 for the control group, indicating that there is no statistically significant difference between the two groups (t=-1.40; p>0.05).

**Table 3. Pre-test and post-test t-test findings related to the self-regulation sub-dimensions of the experimental group**

| Group | Subdimension | $\bar{X}$ | N | SS | T | P |
|---|---|---|---|---|---|---|
| Pre-test | Inhibitory control | 2.64 | 18 | 0.70 | -14.50 | **0.00** |
| Post-test | | 4.85 | 18 | 0.17 | | |
| Pre-test | Attention | 2.57 | 18 | 0.82 | -12.46 | **0.00** |
| Post-test | | 4.85 | 18 | 0.28 | | |
| Pre-test | Working memory | 2.80 | 18 | 1.01 | -8.87 | **0.00** |
| Post-test | | 4.96 | 18 | 0.09 | | |

P<0.05

When examining Table 3, it is observed that the pre-test mean scores of the experimental group's self-regulation inhibitory control sub-dimension were $\bar{x}$ =2.64, $\bar{x}$ =2.64, and the post-test mean scores were $\bar{x}$ =4.85, $\bar{x}$ =4.85. The difference in scores obtained between these tests is statistically significant (t=-14.50; p<0.05).

For the attention sub-dimension, the pre-test mean scores were $\bar{x}$ =2.57, $\bar{x}$=2.57 and the post-test mean scores were $\bar{x}$ =4.85, $\bar{x}$ =4.85. The difference in scores between the tests has shown a statistically significant difference (t=-12.46; p<0.05).

Looking at the working memory sub-dimension, the pre-test mean scores were $\bar{x}$=2.80, $\bar{x}$=2.80 and the post-test mean scores were $\bar{x}$=4.96, $\bar{x}$=4.96. Similar to the inhibitory control and attention sub-dimensions, the difference in scores for the working memory sub-dimension also indicates a statistically significant difference (t=-8.87; p<0.05).

**Table 4. Pre-test and post-test t-test findings related to the self-regulation sub-dimensions of the control**

| Group | Subdimension | $\bar{X}$ | N | SS | T | P |
|---|---|---|---|---|---|---|
| Pre-test | Inhibitory control | 2.70 | 18 | 0.92 | -7.28 | **0.00** |
| Post-test | | 4.62 | 18 | 0.56 | | |
| Pre-test | Attention | 3.20 | 18 | 0.86 | -6.69 | **0.00** |
| Post-test | | 4.52 | 18 | 0.64 | | |
| Pre-test | Working memory | 3.34 | 18 | 1.08 | -5.43 | **0.00** |
| Post-test | | 4.82 | 18 | 0.39 | | |

P<0.05

In Table 4, the control group's pre-test mean scores for the self-regulation inhibitory control sub-dimension were found to be $\bar{x}$ =2.70, $\bar{x}$ =2.70, and the post-test mean scores were $\bar{x}$ =4.62, $\bar{x}$ =4.62. The difference in scores between the pre-test and post-test indicates a statistically significant difference (t=-7.28; p<0.05).

For the attention sub-dimension, the pre-test mean scores were $\bar{x}$ =3.20, $\bar{x}$ =3.20 and the post-test mean scores were $\bar{x}$ =4.52, $\bar{x}$ =4.52. The difference in scores between the pre-test and post-test for the control group is statistically significant (t=-6.69; p<0.05).

The working memory sub-dimension pre-test mean scores were $\bar{x}$ =3.34, $\bar{x}$ =3.34 and the post-test mean scores were $\bar{x}$ =4.82, $\bar{x}$ =4.82. The differences observed are statistically significant (t=-5.43; p<0.05).

**Table 5. t-test findings related to the post-test scores of the self-regulation sub-dimensions for the experimental and control groups**

| Group | Subdimension | $\bar{X}$ | N | SS | T | P |
|---|---|---|---|---|---|---|
| Post-test experimental | Inhibitory control | 4.84 | 18 | 0.17 | 1.56 | **0.36** |
| Post-test control | | 4.62 | 18 | 0.56 | | |
| Post-test experimental | Attention | 4.85 | 18 | 0.28 | 1.92 | **0.07** |
| Post-test control | | 4.52 | 18 | 0.64 | | |
| Post-test experimental | Working memory | 4.95 | 18 | 0.09 | 1.58 | **0.13** |
| Post-test control | | 4.82 | 18 | 0.39 | | |

P<0.05

In Table 5, for the self-regulation inhibitory control sub-dimension, the post-test mean scores for the experimental group were $\bar{x}$ =4.84, $\bar{x}$ =4.84, and for the control group, the post-test mean scores were $\bar{x}$ =4.62, $\bar{x}$ =4.62. The difference in post-test scores between the experimental and control groups is not statistically significant (t=1.56; p>0.05).

