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FROM THE EDITOR

Dear Colleagues,

The *Journal of Theoretical Educational Science* is happy to publish the fourth and last issue of 2023! In this issue, you will find ten research articles by 17 authors from different disciplines. We hope that these articles will contribute to the literature.

Starting in 2022, we included the reviewer list in the year's last issue. As you see in the following pages, 96 reviewers from 6 countries and 59 different institutions contributed to 2023 issues. Although this is a faculty journal, just 7 of these reviewers were from Afyon Kocatepe University. In 2024, we will endeavor much more to internationalize our journal, not only with our reviewer list but also with our author list.

Finally, we should also sincerely thank the Editorial Board, reviewers, language and layout editors, and authors for their invaluable contributions. Also, we would like to announce that our redaction editor, Merve Vezir Kaplan, and our language editor, Gamze Kapucu, finished their master's degrees. We congratulate them on their master's degree and diligent work in producing the journal.

We look forward to receiving submissions of sufficient rigor and quality for the following issues. We wish you good health and hope to meet again for the 2024 January issue!

Fatih GÜNGÖR, PhD
Afyon Kocatepe University
Faculty of Education

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Note: The recurring reviewer names on the list show that they reviewed more than one manuscript in 2023. We automatically downloaded the names of reviewers from TR Dizin, who are published article reviewers. As we could not retrieve the reviewer names of rejected manuscripts, this should be considered in statistics. By the way, we thank these reviewers who are not on this list for this reason.

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Ranking the Criteria Effective in the Selection of E-Learning System by Fuzzy AHP (F-AHP) Method

E-Öğrenme Sistemi Seçiminde Etkili Kriterlerin Bulanık AHP (F-AHP) Yöntemiyle Sıralanması

Yasemin SÖNMEZ GÜMÜŞHAN* **Fatma SÖNMEZ ÇAKIR****

Received: 23 November 2022 **Research Article** **Accepted:** 12 September 2023

ABSTRACT: E-learning systems are one of the effective methods used for education. It is obvious that both during the Pandemic period when distance education is actively used and in normal life, participants apply to e-learning systems to follow lessons or improve themselves. Computer and internet applications are getting into education more and more day by day. Education through e-learning, which can work online or offline, is more and more effective every day. Thanks to these systems, education becomes more transparent, accessible and fairly distributed. Since many criteria will have an impact on the selection of a suitable e-learning system, these criteria were determined in the study and presented to expert opinions. In the selection of e-learning systems, 10 criteria were selected by literature review and the criteria were conveyed to the experts. The criteria were listed using the fuzzy AHP method. The most effective criterion in the study was found to be interaction. This criterion is followed by ease of use, content and reliability criteria.

Keywords: e-learning, distance learning, mobile learning, AHP, F-AHP, MCDM.

ÖZ: E-öğrenme sistemleri eğitimde kullanılan etkili yöntemlerden biridir. Hem uzaktan eğitimin aktif olarak kullanıldığı Pandemi döneminde hem de normal yaşamda katılımcıların dersleri takip etmek veya kendilerini geliştirmek için e-öğrenme sistemlerine başvurdukları açıktır. Bilgisayar ve internet uygulamaları her geçen gün daha fazla eğitimin içine girmektedir. Çevrimiçi veya çevrimdışı çalışabilen e-öğrenme yoluyla eğitim, her geçen gün daha da etkilidir. Bu sistemler sayesinde eğitim daha şeffaf, erişilebilir ve adil bir şekilde dağıtılmaktadır. Uygun bir e-öğrenme sisteminin seçiminde birçok kriterin etkisi olacağından, çalışmada bu kriterler belirlenmiş ve uzman görüşlerine sunulmuştur. E-öğrenme sistemlerinin seçiminde literatür taraması yapılarak 10 kriter seçilmiş ve kriterler uzmanlara aktarılmıştır. Bulanık AHP yöntemi kullanılarak kriterler listelenmiştir. Araştırmada en etkili ölçüt etkileşim olarak bulunmuştur. Bu kriteri kullanım kolaylığı, içerik ve güvenilirlik kriterleri takip etmektedir.

