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EVALUATION OF PRESCHOOL TEACHERS' NEUROPHYSIOLOGICAL PERCEPTION LEVELS: MERSIN PROVINCE EXAMPLE

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ABSTRACT

This research, which was conducted to determine the neurophysiological perception levels of preschool teachers towards behavior, learning and cognitive processes, was designed in a screening model. The Neurophysiological Learning Perception Scale (NAÖ) developed by Sülün, Aydoğdu, Taşçı and Şimşek (2014) was used to obtain data in this research, where the sample consisted of 200 pre-school teachers working in official institutions affiliated with the Ministry of National Education in the central districts of Mersin province. In addition, the General Information Form prepared by the researcher was distributed to the teachers. In data analysis, Kolmogorov-Smirnov and Shapiro-Wilk tests were performed to test normality. Mann-Whitney ut-test was used for significance tests between groups, and Kruskal-Wallis Htest was used to compare more than two groups. As a result of the research, the participants considered the information about the brain as valuable information, they did not have sufficient knowledge about neurophysiology, it would be useful for them if they went through education, and that it would be useful in the fields of participation in the lesson, student attitude towards the lesson, permanence in learning and academic success. As a result of the research, it was understood that the participants believed in the positive relationship between the brain and learning, that age and professional experience did not affect neurophysiological perception, but as the level of education increased, a more positive perception occurred.

Keywords: Neurophysiology, neurophysiological perception, preschool education, preschool teacher

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OKUL ÖNCESİ ÖĞRETMENLERİNİN NÖROFİZYOLOJİK ALGI DÜZEYLERİNİN DEĞERLENDİRİLMESİ: MERSİN İLİ ÖRNEĞİ

ÖZET

Okul öncesi öğretmenlerinin davranış, öğrenme ve bilişsel süreçlerine yönelik nörofizyolojik algı düzeylerinin belirlenmesi amacıyla yapılan bu araştırma tarama modelinde tasarlanmıştır.Örneklem olarak Mersin ili merkez ilçelerinde Milli Eğitim Bakanlığı'na bağlı resmi kurumlarda görev yapan 200 okul öncesi öğretmeninin oluşturduğu bu araştırmada verilerin elde edilmesi için Sülün, Aydoğdu, Taşçı ve Şimşek (2014) tarafından geliştirilen Nörofizyolojik Öğrenme Algı Ölçeği (NAÖ) kullanılmıştır. Ayrıca öğretmenlere araştırmacı tarafından hazırlanan Genel Bilgi Formu dağıtılmıştır. Veri analizinde, normallik testi için Kolmogorov-Smirnov ve Shapiro-Wilk testleri yapılmıştır. Gruplar arası anlamlılık testleri içinise Mann-Whitney ut-testi, ikiden fazla grubu karşılaştırmak için Kruskal-Wallis H-testi yapılmıştır. Yapılan araştırma sonucunda katılımcıların beyin ile ilgili bilgiyi değerli bulduğu,nörofizyoloji ile ilgili yeterli bilgiye sahip olmadıkları, öğrenimden geçerlerse kendileri için faydalı olacağı, eğitimde kullanılması halinde derse katılım, derse karşı öğrenci tutumu,öğrenmede kalıcılık, akademik başarı alanlarında faydalı olacağı yönünde pozitif algıya sahip oldukları anlaşılmıştır. Araştırma sonucunda katılımcıların beyinle öğrenme arasındaki pozitifilişkiye inandığı, yaşın, mesleki tecrübenin nörofizyolojik algıya etkisi olmadığı fakat öğrenimdüzeyi yükseldikçe daha pozitif algı oluştuğu anlaşılmıştır.

Anahtar kelimeler: Nörofizyoloji, nörofizyolojik algı, okul öncesi eğitim, okul öncesi öğretmeni

1. INTRODUCTION

The human brain is an organ that is born "incomplete," indicating its potential for development and adaptability in response to environmental influences. Brain development relies on the formation of connections between neurons. These connections are established by transmitting data from the environment, including sound, visual stimuli, touch, taste, and smell. The formation and strengthening of these neural connections increase as a child builds relationships with individuals such as parents, caregivers, and peers and interacts with their surroundings. Early synaptic connections acquired during infancy positively influence a child's lifelong learning abilities and contribute to their physical and cognitive well-being.

Until the 1960s, scientists believed that the brain was a fixed structure controlled solely by genetics and unchangeable. However, some researchers in the 1800s had proposed the idea that the brain could undergo changes. For example, Spurzheim (1815) suggested that exercise could increase blood flow to organs, potentially leading to their growth, including the brain. Charles Darwin (1874) also observed that domesticated rabbits had smaller brains compared to wild rabbits, suggesting that domesticated rabbits might not use their minds, emotions, and instincts as much as their wild counterparts, leading to smaller brain sizes. Hubel (1965) conducted laboratory studies in the mid-1960s that provided the first evidence that the brain could morphologically, physiologically, and chemically change. Hebb (1949) postulated that environmental changes primarily influenced neurological changes in his research, comparing mice raised in traditional cages with those allowed to roam freely in a room.

Subsequently, Rosenzweig and others (Will, Galani, & WeKelche, 2004) used environmental enrichment in learning experiments.

The preschool period is often referred to as the "magical" years of life, characterized by rapid physical and cognitive development. It is also considered the most critical time for a child's emotional, social, and personality development (Oktay, 1999). Brain research emphasizes the positive effects of experiential richness during early childhood, while the absence of such experiences can lead to physical, cognitive, social, and emotional difficulties. If early childhood experiences are negative, or if the child does not have the opportunity for essential experiential development, it can lead to issues in the child's intelligence, emotions, and personality development.

Brain development depends on three main factors: genetics, environment, and experience. Genetics determine the basic potential for brain development and set the stage for it. The child's environment provides the opportunity for this potential to be realized. If a child has a healthy genetic potential and a rich environment but lacks opportunities for experiences, their brain will not develop cognitively. Therefore, it is not only the richness and quality of the environment but also the timing and effectiveness of these experiences that are crucial for brain development (National Scientific Council on the Developing Child, 2007). Early years are critical for the development of neural connections in the brain. During this period, the brain is flexible and open to change and development as it responds to positive and negative experiences. These early learning experiences shape a child's future and are a vital period for learning (Nelson, Zeanah, Fox, Marshall, Smyke, & Guthrie, 2007).

1.1. Brain-Based Learning

Demirel (2010) defines brain-based learning by merging neuroscience with neurology-linguistics and cognitive psychology, seeing them as fields that deal with the structure and functions of the brain. According to Duman (2015), brain-based learning is a way of thinking about learning. Based on neuroscientific research, brain-based learning is an approach that explains the useful tools, materials, and principles created for the school environment by relying on assumptions about the brain's natural learning process, human experience, common sense, and brain-related research.

The aim of brain-based learning is to free students from rote memorization and provide them with more meaningful learning experiences. The goal is to cultivate individuals who can deal with more complex and higher-order problems, exhibit analytical skills, and engage in critical thinking (Caine and Caine, 2002). According to this theory, the purpose of education is to expand natural knowledge. For a student to perform a behavior, they need basic learned knowledge. Without this experience, the student cannot exhibit a behavior of a sufficient level. Therefore, it is necessary to expand the acquired natural knowledge and provide more experiences for this purpose. Caine and Caine (2002) state that brain-based learning occurs in three stages: receptive immersion, ready to embrace with comfort, and active processing.

Brain-based learning involves designing and presenting real-world experiences to students, emphasizing the essence of understanding concepts. In this regard, brain-based learning can be considered student-centered. Accordingly, learning environments created are characterized by being free from threats and pressure, enriched with rich content, and conducive to student interaction. Due to its student-centered and experiential nature, brain-based learning supports student engagement, individual experiences, and learning through exploration (Çengelci, 2005). Due to its unique characteristics, brain-based learning necessitates differentiation in assessment and changes in teacher-student roles.