For the attention sub-dimension, the post-test mean score for the experimental group was $\bar{x}$ =4.85, $\bar{x}$ =4.85, and for the control group, the post-test mean score was $\bar{x}$ =4.52, $\bar{x}$ =4.52. Similar to the inhibitory control sub-dimension, there is no statistically significant difference between the post-test scores of the experimental and control groups (t=1.92; p>0.05).

In the working memory sub-dimension, with the experimental group's post-test mean score at $\bar{x}$ =4.95, $\bar{x}$ =4.95 and the control group's post-test mean score at $\bar{x}$=4.82, $\bar{x}$=4.82, the difference between the two tests, when considered, does not show a statistically significant difference (t=1.58; p>0.05).

## DISCUSSION AND CONCLUSION

In this section of the research, the findings have been discussed in light of the data obtained from the results, and recommendations have been made.

This study aims to investigate the effect of yoga training on the self-regulation skills of children aged 60-69 months who attend preschool education. When examining the pre-test mean scores of self-regulation for both the experimental and control groups, it was found that the mean scores of both groups were similar, indicating no significant difference between the groups. This situation can be interpreted as demonstrating homogeneity between the experimental and control groups in terms of the level of self-regulation skills.

Upon reviewing the findings associated with the experimental group, it was noted that the pre-test mean scores for self-regulation in the sub-dimensions of inhibitory control, attention, and working memory differed significantly from the post-test mean scores. The increase in

post-test scores for the inhibitory control sub-dimension, following the yoga training, suggests that the children have developed their abilities to better identify both their own and their peers' emotional responses to certain events, build empathy, express their thoughts easily, and resolve problem situations through discussion. In a similar vein, notable improvements were observed in the attention and working memory sub-dimensions among children in the experimental group. These included a greater willingness to adhere to classroom rules, enhanced success in completing activities and assigned tasks, improved concentration abilities, and an increased desire to maintain a more organized environment. Drawing on these findings, it can be concluded that the yoga training incorporated in the study had a positive impact on self-regulation skills. A significant increase in scores for inhibitory control, attention, and working memory was noted among the children in the experimental group. Dunayeva (2019) and Bilmez (2023) have concluded in their studies that yoga exercises positively affect children's focusing, memory, problem-solving, and emotion regulation skills. They also noted that children who continue yoga training exhibit more positive behaviors and respond appropriately to adverse situations. These results are in parallel with the findings of this research. Yoga incorporates comprehensive practices that allow an individual to focus on their inner world, integrate with their surroundings, and lead their life in a more organized manner. Furthermore, studies by Avadhuta (2005) and Bodur (2020) have shown that yoga strengthens children's self-regulation skills and enhances their self-regulation abilities. Frolov and colleagues (2013) indicated in their research that through the correct breathing techniques practiced within yoga training, children's bodies are enriched with oxygen, which positively affects blood circulation and thereby supports their mental processes and physical development. These outcomes further support the findings of this research.

Significant differences were noted in the pre-test and post-test scores of the control group as well; however, the mean scores of the control group were lower in comparison to those of the experimental group. This finding suggests that the children in the control group, by continuing their preschool education and engaging in the activities of the preschool education program throughout the process, showed development in their self-regulation skills. However, when comparing the post-test mean scores of the experimental and control groups, the children in the experimental group had noticeably higher scores than those in the control group. This indicates that while preschool education activities contribute to the development of self-regulation skills, the yoga training provided to the experimental group had a more pronounced positive impact on these skills.

A review of the relevant literature has found results similar to those of this research. Kırkıç and Demir (2020) highlighted in their study that children's self-regulation skills are supported during the preschool education process. A study conducted by Flook, Goldberg, Pinger, Bonus, and Davidson (2010) showed that mindfulness and yoga-based programs improve preschool children's self-regulation skills such as sustaining attention, emotional control, and flexibility. Yoga also contributes to the development of skills in regulating behavior and impulse control (Harrison et al., 2004), which are crucial for success in learning environments and social interactions. Furthermore, yoga can help increase children's body awareness and sensitivity towards themselves, aiding them in better understanding their needs and limits (Conboy et al., 2013).