Anahtar kelimeler: e-öğrenme, mesafeli öğrenme, mobil öğrenme, AHP, F-AHP, MCDM.

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Electronic learning (E-learning) systems are systems that educate students. In these systems, students are provided to learn the necessary information by using tools such as virtual classrooms. These systems are also network-supported platforms that can work online or offline and can be personalised according to the user's wishes. And the systems usually have a specific interface that allows the user to ask questions to the instructor. E-learning systems have features other than those listed, which are effective in selecting the e-learning system. E-learning was defined as the use of digital technology for education (Tudor et al., 2018). In the literature, it is seen that the concept of e-learning is used in ways such as web-based learning, online learning, mobile learning, and virtual or digital collaboration learning (Adedoyin & Soykan, 2020; Azlan et al., 2020; Mahalakshmi & Radha, 2020; Männistö et al., 2020; Wirani & Manurung; 2020). The prevalence of e-learning systems depends on the quality of knowledge transfer and the development and improvement in the effectiveness of the platform (Khan et al., 2019). E-learning systems are easy to access, less costly, provide the opportunity to access educational content at any place and time, reach more students at the same time, do not need a classroom, are repeatable, and can be slowed down and accelerated. It has advantages such as providing equal education opportunities for everyone and updating the curriculum anytime.

It is undeniable that education is a very important requirement for people around the world and should be accessible to everyone. The delivery of this training to people and its effective and efficient implementation is an important element in illuminating the future. The COVID-19 pandemic has also revealed the necessity of taking new and up-to-date steps in education. According to the World Economic Forum, COVID-19 has caused schools to close around the world and left more than 1.2 billion children out of face-to-face education. As a result, teaching has moved to distance and digital platforms, and there has been a significant increase in the use of e-learning systems. The systems were also used in the pre-epidemic period, but their importance was even better understood during and after the epidemic.

According to Global News Wire (2020), mobile learning has been the fastest-growing market in the industry, with an average annual growth rate of 20%. The same report also expects the global mobile learning market to reach US$ 80.1 billion by 2027. According to Reuters' report, the global e-learning market will reach a value of 398.15 billion dollars in 2026. The latest report from the National Center for Education Statistics (NCES, 2019) shows that the number of enrollments in distance education courses has increased. However, the overall university enrollment rate has decreased (NCES, 2019). According to the e-Learning Market Intelligence Report, the Global eLearning Market is projected to reach USD 352,348.96 million by 2027 from USD 126,199.67 million in 2021, at a compound annual growth rate (CAGR) of 18.66% during the forecast period. According to the Comprehensive Learning Management System (LMS) Market Report and Trends (2021), the Global e-learning market is expected to reach a size of 374 billion USD by 2026. The market is expected to grow at a compound annual growth rate of 14.6. According to the same report, the most important reason for this rapid growth is the Covid-19 quarantine and the accompanying global closures.

The general aim of societies is to strengthen the development of people's intellectual capital to raise self-sufficient, responsible individuals who can understand

and explain. The more these goals can be achieved, the longer they will be able to survive in societies. The quality of a country's human intellectual capital should include developing skills such as questioning, exploring, inventing, reflecting interest, and communicative and collaborative skills among students (Malik et al., 2021). In this way, societies can improve their technology and knowledge levels. The investment in education and the effort spent in development will ensure that nations are always one step ahead. Having a successful e-learning system can affect the educational institution's image and save institution resources (funds, time, and labor) (Taha, 2014).

Students currently in various levels of education can be defined as members of the digital native or network generation born in the digital age and interacting with digital technology from childhood (Chelvarayan et al., 2020). These individuals can use mobile devices and the socialization and education platforms they provide. If this way of learning is adopted by students more, the quality of education and the number of individuals who can access education will increase. Due to the growing popularity of e-learning platforms and the rapid increase in the number of learning systems available, choosing the right platform for students has become crucial.

The aim of the study is to determine the factors that are effective in the selection of e-learning systems, to show the designers and trainers which criteria are more important, and to focus on these issues. During the design phase of the study, criteria were determined by literature review, the criteria used in other studies, and the methods used were presented. The use of a large number of criteria as e-learning system evaluation criteria and the addition of up-to-date criteria makes this study different from other studies.