Brain-based learning, designed based on student-centered and individual experiences, has unique features. Therefore, the learning process cannot be evaluated using traditional methods. In traditional assessments, the teacher typically feels understood when the subject matter is taught, and assessments focus on how much the student has learned. In brain-based learning, it is impossible to evaluate students from a single perspective. In addition to tests and scales used in traditional techniques, techniques that directly involve students in the learning process, such as portfolios, journals, assignments, field trips, observations, and projects, are preferred. Caine and Caine (2002) attribute the preference for these assessment techniques in brain-based learning to the fact that they place all responsibility for learning in the hands of the student.

In classical methods, the teacher feels understood in the learning process, while in brain-based learning, it is the student who feels understood. This naturally requires the creation of an atmosphere and a learning environment in which students can express themselves openly and naturally without fear of pressure or stress. In such an environment, students should feel comfortable, unafraid of making mistakes, and view every experience as a gain (Hiçyılmaz, 2013). In brain-based learning, students are responsible for their own learning and are active participants in the process. Instead of memorizing information as it is, students acquire knowledge by exploring and experiencing it themselves. In this process, students take on roles as investigators, discussants, questioners, and interact with and share with others (Caine and Caine, 2002).

1.2. Significance of the Research

The preschool period is a critical time when the foundations of life are laid. It is a period when children develop rapidly in all areas, and the first steps toward their future are taken. Therefore, it is essential to support children in every aspect during this period (Oktay, 1999). Brain research has established that learning occurs through neurological pathways. In this context, scientific studies not only make the formation of learning more understandable but also shed light on what can be done to better support cognitive development. The development of a well-functioning intellectual structure significantly affects a person's ability to lead a productive life. Supporting the healthy development of mental potential through positive experiences during early childhood is crucial for offering a bright future (Çelebi and Afyon, 2011).

In recent years, in-depth research into the neurological nature of learning, combined with the increase in computer and communication capabilities, has brought technology to the forefront of education discussions. Given the brain's rapid and lasting response to external stimuli during early childhood, early exposure to the intersection of neurophysiological perception and early childhood teachers could be a significant advantage. As time progresses and environmental opportunities continue to evolve, supporting brain development through early experiences should be seen as an effort to improve human life. Neglectful attitudes alongside negative or deficient effects should be viewed as obstacles to improving human life in the future (Nelson et al., 2007). Otherwise, retroactive compensation efforts will be both time-consuming and costly.

Wolf and Brandt (1998) state that a child exposed to an enriched environment of learning experiences can understand new information more quickly and practically. Oktay (1999) emphasizes the importance of early childhood education in today's educational context, given the significant impact of early environmental stimulation on a child's brain development. Children who lack rich learning environments during this period or experience severely limited environments may spend more time connecting learned information, reinterpreting and organizing it, and may experience academic failure in the later years. The National Scientific Council on the Developing Child (2007) addressed topics related to early childhood and explained that the rich stimulating environment during early childhood significantly influences brain development in children. While genetics and experience both play important roles in brain development, the quality of the environment will determine whether these two factors have a positive or negative impact. Therefore, individuals raised in environments lacking these opportunities will face challenges in compensating for their deficiencies, and this compensation will be both more difficult and more expensive (Nelson et al., 2007).

Research on early childhood and brain-based learning theory, which is based on the neurological dimension of learning, indicates that many studies refer to experimental models (Çelebi, 2008; Çengelci, 2005; Özden, 2005; Avcı, 2007; Hasra, 2007; Baştuğ, 2007; Aydın, 2008; Yağlı, 2008; Usta, 2008; Sadık, 2013; Bozbağ, 2015; Çakıroğlu, 2014). When these studies are examined in detail, they demonstrate that brain-based learning has a positive impact on student achievement, attitudes, comprehension skills, the acquisition of critical thinking skills, and the enhancement of learning retention. Similarly, international studies have found positive effects of brain-based teaching on student achievement and attitudes. Weimer (2007) found that using brain-based learning in lessons increased student participation and interest. Sikes (2009) found that brain-based instruction positively affected the academic achievements and attitudes of fifth-grade students. Roberts-Perrin (2012) discovered that teachers' knowledge and thoughts about brain-based learning significantly influenced decision-making processes. Hodges (2013) noted that while teachers had a high awareness of brain-based learning, there was no significant relationship between their professional experience and its implementation. Shabatat and Al-

Taawneh (2016) found that educational programs based on brain-based learning theory improved student achievement compared to traditional programs.

In this study, we aim to determine preschool teachers' level of neurophysiological perception regarding learning, behavior, and cognitive processes. To achieve this goal, we sought answers to the following research questions:

- What is the current level of preschool teachers' perception of neurophysiology regarding learning and behavior?
- What are teachers' thoughts on the importance of neurological research in education?
- What connections do teachers establish between learning and the brain?
- Is there a significant relationship among the subdimensions of the Neurophysiological Perception Scale?

2. METHOD

2.1. Research Design

This study is quantitative research employing a general survey model, as it aims to investigate the neurophysiological perception levels of preschool teachers working in public preschool institutions in central districts of Mersin (Akdeniz, Mezitli, Toroslar, Yenişehir), as well as examining these neurophysiological perception levels in terms of various variables (professional seniority, educational level, age, etc.). The survey model involves determining the opinions of participants about a particular subject or event in terms of skills, abilities, attitudes, interests, and is often conducted with larger samples compared to other types of research (Büyüköztürk et al., 2014).

2.2. Population and Sample

The population of this study comprises all preschool teachers working in official institutions affiliated with the Ministry of National Education in Mersin province. A study group consisting of 200 preschool teachers, selected using an appropriate sampling method, working in official institutions affiliated with the Ministry of National Education in central districts of Mersin (Akdeniz, Mezitli, Toroslar, Yenişehir), was formed.

Table1. Distribution of demographic data of study participants

Variables		1	2	3	4	Total
Gender		Female	Male			
	n	184	16			200
	%	92	8			100
Education		Undergraduate	Master			-
	n	171	29			200
	%	85.5	14.5			100
Age		under 30	31-40 years old	40 years and above		-
	n	20	110	70		200
	%	10	55	35		100
Seniority		10 year and under	11-15 year	16-20 year	20 years and above	-
	n	50	78	48	24	200
	%	25	39	24	12	100

According to the data in the table, it was determined that the vast majority of the participants (92%) were female, while 8% were male. Regarding the age distribution of the participants, more than half (55%) were in the age range of 31-40, 10% were below the age of 30, and 35% were 40 years or older. When examining the educational level of the participants, it was found that 85.5% had a bachelor's degree, while the remaining participants had a master's degree. In terms of professional experience, the majority (39%) had 11-15 years of experience, 25% had less than 10 years, 24% had 16-20 years of experience, and 12% had over 20 years of experience. Based on these findings, it can be evaluated that nearly all of the participant teachers (92%) were female, more than half were in the 31-40 age range, the majority (85.5%) had a bachelor's degree, and 39% had 11-15 years of professional experience. It should also be noted that 14.5% of the participants had a master's degree, and 90% were aged 30 or older.

2.3. Data Collection Tools

In the research, two data collection instruments were employed. The first instrument was the 'General Information Form,' which was created by the researcher to gather general demographic information from the participants. The second instrument used was the 'Neurophysiological Perception Scale (NPS),' developed by Sülün, Aydoğdu, Taşçı, and Şimşek (2014) to assess participants' perceptions. Frequency analysis was conducted on the responses provided by the participants in the information forms. The data distributions were presented in tables using 'n' and '%.' Subsequently, the data obtained from the perception scale were analyzed to determine if there were any differences based on demographic variables using significance tests. To determine which analysis to conduct, Kolmogorov-Smirnov and Shapiro-Wilk tests were initially performed to check whether the data followed a normal distribution (Table 2).