Upon examining another finding, it was observed that there was no statistically significant difference between the post-test scores of the self-regulation sub-dimensions for the experimental and control groups. However, it was found that the scores for the self-regulation inhibitory control, attention, and working memory sub-dimensions were higher for the experimental group compared to the control group. This suggests that yoga training helps children improve their attention, cope with stress, and supports the development of emotional control skills. Based on the recorded score increases in the self-regulation sub-dimensions for the experimental group, we can say that yoga training is effective in enhancing self-regulation skills in children during the preschool period and can be used as a tool to support these skills. Yoga is a practice that enriches children's environment and life experiences (Avt., 2005; Bodur, 2020). A rich environment and diverse stimuli play a significant role in the development of children's self-regulation skills (Bronson, 2019). Ryabinin (2005) emphasized that integrating different disciplines in addition to preschool education supports children's development. Yoga practice not only provides positive contributions to their physical, emotional, and mental development but also imparts many essential life skills to children (Şener, 2018; Besant, 2022). The yoga training applied during the research process enabled children to explore their bodies and emotional worlds, offering opportunities for self-expression. It can be said that each module included in the yoga program increased children's attention, developed their self-confidence and self-esteem skills, supported emotion regulation abilities, and enhanced children's memory capabilities.

At the end of the research process, the parents of children in the experimental group believe that their children managed their emotions more positively in stressful environments and began to exhibit more positive behaviors thanks to the yoga practices. Based on these

statements, we can say that the children embraced the yoga techniques and applied them routinely. Bronson (2019) and Dunayeva (2019) have reported positive changes in the correction of emotions and behaviors in the development of self-regulation skills following yoga practice. In their study, Frolov and colleagues (2013) thoroughly examined the effects of proper breathing on the body, and they emphasized that early childhood practices of correct breathing improved sleep quality, enhanced coping skills with stress, and positively affected cognitive and emotional development in children. Other similar studies in this field have also concluded that yoga techniques promote emotional balance, support mental processes, alleviate tension, and relax the body (Manaf, 2013; Bilmez, 2023). Consequently, it can be stated that the children's yoga training implemented in this study had a positive influence on the self-regulation skills of the experimental group concerning behavior and emotional control.

The outcome of this research indicates that participation in yoga training positively influenced and supported self-regulation skills in children who were part of the experimental group. Consequently, it is believed that the children successfully acquired the skills outlined in the yoga training program. The fact that the average scores for the sub-dimensions of self-regulation in the experimental group were higher than those in the control group demonstrates the impact of yoga on children's self-regulation abilities. Evaluations of the interviews and observations conducted within the scope of the research suggest that yoga training enabled children to develop permanent and positive habits, adopt and routinely practice the fundamental asanas of yoga, enhance their stress management skills, and learn emotional regulation. Moreover, these findings can assert that yoga training contributes positively not only to the physical and mental health of children but also in areas such as mental health and stress management.

**Suggestions**

In light of these findings, the following recommendations can be proposed:

• The effectiveness of more extended yoga programs could be explored by developing them over longer durations.

• The relationship between yoga and other variables beyond self-regulation could be examined.

• Studies could be undertaken with diverse age groups to evaluate the impacts across different developmental stages.

• Educators could implement yoga activities to support children's self-regulation skills such as attention, inhibitory control, and working memory.

• Teachers may advise parents on the practice of yoga as an alternative method that can support their children's development.

• Experimental studies can be conducted to examine the effects of yoga practices on self-regulation skills among children with special needs.

## REFERENCES

Alkan, E., & Özçoban, F. A. (2017). Yoganın gebelik, doğum ve doğum sonuçları üzerine etkisi. *Smyrna Tıp Dergisi, 1*(1), 64-71.

Arslan, Ö., Çavunt, F., Çoban, A., Ezgi, D., Erkoç, A., Karan, S. Ş., … et al. (2021). Okul öncesi dönem çocuklarının öz düzenleme becerilerinin incelenmesi. *International Primary Education Research Journal, 5*(2), 180-199.

Avadhuta, H. (2005). *Yoga: Sağlığın yolu*. Kozmik Dans Yayıncılık.

Aydın, D., & Özgen, Z. E. (2018). Çocuklarda yoganın etkileri: Sistematik derleme. *International Conference on Empirical Economics and Social Sciences (ICEESS'18)*, 96-103.

Aydın, F., & Ulutaş, İ. (2017). Okul öncesi çocuklarda öz düzenleme becerilerinin gelişimi. *Aksaray Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 1*(2), 67-79.

Bafralı, C. (2021). *Disleksili çocuklarda yaratıcı dans eğitiminin motor fonksiyonlar ve yürütücü işlevlere etkisi: Randomize kontrollü çalışma* [Yayımlanmamış doktora tezi]. Ankara Üniversitesi Sağlık Bilimleri Enstitüsü.