The study was conducted taking the opinions of 16 experts (software engineers, computer engineers, computer teachers, academicians, etc.) on the criteria and processing them with the Fuzzy Analytic Hierarchy Process (F-AHP), which is a Multi-Criteria Decision-Making Method (MCDM). The criteria determined by a wide literature review were presented to the experts, and they were asked to compare these criteria in pairs. Since simultaneous control was also performed while making paired comparisons, no problems were encountered in the consistency ratios, and consistency values below 0.10 were obtained.

Selection of E-Learning Systems, Methods, and Criteria

It has been observed that different criteria are considered in studies on e-learning systems. The criteria used in the scanned studies are given in Table 1. Using cross-case analysis, Soong et al. (2001) examined the websites according to the criteria they determined. Covella and Olsina Santos (2002) conducted a case study to identify, evaluate, and compare the quality of four typical sites and applications with e-learning functionality. Pruengkarn et al. (2005) used the main criteria and their sub-criteria for selection with the SWING method in their study. The study has six main criteria and a total of 21 sub-criteria.

Shee and Wang (2008) evaluated web-based e-learning systems using the AHP method and determined criteria. Four main criteria: user interface, features of the learning community, system content, and customization. These main criteria have 13 sub-criteria. For the interface criterion, the sub-dimensions of ease of use, user-friendliness, ease of understanding, operational stability; for the characteristics of the

learning community criterion, the sub-dimensions of ease of communication with other students and educators, ease of access to shared data, ease of sharing learning materials; for the system content criterion, the sub-dimension of useful and sufficient content; and finally for the personalisation criterion, the sub-dimensions of checking and saving progress were examined. In the study, the most important criterion for users was found to be the interface. Content, learning community, and personalization follow this criterion in order.

Table 1

E-Learning Systems Selection Criteria

Year	Author/s	Criteria
2001	Soong et al.	Instructors And Students Technical Competency, Human Factors, Mind-Set (About Learning), Collaboration, Perceived IT İnfrastructure, Technical Support
2002	Covella and Olsina Santos	Course/Course Features, Student Features, Learning Environment Features, Usability, Confidentiality, Reliability, Efficiency, Certificate Information, Virtual Community
2005	Pruengkarn et al.	Functionality, Reliability, Usability, Efficiency, Sustainability, Portability
2008	Shee and Wang	User Interface, Features of Learning Community, System Content, Personalization
2009	Chao and Chen	E-Learning Material, Learning Record, Self-Learning, Synchronous Learning, Quality of Web Learning Platform
2012	Syamsuddin	Functionality, Reliability, Usability, Efficiency, Sustainability, Portability
2012	Alias et al.	Ease Of Use, Appearance, Linkage, Structure and Layout, Information, Reliability, Efficiency, Support, Communication, Security.
2016	Jain et al.	Accurate/Comprehensible Content, Current/Full Content, Personalization, Security and Navigation, Interactions, User Interface
2017	Garg	Right And Understandable Content, Complete Content, Personalization, Security, Navigation, Interactivity, User Interface
2018	Anggrainingsih et al.	University Policies (Financial Policy), University Regulation (Regulation Policy), Technical Support, Seminars and Training Availability, Portability Products, Reliability Product, Ease to Understand and Ease to Use, Design and User Interface System, Course Quality, Relevant Content, Completeness of Content, Flexibility to Taking Course, Expertise to Use a Computer, Expertise to Use the Internet, Attitudes Toward E-Learning, Forum / Discussion Availability, Attitudes Toward Student, Respond Time, Liveliness Lectures, Attitudes Toward E-Learning
2018	Garg et al.	Functionality, Sustainability, Usability, Portability, Reliability, Efficiency, Ease of Learning, System Content, General Factors
2018	Mohammed et al.	Human resources, Specific ICT Infrastructure for E-Learning, Basic ICT Infrastructure for E-Learning, Strategic Readiness for E-Learning Implementation, Legal and Formal Readiness for E-Learning Implementation
2018	Alhabeeb and Rowley	Student Features, E-Learning System, Experience, Ease of Access, Instructor Features, E-Learning Support Ease of Use, Support and Training, E-Learning Tools, Participation
2019	Khan et al.	Functionality, Sustainability, Portability, Reliability, Usability, Efficiency, Learning Community, Personalization, System Content, General Factors