Table 2. Normality test results

	Kolmogorov- Smirnov			Shapiro-Wilk		
	Statistics	df	p	Statistics	df	p
Cognitive Processes in Neural Dimensions	,148	200	,000	,924	200	,000
The Role of the Brain in Learning	,161	200	,000	,881	200	,000
Structural Functions of the Brain in Cognitive Processes	,146	200	,000	,931	200	,000
Neurophysiological Perception (General)	,147	200	,000	,910	200	,000

As shown in Table 2, it is evident that the skewness and kurtosis values of the data fall within the range of -1.5 to +1.5. For data that do not conform to normal distribution, non-parametric tests were employed. SPSS v23 software was chosen for the statistical analysis of the study. The reliability of the scale used was assessed by calculating the Cronbach's alpha value (Table 3).

Table 3. Reliability analysis

	Cronbach Alpha	N of Items
Cognitive Processes in Neural Dimensions	,910	13
The Role of the Brain in Learning	,894	10
Structural Functions of the Brain in Cognitive Processes	,870	8
Neurophysiological Perception (General)	,961	31

Table 3 reveals that the Cronbach's alpha reliability coefficient for the scale used in this study was found to be 0.96, indicating a high level of internal consistency. The alpha value for the first subscale, 'Neural Dimension in Cognitive Processes,' was calculated as 0.91, for the second subscale, 'The Role of the Brain in Learning,' it was 0.89, and for the third and final subscale, 'Structural Functions of the Brain in Cognitive Processes,' it was 0.87.

2.3.1. General Information Form

A general information form was developed by the researcher to obtain information about the teachers participating in the study. This form includes questions related to the participants' gender, age, educational background, and professional experience.

2.3.2. Neurophysiological Perception Scale (NPS)

The NPS scale, developed by Sülün, Aydoğdu, Taşçı, and Şimşek in 2014, was employed to collect data for determining the participants' general perceptions related to neurophysiological learning. The scale was prepared in a five-point Likert format, where participants indicated their level of agreement with each item as follows: 'strongly disagree: 1,' 'somewhat disagree: 2,' 'not sure: 3,' 'somewhat agree: 4,' and 'strongly agree: 5.'

The scale's validity was established through validity studies, indicating a three-dimensional structure. The first dimension was named 'Neural Dimension in Cognitive Processes,' which includes items emphasizing that behavior, memory, and perception develop as a result of neural (neuron) communication and interaction (Items 1, 3, 6, 9, 10, 12, 13, 14, 19, 21, 27, 28, 29, 31). The second dimension, named 'The Role of the Brain in Learning,' contains items asserting that learning results from communication and interaction among neurons (nerve cells) (Items 2, 5, 8, 11, 16, 23, 24, 25, 26, 30). The third and final dimension, referred to as 'Structural Functions of the Brain in Cognitive Processes,' brings together items that highlight the neural processes in the structuring of behavior, memory, and learning (Items 4, 7, 15, 17, 18, 20, 22). The Cronbach's alpha reliability coefficient for the first subscale consisting of 14 items was reported as 0.90, for the second subscale consisting of 10 items, it was 0.86, and for the third subscale consisting of 7 items, it was 0.76. Additionally, the overall Cronbach's alpha coefficient for the scale was found to be 0.95, indicating a high level of internal consistency and reliability in measuring participants' perceptions related to neurophysiological learning.

2.4. Data Collection

Ethical approval was obtained from the Mersin University Ethics Committee and research permission was obtained from the Mersin Provincial Directorate of National Education before conducting this study. After obtaining the necessary permissions, official preschool institutions in the central districts of Mersin (Akdeniz, Mezitli, Toroslar, Yenişehir) were visited, discussions were held with their administrators, and information about the scope and purpose of the study was provided. Following the briefing, the 'General Information Form' and the 'Neurophysiological Perception Scale (NPS)' were presented to the participants online. The form and scale, provided online, were completed individually by the participants at their convenience.

Data Analysis

Demographic information about the participating teachers was obtained through the 'General Information Form.' For the analysis and evaluation of these data, frequency tables were initially created. Subsequently, the data in these tables were made comprehensible through listing and grouping techniques based on specific accumulation or dispersion characteristics. Data obtained through the NPS scale, used to determine participants' perceptions, were analyzed after necessary codifications were made, and the data were transferred to the SPSS program. For statistical data analysis, non-normally distributed data were analyzed using the Mann-Whitney U test for comparing two groups and the Kruskal-Wallis H-test for comparing more than two groups. In cases where the analyses were significant, pairwise comparisons were conducted using the Mann-Whitney U test to determine which groups differed from each other (Tabachnick & Fidell, 2013). Spearman correlation test was used to determine the relationship between the dimensions of the scale.

2.5. Ethical Considerations in the Study

The rules guiding the researcher to conduct a study in accordance with ethical principles are defined as research ethics (Johnson, 2019). Ethical precautions taken in this research are as follows:

- Official permission was obtained from the Mersin Provincial Directorate of National Education and ethical committee approval was obtained through Mersin University before the research.
- Explanations about the research were provided to the teachers in the study, and information about the purpose and content of the research was given, taking into account their voluntary participation.
- During the distribution of the data collection tools to the participants, information was first provided on how and why the form should be filled out. It was explained that the information they provided would only be used for scientific research purposes and would not be shared with third parties.
- Contact information was included to enable the research data to be shared with them if requested.
- During the research process, the identities of the teachers were kept confidential, and the information was evaluated by coding.

3. RESULTS

3.1. Teachers' Perceptions of the Importance of Neurophysiology Research in Education

Participants' perceptions of neurophysiology research in education were tried to be measured with four questions, and the frequency and percentage values of the participants' answers are shared in the table below.

Table 4. Participants' perceptions of Neurophysiology research in education

		f	(%)
Do you believe that you need education to acquire knowledge about the brain?	Yes	160	80.0
	No	40	20.0
Do you think having scientific knowledge about the structure and function of the brain is beneficial in your learning process?	Yes	187	93.5
	No	13	6.5
In what situations do you perceive competency in the neurophysiological/biological processes of learning and behavior?	Satisfactory	70	35.0
	Intermediate	115	57.5
	Advanced	15	7.5
Have you ever participated in any Neurophysiological Perception education or courses during your educational journey?	Yes	15	7.5
	No	185	92.5
	General	200	100.0

When the distribution of answers regarding the participants' perceptions of neurophysiology research in education was evaluated, 80% said they needed education to have knowledge about the brain, 93.5% found scientific information about brain function valuable, and 57.5% had a moderate level of knowledge about neurophysiology processes. It was determined that 92.5% of them stated that they had knowledge and that 92.5% of them stated that they did not attend any training on neurophysiology.

3.2. Teachers' Perceptions of Neurophysiology of Learning and Behavior

The perceptions of the participant teachers regarding the neurology of learning and behavior were determined using the 31 attitude statements specified in the NAÖ. The data related to these expressions, including the mean values and standard deviations, are presented in the table below.