Bauer, I. M., & Baumeister, R. F. (2011). Self-regulatory strength. In K. D. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory, and applications* (Vol. 2, pp. 64-82). Guilford Press.

Berk, E. L. (2013). *Bebekler ve çocuklar* (N. Işıkoğlu Erdoğan, Çev.). Nobel Yayıncılık. (Orijinal çalışma 2012'de yayınlanmıştır)

Berk, L. (2015). *Child development* (9th ed.). Pearson Higher Education.

Besant, A. W. (2022). *Yogaya giriş* (E. Coşkun, Çev.). Akademim Yayınları.

Bilmez, B. (2023). *Yoga farkındalık programının 60-72 aylık çocukların duygu düzenleme becerilerine ve annelerin görüşlerine etkisinin incelenmesi* [Yayımlanmış doktora tezi]. Ankara Üniversitesi Sağlık Bilimleri Enstitüsü.

Birdee, G. S., Legedza, A. T., Saper, R. B., Bertisch, S. M., Eisenberg, D. M., & Phillips, R. S. (2008). Characteristics of yoga users: Results of a national survey. *Journal of General Internal Medicine, 23*(10), 1653-1658. https://doi.org/10.1007/s11606-008-0735-5

Blair, C., & Raver, C. C. (2012). Child development in the context of adversity: Experiential canalization of brain and behavior. *American Psychologist, 67*(4), 309-318. https://doi.org/10.1037/a0027493

Bodur, B. (2020). *Çocuk yogası*. Okuyan Us Yayıncılık.

Bronson, M. B. (2019). *Erken çocuklukta öz-düzenleme doğası ve gelişimi* (E. Sezgin & M. Kır Yiğit, Çev.). Eğiten Kitap Yayıncılık.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2012). *Örnekleme yöntemleri*. Pegem Akademi.

Çelik, B., & Kamaraj, İ. (2020). 60-72 aylık çocukların öz düzenleme becerisi üzerinde çocuk katılımlı eğitim programının etkisinin incelenmesi. *Marmara Üniversitesi Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi, 51*(51), 1-17.

Çelik, N., & Daşcan, Ö. (2017). *Okul öncesi eğitimi programı ve etkinlik kitabı*. Anı Yayıncılık.

Çiltaş, A. (2011). Eğitimde öz-düzenleme öğretiminin önemi üzerine bir çalışma. *Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 3*(5), 1-11.

Duman, G. (2014). Hareket eğitimine giriş. In G. Duman (Ed.), *Okul öncesi dönemde beden eğitimi*. Hedef Yayıncılık.

Eggleston, B. (2015). The benefits of yoga for children in schools. *The International Journal of Health, Wellness, and Society, 5*(3), 1-7.

Erkuş, A. (2013). *Davranış bilimleri için bilimsel araştırma süreci* (4. bs). Seçkin Yayıncılık.

Erol, A., & İvrendi, A. (2018). 4-6 yaş çocuklarına yönelik öz-düzenleme becerileri ölçeğinin geliştirilmesi (Anne formu). *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi, 44*, 178-195.

Frolov, A., Afanasyeva, S., & Rama, S. (2013). Doğru nefes alın- uzun yaşayın! *İnsan ekolojisi: Sağlık, kültür ve yaşam kalitesi* (ss. 137-142).

Galantino, M. L., Galbavy, R., & Quinn, L. (2008). Therapeutic effects of yoga for children: A systematic review of the literature. *Pediatric Physical Therapy, 20*(1), 66-80.

Gulati, K., Sharma, S. K., Telles, S., & Balkrishna, A. (2019). Self-esteem and performance in attentional tasks in school children after 4½ months of yoga. *International Journal of Yoga, 12*(2), 158-164.

Günsel, A. M. (2004). *Okul öncesinde beden eğitimi ve uygulamaları*. Anı Yayıncılık.

Halliwell, E., Jarman, H., Tylka, T. L., & Slater, A. (2018). Evaluating the impact of a brief yoga intervention on preadolescents' body image and mood. *Body Image, 27*, 196-201.

Kemiksiz, Ö. (2021). Yazma becerilerinin geliştirilmesi üzerine hazırlanan tezlere yönelik bir inceleme: Yarı deneysel çalışmalar. *OPUS International Journal of Society Researches, 18*(41), 3172-3200. https://doi.org/10.26466/opus.887374

Kırkıç, K. A., & Demir, B. (2020). Examination of pre-school students' self-regulation skills. *Problems of Education in the 21st Century, 78*(6), 967-977.

Manaf, A. (2013). *Yoga nedir? Ne değildir?* Gala Yayıncılık.