2019	Fitriastuti et al.	Reliability, Flexibility, Integration, Accessibility, Response Time, Completeness, Accuracy, Format, Service Reliability, Service Support, User's Empathy
2020	Chelvarayan et al.	Performance Expectancy, Effort Expectancy, Social Influence, Quality of Service, Perceived Enjoyment, Mobile Learning Intention
2020	Jaukovic Jocic et al.	Level of content, Presentation method, Teaching method, E-learning environment, Learning materials, Quality of multimedia content, Group work and interactivity
2020	Naveed et al.	Attitude towards e-learning, Motivation of students, General internet self-efficacy, Interaction with other students, Commitment to online studies, Instructors' attitude towards e-learning, Information and Communication Technologies skills, Ease language communication, Appropriate timely feedback, Interactive learning activity, Appropriate course design , Use of multimedia instruction, User-friendly design, Understandable content, Convenient system, Ease of access, Technical support for users, Good internet speed, Efficient technology infrastructure, Reliability, Infrastructure preparation, Financial preparation, Education of users, Faculty support, Ethical and legal issues
2020	Muhammad et al.	Timely, Relevant, Multilanguage, Variety of Presentation, Accuracy, Reliability of Content, Attractive, Appropriateness, Color, Multimedia Elements, Text, Browser Compatibility, Index, Navigation, Consistency, Links, Logo, Domain, User Friendly, Reliability, Availability, Interactive Features.
2020	Korucuk B.	Personal Suitability, Effectiveness, Learning, Program Evaluation, Technology, Material, Evaluation, Support Services
2021	Gong et al.	User Interface, Personalization, Interactivity, Security, Complete Content, Navigation, Right and Understandable Content
2021	Toan et al.	Design, Navigation, Response Rate, Impression Score, User-Friendliness, Interactivity, Connectivity, Security, Right and Understandable Content, Complete Content, Up-to-Date, Ethical and Legal Issues, Variety of Educational Level, Price, Personalization
2021	Siew et al.	Learning and Teaching, Attractiveness, Quality Management System, Information Quality, Flexibility
2021	Alojaiman	Reliability, Updated, Understandability, Timeliness, Accuracy, Visual representation, Security, Loading speed, Accessibility
2021	Güldeş et al.	Framework, Function, Security, Material, Collaboration, Quality, Assessment
2022	Atıcı et al.	Adaptation, Framework, Function, Security, Content, Cooperation and Communication, Quality, Learning, Assessment and Evaluation, Technical Specifications, Support

Chao and Chen (2009) identified five main criteria in their study. Among these criteria, there are five sub-criteria for the e-learning materials criterion, which is also the subject of our study. These are given as ease of use, structure, and contents, contain active and vivid multimedia design, and possess interactive mode and exercise and quizzes. The Consistent Fuzzy Preference Relations (CFPR) method was used in the study.

Alias et al. (2012) identified elements to ensure the success of E-learning. In order to determine the important elements of e-learning based on students' perceptions, a scale was applied to the students, and the obtained data were analyzed using SPSS.

Syamsuddin (2012) used the F-AHP method to determine the quality of e-learning software in his study. The six criteria used in his study have 22 sub-criteria. These six criteria are given in the relevant row in Table 1.

Prougestaporn et al. (2015) identified the criteria that are important for creating an effective e-learning environment that can be used in higher education courses, summarised the main success factors and evaluated the effectiveness of e-learning for higher education. The questionnaire was applied to the participants, and the results were analyzed. Abdel-Gawad and Woollard (2015) examined teacher characteristics (attitude towards e-learning, technology and support competence); students' characteristics (computer proficiency, English language proficiency, and learning style); and technology (usability, facilities, and infrastructure) factors as important criteria for designing a successful e-learning system.