Table 5. Participants' perceptions about Neurophysiology

Ontological well-being		$\bar{X}$	**SS**
1	We encode the information we learn in different parts of the memory in our brain.	4.01	,848
2	Learning is the process of creating memory.	4.05	,846
3	We respond to the world we perceive through nerves distributed throughout our body.	4.03	,873
4	The type of memory we have is determined by the continuity of the connection between nerve cells.	3,84	,859
5	The level of chemicals our brain releases affects the nature of learning.	3,96	,788
6	When we are exposed to various stimuli, various systems of our memory are activated.	4.04	,813
7	The complex neural connections that enable us to think form the basis of our conscious behavior.	4.04	,749
8	We learn as a result of the interaction of our nerve cells with each other.	4.01	,726
9	Neural processes that occur in a very short time underlie every behavior of ours.	3,87	,791
10	The reason we forget information is because we do not strengthen the neural networks that represent that information.	3,86	,777
11	With each learning experience, we ensure that new synaptic connections are formed.	4.00	,799
12	Our physical reactions occur according to the accumulation in our memory.	3,97	,753
13	We realize perception thanks to the nerves distributed throughout our body.	4.02	,694
14	Depending on the behavior we perform, the area of the brain associated with this behavior works.	4.01	,702
15	In the process of learning, material (assimilation processes) changes occur in brain cells.	3,89	,794
16	Learning occurs as a result of neurophysiological processes in the brain	4.05	,721
17	We cannot understand the nature of learning without knowing how our brain cells work.	3,90	,806
18	Thanks to our brain's ability to receive the information it directly pays attention to, we learn without being preoccupied with unnecessary stimuli.	3,76	,799
19	Regardless of the biochemical configuration of our brain, our thoughts cannot exist on their own.	3,90	,713
20	Our behavior is based on biochemical processes occurring in neurons.	3,97	,719
21	Our short-term memory is associated with poor communication between nerve cells.	3,83	,803
22	Memory is a physiological process that occurs during the interaction of nerve cells.	3,89	,739
23	We learn by using different parts of our brain in a coordinated way.	4.07	,684
24	By making learning permanent through regular repetition, we strengthen the connection between nerve cells.	4.12	,654
25	To learn more effectively, we must use both parts of the brain together.	3,89	,813
26	We use neural networks when we associate received information with previous information.	4.08	,652
27	We exhibit the behavior we exhibit depending on the situation we are in, when the neurons of our nervous system affect the relevant organs.	3,95	,685
28	We realize a remembering event as a result of the joint stimulation of neural networks that form permanent connections.	4.02	,665
29	Our brains develop best when we learn in an enriched teaching and learning environment.	4.17	,683
30	Learning is a relatively permanent change in behavior that results from experience.	4.21	,684
31	As we create our long-term memory, we make many connections between nerve cells.	4.05	,703
Average		4,14	

1: Strongly disagree - 5: Strongly agree

When examining the data in the table, it is observed that the attitude statements with the highest average scores are "Our brain develops better when we learn in an enriched teaching and learning environment" (average score: 4.17) and "Learning is a relatively permanent change in behavior that occurs as a result of experience" (average score: 4.21). On the other hand, the attitude statements with the lowest average scores are "The short duration of our memory is due to weak communication between nerve cells" (average score: 3.83) and "Our brain learns without entering unnecessary stimuli thanks to its ability to directly perceive the information we focus on" (average score: 3.76). When evaluating the overall averages of responses to the scale, X=4.05, and the average standard deviation is calculated as Ss=0.72. According to these values, it can be interpreted that the average perceptions of participant teachers regarding the neurophysiology of learning and behavior are 4.14, indicating that participants largely "agree" with the statements put forth in the scale. Additionally, when examining the values for each item, there appears to be a trend ranging from 3.76 (very close to "agree") to 4.21 (towards "strongly agree").

Considering that the average standard deviation in the analysis is 0.72, it can be assumed that there is an approximate 1-point difference in views among the participants on a scale of 1-5. Given that there is a "1" difference between the five different participation responses on the scale (1- "strongly disagree" - 5- "strongly agree"), it can be inferred that participants' views can significantly differ from each other by approximately 1 point. This suggests that the perceptions of teachers may not be homogeneous. Therefore, it can be assumed that teachers generally "agree" with the views on the scale.

3.3. Teachers' Perceptions of the Link Between Learning and the Brain

Teachers' perceptions of a possible relationship between learning and the brain were examined, and the findings regarding the mean and standard deviation values obtained by evaluating their answers to the scale are shared in the table below.

Table 6. Mean score and standard deviation estimation of the neurophysiological perception scale and its sub-parameters used in the study

	Min.	Maks.	Overall score average	Attitude average	SS
Cognitive Processes in Neural Dimensions	18	65	51,64	3,97	6,69
The Role of the Brain in Learning	12	50	40,37	4.03	5,43
Structural Functions of the Brain in Cognitive Processes	12	40	31.48	3,93	4,45
Neurophysiological Perception (General)	42	155	123,48	3,98	15,93

When the average scores and standard deviations of the neurophysiological perception scale and its sub-parameters used in the study are evaluated; it has been determined that the sub-parameter with the highest average score is "The Role of the Brain in Learning" (4.03±5.43), and the sub-parameter with the lowest average score is "The Structural Functions of the Brain in Mental Processes" (3.93±4.45). It was found that teachers' neurophysiological perception levels were above the average score for both sub-parameters and the general scale.

To examine the formation of participants' perceptions regarding the relationship between the brain and learning, the responses to attitude statements have been ranked from least preferred to most preferred. The obtained values are presented in the following cumulative bar graph.

Table 7. Bar chart of participants' perceptions of neurophysiology

We learn without being occupied by unnecessary stimuli thanks to our brain's direct attention to the information it receives.	3,76
Our short-term memory is associated with weak communication between nerve cells.	3,83
The type of our memory depends on the continuity of the connection between nerve cells.	3,84
The reason we forget information is that we do not strengthen the neural networks that represent that information.	3,86
Underneath every behavior of ours, there are neural processes that occur very rapidly.	3,87
Changes occur in brain cells during the learning process in terms of material (assimilation processes).	3,89
Memory is a physiological process that occurs during the interaction of nerve cells.	3,89
To learn more effectively, we should use both regions of the brain together.	3,89
Without knowing how our brain cells work, we cannot understand the nature of learning.	3,9
Regardless of the biochemical configuration of our brain, our thoughts cannot exist on their own.	3,9
We exhibit the behavior according to the situation we are in when the neurons of our nervous system affect the relevant organs.	3,95
The level of chemicals released by our brain affects the nature of learning.	3,96
Our physical reactions emerge based on the accumulation in our memory.	3,97
Our behaviors are based on biochemical processes that occur in neurons.	3,97
With each learning experience, we enable the formation of new synaptic connections.	4.00
We encode the information we learn into different parts of our brain's memory.	4,01
We perform learning through the interaction of our nerve cells with each other.	4,01
Depending on the behavior we engage in, the corresponding area of the brain becomes active.	4,01
We perform the perception phenomenon through nerves distributed throughout our body.	4,02
We create a memory event by the common stimulation of nerve networks that form permanent connections.	4,02
We respond to the perceived world through distributed nerves in our body.	4,03
When exposed to various stimuli, various systems of our memory are activated.	4,04
Complex neural connections that enable us to think form the basis of our conscious behaviors.	4,04
Learning is the process of forming memory.	4,05
Learning occurs as a result of neurophysiological processes in the brain.	4,05
When creating our long-term memory, we establish connections between nerve cells many times.	4,05
We learn by coordinating different regions of our brain.	4,07
When we relate acquired information to previous knowledge, we use neural networks.	4,08
By making learning continuous through regular repetition, we strengthen the connection between nerve cells.	4,12
When we learn in an enriched teaching and learning environment, our brain develops in the best way.	4,17
Learning is a relatively permanent change in behavior resulting from experience.	4,21

When examining the values in the table, it is observed that teachers' views on neurophysiological processes range from 3.76 to 4.21. According to these findings, it can be concluded that teachers do not fully embrace the views that establish the relationship between the brain and learning at the "disagree" and "strongly disagree" levels. Another observation is that teachers have expressed their attitudes towards the relationship between neurophysiology, the learning process, and the brain as being in the "undecided" and "agree" levels. When examining the responses of the participants, it is notable that there is a trend from "undecided" to "agree" in their perceptions. When these data are evaluated together, it can be generally concluded that teachers acknowledge the existence of a relationship between the brain and learning. However, it is also noteworthy that the perception of "strongly agree" did not emerge.

Furthermore, it is evident that items 23, 24, 26, 29, and 30 in the scale represent attitudes explicitly stating the direct relationship between the brain and learning, and these views are most widely accepted by the participants, ranging from 4.07 to 4.21. These findings should be considered together with the shift from the "agree" level to the "strongly agree" level. When examining the scale scores in the table, it is determined that the statements closest to the "undecided" view and least accepted within the general distribution are related to the structure and functioning of the brain.