McClelland, M. M., & Tominey, S. L. (2011). Introduction to the special issue on self-regulation in early childhood. *Early Education and Development, 22*(3), 355-359. https://doi.org/10.1080/10409289.2011.574265

Nanthakumar, C. (2018). The benefits of yoga in children. *Journal of Integrative Medicine, 16*(1), 14-19. https://doi.org/10.1016/j.joim.2017.12.008

Oktay, A. (1999). *Yaşamın sihirli yılları: Okul öncesi dönem*. Epsilon Yayıncılık.

Ozana, U., Güven, G., Sezer, T., & Azkeskin, E. (2015). Okul öncesi dönemdeki çocukların bağlanma biçimleri ile sosyal yetkinlik ve duygu düzenleme becerileri arasındaki ilişkinin incelenmesi. *Hacettepe University Faculty of Health Sciences Journal, 2*(1), 42-56.

Öner, Ş., & Özbey, S. (2022). Okul öncesi dönemdeki çocukların sosyal bilgiyi işleme becerileri ile psikolojik sağlamlık düzeyleri arasındaki ilişkinin incelenmesi. *International Journal of Social, Humanities and Administrative Sciences, 8*(53), 101-120.

Özgün, S. Y., Özkul, B., Oral, E., & Şemin, İ. (2020). Yoga eğitiminin erken çocukluk dönemindeki çocukların bilişsel işlevlerine etkisi. *Eğitim ve Bilim, 46*(206), 59-77. http://dx.doi.org/10.15390/EB.2020.9088

Pandya, S. P. (2018). Yoga, emotional awareness and happiness in children: A multi-city study of the Chinmaya Bala Vihar programme. *Child & Youth Care Forum, 47*(6), 897-917.

Polnariev, B. A. (2006). Dynamics of preschooler's self-regulation: Viewed through the lens of conflict resolution strategies during peer free-play (Doctoral dissertation, City University of New York).

Ryabinin, P. (2005). *Okul öncesi çocukların beden eğitiminde hatha yoga jimnastiği kullanma yöntemi* [Doktora tezi]. Krasnoyarsk Devlet Pedegojik Üniversitesi.

Sezer, Ş. İ. (2022). *Erken çocukluk döneminde sosyal duygusal gelişim*. Nobel Yayıncılık.

Şahin, F. (2014). *Okul öncesi dönemde fen eğitimi*. Hedef Yayıncılık.

Şener, E. (2018). *Anne ve çocuk yogası*. Aura Yayıncılık.

Turan, F., & Yükselen, A. İ. (2017). *Çocuk gelişimi 1: Bebeklik döneminde gelişim*. Hedef Yayıncılık.

White, L. S. (2009). Yoga for children. *Pediatric Nursing, 35*(5), 277-281.

White, L. S. (2012). Reducing stress in school-age girls through mindful yoga. *Journal of Pediatric Health Care, 26*(1), 45-56. https://doi.org/10.1016/j.pedhc.2011.01.002

Yaralı, K. T., & Aytar, F. A. G. (2017). Okul öncesi dönem çocuklarının davranışlarının öz düzenleme becerileri yönünden incelenmesi. *Mersin Üniversitesi Eğitim Fakültesi Dergisi, 13*(3), 856-870.

| **KATKI ORANI** *CONTRIBUTION RATE* | **AÇIKLAMA** *EXPLANATION* | **KATKIDA BULUNANLAR** *CONTRIBUTORS* |
|---|---|---|
| Fikir ve Kavramsal Örgü *Idea or Notion* | Araştırma hipotezini veya fikrini oluşturmak *Form the research hypothesis or idea* | Vera SEVEN İsa KAYA |
| Tasarım *Design* | Yöntem ve araştırma desenini tasarlamak *To design the method and research design.* | Vera SEVEN İsa KAYA |
| Literatür Tarama *Literature Review* | Çalışma için gerekli literatürü taramak *Review the literature required for the study* | Vera SEVEN İsa KAYA |
| Veri Toplama ve İşleme *Data Collecting and Processing* | Verileri toplamak. düzenlemek ve raporlaştırmak *Collecting. organizing and reporting data* | Vera SEVEN İsa KAYA |
| Tartışma ve Yorum *Discussion and Commentary* | Elde edilen bulguların değerlendirilmesi *Evaluation of the obtained finding* | Vera SEVEN İsa KAYA |

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*Researchers do not have any personal or financial conflicts of interest with other people and institutions related to the research.*

**Etik Kurul Beyanı/ *Statement of Ethics Committee***

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*This research was conducted with the decision of Fatih Sultan Mehmet Foundation University Ethics Committee dated 27.10.2022 and numbered 18/13.*