3.4. Teachers' Neurophysiological Perception Levels According to Demographic Variables

3.4.1. Neurophysiological Perception Levels of Teachers by Age

The findings regarding teachers' neurophysiological perception levels by age were analyzed using the Kruskal-Wallis H test, and the data are presented in the table below.

Table 8. Neurophysiological perception levels of teachers according to age variable

	Age	N	S.Place	X2 -	N*
Cognitive Processes in Neural Dimensions	30 years and under	20	106,33	,228	,892
	31-40 years	110	99,96		
	over 40 years old	70	99,69		
The Role of the Brain in Learning	30 years and under	20	106.13	,219	,896
	31-40 years	110	99,62		
	over 40 years old	70	100,27		
Structural Functions of the Brain in Cognitive Processes	30 years and under	20	109,98	,689	,709
	31-40 years	110	98,45		
	over 40 years old	70	101.01		
Neurophysiological Perception (General)	30 years and under	20	108.30	,445	,800
	31-40 years	110	98,95		
	over 40 years old	70	100,71		

* Kruskal-Wallis'in H test

When the neurophysiological perception scale and its subscales were evaluated by age, it was observed that there was no statistically significant difference among all age groups when compared to each other (p>0.05). Based on this finding, it is considered that the neurophysiological perceptions of the teachers participating in the study do not vary by age.

3.4.2. Neurophysiological Perception Levels of Teachers by Professional Experience

The findings regarding teachers' neurophysiological perception levels based on their professional experience variable were analyzed using the Kruskal-Wallis H test, and the data are presented in the table below.

Table 9. Neurophysiological perception levels of teachers according to professional experience

	Experience	N	S.Place	X2	N*
Cognitive Processes in Neural Dimensions	10 years and under	50	106,27	,228	,892
	11-15 years old	78	103.04		
	16-20 years old	48	91,64		
	20 years and older	24	97,96		
The Role of the Brain in Learning	10 years and under	50	103,43	,219	,896
	11-15 years old	78	108.08		
	16-20 years old	48	87,65		
	20 years and older	24	95,46		
Structural Functions of the Brain in Cognitive Processes	10 years and under	50	104,51	,689	,709
	11-15 years old	78	103,57		
	16-20 years old	48	87,74		
	20 years and older	24	107,69		
Neurophysiological Perception (General)	10 years and under	50	105,88	,445	,800
	11-15 years old	78	104,70		
	16-20 years old	48	88,43		
	20 years and older	24	99,79		

* Kruskal-Wallis'in H test

When the values in the table above are examined, it is determined that the participants' neurophysiological perception levels related to neurophysiological learning do not statistically differ based on the professional experience variable. Since the obtained p-values in the data analysis were found to be p>0.05, it is considered that the participants' neurophysiological perception levels do not change regardless of whether their professional experience increases or decreases.

3.4.3. Neurophysiological Perception Levels of Teachers According to Educational Level

The findings regarding teachers' neurophysiological perception levels based on their educational level variable were analyzed using the Mann-Whitney U test, and the data are presented in the table below.

Table 10. Neurophysiological perception levels of teachers according to the educational level variable

	Education	N	S.Place	S	N*
Cognitive Processes in Neural Dimensions	Undergraduate	171	97,64	-1704	,048
	Master	29	117,36		
The Role of the Brain in Learning	Undergraduate	171	97,68	-1689	,041
	Master	29	117,14		
Structural Functions of the Brain in Cognitive Processes	Undergraduate	171	97,20	-1971	,049
	Master	29	119,95		
Neurophysiological Perception (General)	Undergraduate	171	97,69	-1670	,045
	Master	29	117.07		

* Mann-Whitney U test

When the results of the Mann-Whitney U test analysis in the table regarding participants' neurophysiological perception levels based on their educational level are evaluated, values for Neural Measurement of Mental Processes (p=0.048), Brain's Role in Learning (p=0.041), Structural Functions of the Brain in Mental Processes (p=0.049), and Neurophysiological Perception Scale (p=0.045) were obtained. According to these obtained values, it was determined that graduate teachers had higher perceptions of neuronal dimensions in mental processes, the role of the brain in learning, structural functions of the brain in mental processes, and overall neurophysiological perception levels compared to undergraduate teachers.

3.4.4. Neurophysiological Perception Levels of Teachers According to Training Needs

Findings regarding teachers' neurophysiological perception levels according to the training need variable were analyzed with the Mann-Whitney U test, and the data are shared in the table below.

Table 11. Neurophysiological perception levels of teachers according to the training need variable

	Need for education	N	S.Place	S	N*
Cognitive Processes in Neural Dimensions	Yes	160	97,59	-1430	,153
	No	40	112,15		
The Role of the Brain in Learning	Yes	160	99,11	-,685	,493
	No	40	106.06		
Structural Functions of the Brain in Cognitive Processes	Yes	160	99,22	-0,632	,527
	No	40	105,64		
Neurophysiological Perception (General)	Yes	160	98,16	-1144	,252
	No	40	109,85		

When the neurophysiological perception levels of the participants regarding their need for education were evaluated based on the findings in the table, it was understood that there was no statistically significant difference (p>0.05). It is considered that there is no difference in the neurophysiological perception levels of the participants between teachers who perceive a need for education and those who do not.

3.4.5. Neurophysiological Perception Levels of Teachers According to the Value of Scientific Knowledge

The findings related to the neurophysiological perception levels of teachers based on the variable of the value of scientific knowledge were analyzed using the Mann-Whitney U test, and the data are presented in the table below.

Table 12. Neurophysiological perception levels of teachers according to the variable of the value of scientific knowledge

	Information	N	S.Place	S	N*
Cognitive Processes in Neural Dimensions	Yes	187	100,35	-0,142	,887
	No	13	102,69		
The Role of the Brain in Learning	Yes	187	100,27	-0,215	,830
	No	13	103,81		
Structural Functions of the Brain in Cognitive Processes	Yes	187	100,88	-.354	,723
	No	13	95.04		
Neurophysiological Perception (General)	Yes	187	100,41	-,084	,933
	No	13	101,81		

* Mann-Whitney U test

The data regarding the neurophysiological perception levels of participant teachers based on their perception of the value of scientific knowledge were analyzed using the Mann-Whitney U test. When the findings were evaluated, it was understood that the calculated p-value (>0.05) indicated that there was no statistically significant difference. Based on this finding, it is considered that the perception of scientific knowledge as valuable does not have an impact on the neurophysiological perception levels of participant teachers.

3.4.6. Neurophysiological Perception Levels of Teachers According to Neurophysiological Perception Adequacy

The data obtained from the neurophysiological perception levels based on the variable of teachers' neurophysiological perception competence were analyzed using the Kruskal-Wallis H test, and the findings are presented in the table below.

Table 13. Neurophysiological perception levels of teachers according to the neurophysiological perception adequacy variable

	Sufficiency	N	S.Place	X2	N*
Cognitive Processes in Neural Dimensions	Little	70	83.03	9903	,007
	Middle	115	109,94		
	Forward	15	109,67		
The Role of the Brain in Learning	Little	70	82,50	10 633	,005
	Middle	115	109,85		
	Forward	15	112,80		
Structural Functions of the Brain in Cognitive Processes	Little	70	84,84	8 112	,017
	Middle	115	109,57		
	Forward	15	104.07		
Neurophysiological Perception (General)	Little	70	82.06	10 967	,004
	Middle	115	110,49		
	Forward	15	109,97		

* Kruskal-Wallis'in H test

It has been determined that there is a significant difference in the neurophysiological perception levels of the participants based on the variable of neurophysiological perception competence. According to the findings, Mental Processes Neural Measurement p=0.007, Brain's Role in Learning p=0.005, Brain's Structural Functions in Mental Processes p=0.017, and Neurophysiological Perception Scale p=0.004 were calculated. Based on these findings, it was found that teachers who rated their competence level as low had higher perception levels in neural dimensions in mental processes, the role of the brain in learning, and the overall neurophysiological perception compared to those who considered themselves to have moderate and advanced competence.

3.4.7. Neurophysiological Perception Levels of Teachers According to Having Passed Neurophysiological Perception Training

The data obtained from the teachers' neurophysiological perception levels according to the variable of having received neurophysiological perception training were analyzed with the Mann-Whitney U test, and the findings are shared in the table below.

Table 14. Neurophysiological perception levels of teachers according to the variable of undergoing neurophysiological perception training

	Education	N	S.Place	S	N*
Cognitive Processes in Neural Dimensions	Yes	15	93,90	-,461	,645
	No	185	101.04		
The Role of the Brain in Learning	Yes	15	99,10	-,098	,922
	No	185	100,61		
Structural Functions of the Brain in Cognitive Processes	Yes	15	85,27	-1067	0,286
	No	185	101,74		
Neurophysiological Perception (General)	Yes	15	96,37	-0,288	,773
	No	185	100,84		

* Mann-Whitney U test

When the values in the table are examined, it can be observed that there is no statistically significant difference in the neurophysiological perception levels of the participants based on whether they have received neurophysiological perception education ($p>0.05$). Based on this data, it is concluded that the neurophysiological perception levels of teachers do not change based on whether they have received education on this subject.

3.4.8. The Relationship Between Teachers' Neurophysiological Perceptions and Sub-Dimensions of the Scale

The relationship between teachers' neurophysiological perceptions and the sub-dimensions of the scale was analyzed with the Spearman correlation test, and the findings are shared in the table below.

Table 15. The relationship between teachers' neurophysiological perceptions and sub-dimensions of the scale

		Cognitive Processes in Neural Dimensions	The Role of the Brain in Learning	Structural Functions of the Brain in Cognitive Processes	Neurophysiological Perception (General)
Cognitive Processes in Neural Dimensions	P	1000	,833 **	,816 **	,950 **
	P	.	,000	,000	,000
The Role of the Brain in Learning	P	,833 **	1000	,755 **	,916 **
	P	,000	.	,000	,000
Structural Functions of the Brain in Cognitive Processes	P	,816 **	,755 **	1000	,897 **
	P	,000	,000	.	,000
Neurophysiological Perception (General)	P	,950 **	,916 **	,897 **	1000
	P	,000	,000	,000	.

*Spearman correlation test

When examining the relationship between the neurophysiological perception scale and its sub-dimensions, the Neural Dimension of Mental Processes ($r = 0.950$ $p = 0.000$) was found to be the most correlated sub-dimension, followed by the sub-dimension of Structural Brain Functions in Mental Processes ($r = 0.897$ $p = 0.000$). There is a statistically significant relationship between sub-dimensions and the scale. It has been determined that increasing the Neural Dimension in Mental Processes is the sub-dimension that will maximize the level of neurophysiological perception.

4. DISCUSSION

In this study, the neurophysiological perceptions of the working group of preschool teachers were attempted to be determined based on their personal opinions, and the findings obtained were discussed comparatively with the scientific literature and research findings in this field.

According to the findings, almost all teachers find the knowledge about the function of the brain valuable, but only about half of them have knowledge about neurophysiology, and almost all of them have not received any education on this subject. When the scientific literature on how learning occurs is examined, it is noteworthy that Caine and Caine (1991) stated that education designed considering the working system of the brain is more effective. Due to the increasing importance of research in the field, a different perspective on learning from a neurocognitive point of view has been adopted. Therefore, Ronis (2007) described learning as "educational neuroscience," while Biler (2003) and Willis (2008) defined it as "brain-friendly learning." Senemoğlu (2013), who attaches importance to studies on effective learning, emphasizes that if the learning and teaching environment is designed in accordance with the individual's developmental characteristics, more permanent and effective learning can be achieved.

Despite the fact that the majority of the participants in the study stated that they had not received specific training in this regard, they all share the view that any training they receive would be significantly effective. When the experimental studies of Çelebi (2008), Çengelci (2005), Özden (2005), Avcı (2007), Hasra (2007), Baştuğ (2007), Aydın (2008), Yağlı (2008), Usta (2008), Sadık (2013), Bozbağ (2015), and Çakıroğlu (2014) in the field are examined, it is stated that lessons designed according to neurophysiological learning are very effective in the formation of skills such as permanence in learning, participation in the lesson, sharing of individual experiences, and gaining experience. Aydoğdu (2014) found in his research that teacher candidates from different departments had a good level of perception, and among the students of the Classroom Teaching, Science Teaching, and Psychological Counseling and Guidance departments, students in the Psychological Counseling and Guidance and Science Teaching departments had a higher level of perception compared to students in the Classroom Teaching department. This finding may be due to the expectation that students in both Psychological Counseling and Guidance and Science Teaching departments would have higher knowledge about "neurophysiological perception" and its importance. These findings are supportive of the findings obtained in the current study.

When examining teachers' perceptions of the relationship between learning and behavioral neurophysiology, it was found that the attitude statement "Learning is a relatively permanent change in behavior that occurs as a result of experience," which states that learning is a behavioral change that occurs as a result of a neurophysiological process, was the most preferred attitude statement. The attitude statements "Our brains develop better when we learn in an enriched teaching and learning environment" and "Learning occurs as a result of neurophysiological processes in the brain" were adopted with an "agree" attitude. Sadık (2013) and Duman (2015) have stated that enriching the learning environment will increase permanence in learning. This scientific view and studies designed with a neurophysiological learning approach in different branches by Çengelci (2005), Özden (2005), Hasra (2007), Usta (2008), İnci (2010), and Hiçyılmaz (2013) have reached positive results in terms of permanence in learning and academic success. Baştuğ (2007) and Çelebi (2008) have stated that students' higher-order thinking skills develop in lessons designed with a neurophysiological perspective. In an experimental design conducted with preschool children, Duman and Köksal (2019) reached the results that students achieved better success in school readiness, expressed themselves better, and gained experience.

Weimer (2007) and Özaydın Özkara (2020) stated in their research that students' participation in the lessons increased, while Çengelci (2005), Avcı (2007), Çelebi (2008), Yağlı (2008), İnci (2010), and Sikes (2009) found positive increases in students' attitudes towards the lessons. Although there were some studies that did not support these findings, such as the research by Yağlı (2008), it was observed that the academic achievement of students in these studies did not differ significantly. Aydın (2008) and Bozdağ (2015) stated that although they achieved a significant difference in student academic achievements, they did not observe a difference in students' attitudes towards the lesson. Considering the findings and results obtained, it can be evaluated that students can express themselves better, participate more actively in the lesson, achieve higher academic success, and develop positive attitudes towards the lesson in a lesson designed with a neurophysiological learning approach. It is considered that the findings of the studies that support this opinion and research in the field contribute to the significance of the results obtained in this study.

When the relationship between learning and the brain was examined, it was found that the attitudes in the "The role of the brain in learning" and "Structural brain functions in mental processes" sub-dimensions of the scale were close to or above 4.00. It is understood that the information contained in the brain and neuron-related items in the scale requires in-depth knowledge and is generally evaluated between 3.50-4.00. This shows that teachers consider this subject important but have not made a final decision regarding agreement. The rate of adoption of views directly expressing the relationship between learning and the brain is 4.00 and above. These findings indicate that teachers fully agree with the view that there is a relationship between learning and the brain. Caine and Caine

(1991) supported this view by stating that knowing the working system of the brain would allow both the teacher to plan a more effective lesson and the students to achieve more permanent learning. Buzan (2001) also supports the view that the most important thing in learning is to use the potential of the brain. These two views enhance the significance of the results obtained in the research, indicating that the findings are meaningful, and teachers' perceptions are positively oriented.

Regarding the variable of age, no significant difference was found in the neurophysiological perception levels of teachers. Since no other research has been found in this field, and theoretical determinations do not include the age factor, this finding obtained in the study can be accepted.

In terms of professional experience, no significant difference was found in the views of teachers. Similar findings were reached by Hodges (2013). However, Sülün and Çapanoğlu (2022) found that teachers with "16-20 years" of professional experience had a more positive perception compared to others. Since this finding is not supported by theoretical knowledge and other research, it is considered that whether professional experience leads to a change in neurophysiological perception levels is still a controversial issue.

Although no research has been found that shows whether the variable of educational level affects teachers' neurophysiological perceptions, it was found in this research that teachers with a master's degree had a more positive perception compared to those with a bachelor's degree. This finding can be related to the fact that receiving more in-depth education about education and learning increases the opportunity to access research in the field, leads to a broader knowledge about the nature of learning, and therefore results in a higher level of awareness about the neurophysiological structure of learning. Since there is no other research in this field, it can be considered that receiving education in the field will lead to a positive perception, even if it does not depend on whether one has knowledge of neurophysiology.

It was found that teachers' perceptions did not change depending on whether they needed training in the field of neurophysiological perception. This finding is also supported by the research findings of Sülün and Çapanoğlu (2022). No other research findings have been found on this issue. However, when evaluated together with the educational level variable, it is considered that the attitude of appreciating the importance of neurophysiological perception will be positive regardless of whether one has knowledge of neurophysiology.

A similar finding was obtained regarding the variable of the value of scientific knowledge. Although the value of scientific knowledge is high, it was determined that teachers' neurophysiological perception levels did not change.

According to the variable of whether teachers considered themselves competent in the field of neurophysiology, it was found that perceptions differed significantly. According to the findings, teachers who considered themselves less competent had higher perceptions of neural dimensions in mental processes and the structural functions of the brain in mental processes, as well as higher general neurophysiological perception levels, compared to those who considered themselves to have intermediate or advanced competence. When this finding is evaluated together with the answers to the previous questions, it can be considered that those who do not consider themselves competent attach more importance to the subject, while others have perceptions that contradict their initial positive perceptions.

It was found that whether teachers received training in neurophysiological perception did not lead to a change in their perceptions. A similar finding was reached by Sülün and Çapanoğlu (2022). Although this finding is not supported by other research, research findings that emphasize the importance of neurophysiological perception, such as Çengelci (2005), Özden (2005), Hasra (2007), Usta (2008), Hiçyılmaz (2013), Weimer (2007), Özaydın Özkara (2020), Avcı (2007), Çelebi (2008), Yağlı (2008), İnci (2010), and Sikes (2009), suggest that neurophysiological perception is well understood by teachers and that adopting it in the design and teaching process leads to positive achievements in teaching and learning. It can be considered that teachers' neurophysiological perception levels are positively oriented even though they have not received education in this field.

In the last question of the study, the relationship between attitude statements in the neurophysiological perception scale's sub-dimensions and the perception to be measured throughout the scale was analyzed. In the evaluation made, a significant relationship was found between the sub-dimensions and the general perception.

5. CONCLUSION and RECOMMENDATIONS

The findings obtained have been discussed in comparison with theoretical knowledge and the results of research conducted in the field, leading to the following conclusions:

- The majority of participating teachers value knowledge about the function of the brain.
- The teachers participating in the research do not possess sufficient knowledge about neurophysiology.
- A large portion of the teachers participating in the research have not received training in neurophysiology.
- Most of the teachers participating in the research believe that the education they would receive in neurophysiology would be beneficial for them.
- The participating teachers believe in a positive relationship between the brain and learning.
- The age of teachers does not affect their neurophysiological perception levels.
- The impact of teachers' professional experience on their neurophysiological perception levels is still a subject of debate.
- As the educational levels of teachers increase, their neurophysiological perception levels change positively.

- The need for neurophysiological perception training among teachers does not affect their perceptions on this matter.
- Teachers develop a more positive perception in this field as their experiences related to neurophysiological perception decrease.
- Having a lower level of neurophysiological perception among teachers leads to the perception that the role of the brain in learning is higher.
- Neurophysiological perception training does not affect perception in this field.

Based on the results obtained from the research, the following recommendations can be made for practitioners and researchers:

For Practitioners:

- Initiatives can be taken to increase teachers' neurophysiological perception levels.
- University teacher training programs can include courses related to the field of neurology.

For Researchers:

- Comparative research can be conducted on the teaching activities of teachers with high and low neurophysiological perception levels.
- Research can be conducted to determine which skills develop in students who receive education from teachers with high neurophysiological perception levels.
- The awareness levels of teachers regarding the relationship between the brain and learning can be researched in terms of different variables.
- Analysis can be carried out to determine the professional skill changes in teachers resulting from neurophysiological perception training.
- The relationship between the neurophysiological perception levels of teachers and their professional achievements can be analyzed.

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GENİŞLETİLMİŞ TÜRKÇE ÖZET

Giriş ve Araştırma Problemleri ve Amaç

Okul öncesi dönem, yaşamın temellerinin atıldığı önemli bir dönemdir. Çocuğun her alanda hızlı geliştiği, ileriki yaşlarının nasıl olacağına ilişkin ilk adımların atıldığı bu yıllarda çocuğun her bakımdan desteklenmesi gerekir. Özellikle zihinsel gelişimin çevreden büyük oranda etkileniyor olması nedeniyle çocuklara bu dönemde olumlu deneyimler yaşatılması ihmal edilmemelidir. Öğrenmenin nörolojik yollarla meydana geldiği araştırmalarla sabittir. Bu alanda yürütülen çalışmalar bir yandan öğrenmenin oluşumunu dahada anlaşılır kılarken, elde edilen bulgular, zihinsel gelişimi daha iyi desteklemek için neler yapılabileceğine ışık tutmaktadır.

Bu araştırma, Mersin merkez ilçelerinde (Akdeniz, Mezitli, Toroslar, Yenişehir) resmi okul öncesi kurumlarında görev yapan okul öncesi öğretmenlerinin nörofizyolojik algı düzeyleri ve bu nörofizyolojik algı düzeylerinin çeşitli değişkenler (mesleki kıdem, öğrenim düzeyi, yaş vb.) açısından incelemeyi amaçlamaktadır.

Bu amaç doğrultusunda aşağıda belirtilen araştırma sorularına yanıt aranmıştır:

a. Okul öncesi öğretmenlerinin öğrenme ve davranış nörofizyolojisi hakkındaki algıları ne durumdadır?
b. Öğretmenlerin eğitimde nöroloji araştırmalarının önemi hakkındaki düşünceleri ne durumdadır?
c. Öğretmenlerin öğrenme ve beyin arasındaki kurdukları bağ ne durumdadır?
d. Nörofizyolojik Algı Ölçeği alt boyutlarında anlamlı bir ilişki var mıdır?

Literatür Taraması

İnsanın verimli bir hayat sürebilmesinde gelişmiş zihinsel yapının büyük bir etkisi vardır. Diken (2010)'in de vurgulandığı gibi erken yaş döneminde çocuğun zihinsel potansiyelinin olumlu yönde desteklenmesi ona iyi bir gelecek sunmak için önemli bir dönemdir. İnsanlık için büyük bir kazanım olan zihinsel potansiyelin sağlıklı deneyimlerle olumlu yönde desteklenmesi ancak bu alanda yapılan bilimsel çalışmalarla mümkündür. Erkenyaş döneminde ne zaman, ne kadar, nasıl bir ortamda ve nasıl desteklenmesi gerektiğine ışık tutun bilimsel çalışmaların artırılması öğretmenler için de kılavuzluk edecektir (Çelebi ve Afyon, 2011).

Son yıllarda öğrenmenin nörolojik doğasıyla ilgili derinlemesine yapılan araştırmalar bilgisayar ve iletişim imkânlarının da artmasıyla sık sık teknolojinin gündemine gelmektedir. Erken yaş döneminde dışarıdan gelecek olan uyaranlara ya da gelmeyecek olan uyaranlara oldukça hızlı ve kalıcı tepki verecek olan beynin; nörofizyolojik algı düzeyi,farkındalığı yüksekokul öncesi öğretmenleri ile tanışması büyük şans olacaktır. Zamanın ilerliyor olması, çevresel imkânların sürekli geliştiği böyle bir zamanda insan beyninin deneyimlerle erken yaş döneminde desteklenmesi insan hayatını iyileştirme çabası olarak görülmelidir. Olumsuz ya da eksik bir etkinin yanında ihmalkâr tutumlar ise insan hayatının gelecekte daha iyi bir yere gelmesini engelleyici etkiler olarak görülmelidir (Nelson, vd. 2007). Aksi halde geriye dönük olarak telafi çalışmaları hem daha uzun bir zaman alacak hem de pahalıya mal olacağı düşünülmektedir. Bu nedenle, güncelliğini koruyan bu konunun araştırmalarla hem eğitimcilere hem de bilim adamlarına yeni bulgular sunarak aydınlatılması gerekir.

Erken yaş dönemi üzerine yapılan ve öğrenmenin nörolojik boyutunu temel alan beyin temelli öğrenme kuramı ile ilgili araştırmalara bakıldığında, çalışmaların çoğu deneysel modele atıfta bulunmaktadır (Çelebi, 2008; Çengelci, 2005; Özden, 2005; Avcı, 2007; Hasra, 2007; Baştuğ, 2007; Aydın, 2008; Yağlı, 2008; Usta, 2008; Sadık, 2013; Bozbağ, 2015; Çakıroğlu, 2014). Bu çalışmalar detaylıca incelendiğinde beyin temelli öğrenmenin çocukların başarısına, tutumlarına, kavrama becerilerine, eleştirel düşünmeyle birlikte üst düzey düşünme becerilerinin kazanılmasına ve öğrenmede kalıcılığın artırılmasına olumlu yönde etkisinin olduğunu ortaya koydukları görülmektedir. Benzer şekilde yurt dışı çalışmalarda da Weimer (2007) derslerde beyin temelli öğrenme kullanımının öğrencilerin katılım ve ilgi düzeylerini artırdığını bulmuştur. Sikes (2009), beyin temelli öğretimin beşinci sınıf öğrencilerinin akademik başarılarını ve derslere olan tutumlarını pozitif yönde etkilediğini göstermiştir. Roberts-Perrin (2012) öğretmenlerin beyin temelli öğrenmeye ilişkin bilgi ve düşüncelerinin karar verme sürecini düzeyde etkilediğini bulmuştur. Hodges (2013), öğretmenlerin beyin temelli öğrenme farkındalığının yüksek olduğunu ancak mesleki deneyimleri ile uygulama arasında anlamlı bir ilişki olmadığını belirtmiştir. Shabatat ve Al-Taawneh (2016), beyin temelli öğrenme kuramına dayalı eğitim programlarının geleneksel programlara göre öğrenci başarısını artırdığını bulmuşlardır.

Yöntem

Bu araştırma, Mersin merkez ilçelerinde (Akdeniz, Mezitli, Toroslar, Yenişehir) resmi okul öncesi kurumlarında görev yapan okul öncesi öğretmenlerinin nörofizyolojik algı düzeyleri ve bu nörofizyolojik algı düzeylerinin çeşitli değişkenler (mesleki kıdem, öğrenim düzeyi, yaş vb.) açısından incelemeyi amaçladığından nicel araştırma yöntemlerinden genel tarama modelinde bir araştırmadır.

Bu araştırmanın evrenini Mersin ilinde Milli Eğitim Bakanlığına bağlı resmi kurumlarda görev yapan tüm okul öncesi öğretmenleri oluşturmaktadır. Mersin ili merkez ilçelerindeki (Akdeniz, Mezitli, Toroslar, Yenişehir) Milli Eğitim Bakanlığına bağlı resmi kurumlarda görev yapan ve uygun örnekleme yöntemi kullanılarak seçilen 200 okul öncesi öğretmeninden oluşan bir çalışma grubu oluşturulmuştur.

Araştırmada verilerin elde edilmesi için araştırmacı tarafından oluşturulan ve katılımcılara ait genel demografik bilgilerden oluşan “Genel Bilgi Formu” ve katılımcıların algılarını belirlemek amacıyla Sülün, Aydoğdu, Taşçı ve Şimşek (2014) tarafından geliştirilen “Nörofizyolojik Algı Ölçeği (NAÖ)” kullanılmıştır.

Araştırmaya katılan öğretmenlere ilişkin demografik bilgiler “Genel Bilgi Formu” yardımıyla elde edilmiştir. Bu form, katılımcıların cinsiyet, yaş, eğitim durumu ve mesleki deneyimi gibi bilgileri içermektedir. NAÖ ise 5 likert tipinde ve 3 faktörden oluşan bir ölçektir. Bu faktörler, "Bilişsel

Süreçlerde Nöral Boyut" "Öğrenmede Beynin Rolü" ve "Bilişsel Süreçlerde Beynin Yapısal İşlevleri" olarak belirtilebilir. Ölçek genelinin Cronbach alfa güvenirlik katsayısı 0.95 olarak bulunmuş, bu da katılımcıların nörofizyolojik öğrenmeye ilişkin algılarını ölçmede güvenirliği göstermektedir.

Bu verilerin analiz ve değerlendirmeleri için öncelikle frekansla tabloları oluşturulmuş, daha sonra bu tablolardaki veriler belirli yığılma ya da ayrışma özellikleri bakımından listeleme, gruplama tekniklerle anlaşılır hale getirilmiştir. Katılımcıların algılarını belirlemek amacıyla NAÖ ölçeğiyle elde edilen veriler gerekli kodlamalar yapıldıktan sonra SPSS programına aktarılarak analiz edilmiştir. İstatistiki verilerin analizinde ise Normal dağılıma uymayan veriler; İki grubu analiz etmek için Mann-Whitney U testi, ikiden fazla grubu karşılaştırmak için Kruskal-Wallis H-testi kullanılmıştır. Anlamlı olan analizlerde hangi grupların farklılık gösterdiğini belirlemek için Mann-Whitney u-testi kullanılarak ikili karşılaştırmalar yapılmıştır. Ölçeğin boyutları arasındaki ilişkinin tespiti için Spearman korelasyon testi kullanılmıştır.

Sonuç

Yapılan araştırma sonucunda katılımcıların beyin ile ilgili bilgiyi değerli bulduğu, nörofizyoloji ile ilgili yeterli bilgiye sahip olmadıkları, öğrenimden geçerlerse kendileri için faydalı olacağı, eğitimde kullanılması halinde derse katılım, derse karşı öğrenci tutumu, öğrenmede kalıcılık, akademik başarı alanlarında faydalı olacağı yönünde pozitif algıya sahip oldukları anlaşılmıştır. Araştırma sonucunda katılımcıların beyinle öğrenme arasındaki pozitif ilişkiye inandığı, yaşın, mesleki tecrübenin nörofizyolojik algıya etkisi olmadığı fakat öğrenim düzeyi yükseldikçe daha pozitif algı oluştuğu anlaşılmıştır. Katılımcıların nörofizyoloji alanında bir eğitime ihtiyaç duymaları ve bu konuda bir eğitim almış olmaları algıyı etkilemezken, nöral boyutu geliştirici bir etki yapıldığında genel nörofizyolojik algının da yükseldiği tespit edilmiştir. Araştırmada elde edilen sonuçların alan uygulamacıları ve araştırmacıları için faydalı olacağı düşünülmektedir.