In their literature review conducted in 2016, Zare et al., identified crucial factors for establishing an effective e-learning environment as usability, response time, interactivity, web and course design, accessibility, reliability, cost-effectiveness, functionality, security, stability, trust, accuracy, flexibility, interoperability, and sustainability. Jain et al. (2016) used the distance-based approach (WDBA) method for e-learning system selection and ranking. The most important criteria are listed as up-to-date/full content, correct/intelligible content, and user interface, respectively. Garg (2017) WDBA sought a solution to the E-learning website selection problem using TOPSIS methods. Garg et al. (2018) applied fuzzy COPRAS to evaluate, rank, and select eight e-learning websites based on ten interactive selection indexes.

Khan et al. (2019) used the Proximity Indexed Value (PIV) method in their study. Functionality and sustainability criteria are listed as the two most important criteria. Naveed et al. (2020) evaluated the critical success factors in implementing the e-learning system using multi-criteria decision making. Naveed et al. (2020) also used F-AHP, a multi-criteria decision-making technique, for these five main dimensions and found that the most important main dimension was the corporate governance dimension. Jaukovic Jocic et al. (2020) used Integrated PIPRECIA–Interval-Valued Triangular F-ARAS for e-learning course selection. Gong et al., (2021) listed the evaluation criteria using Linguistic hesitant fuzzy sets (LHFSs) and the TODIM methods. Siew et al. (2021) used the AHP-VIKOR method to select criteria. Alojaiman (2021) has selected an effective e-learning platform using the Hybrid F-AHP-TOPSIS Method. Atici et al. (2022) ranked the criteria using type-2 F-AHP.

Fuzzy Analytical Hierarchy Process (F-AHP)

Fuzzy set theory, developed by Zadeh (1965), allows grading of membership functions. This method aims to mathematically formulate the linguistically expressed variables (Zadeh, 1965). In the classical logic system, if an element belongs to the set, it takes the value of '1'; if it is not a member of that set, it takes the value of '0'. However, in the fuzzy system, the belonging of the elements to the cluster changes between the values of [0-1], in other words, they belong to the cluster at different degrees (Kocakaya et al., 2021).

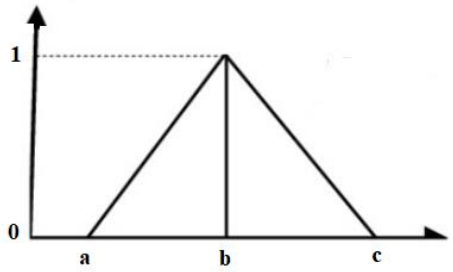
The membership function can be expressed with fuzzy number $\tilde{N}$ and triangular fuzzy number as follows (Chou et al., 2019):

$$\mu_{\tilde{N}}(x) = \begin{cases} (x-l)/(m-l) & , \quad l \le x \le m \\ (u-x)/(u-m & , \quad m \le x \le u \\ 0 & , \quad others \end{cases}$$

In the function, ' l ' indicates the lower value, ' m ' the mean, and ' u ' is the upper value. Mathematical multiplication, division, and addition operations can be made between two fuzzy numbers.

Figure 1

Triangular fuzzy number diagram.



$$\mu_A(x) = \begin{cases} 0, & x \le a \\ \dfrac{x-a}{b-a}, & a < x \le b \\ 1, & x = b \\ \dfrac{c-x}{c-b}, & b < x \le c \\ 0, & x \ge c \end{cases}$$

A fuzzy set A in the universal set X is defined as $A = (x, \mu(x); x \epsilon X)$. Here, $\mu_A: A \rightarrow [0,1]$ is the grade of the membership function and $\mu_A(x)$ is the grade value of $x \in X$ in the fuzzy set A (Panda and Pal, 2015).

The important difference between fuzzy logic and other logic systems is that verbal variables can be used. Verbal variables allow for approximate descriptions of concepts that cannot be expressed clearly. Chang (1996) presented a new approach in which F-AHP suggested using triangular fuzzy numbers for pairwise comparison scales and making pairwise comparisons with these numbers and introduced F-AHP. F-AHP is a modified version of the AHP method. Although the purpose of the AHP is to determine the weights of the criteria according to the knowledge of the experts, the traditional AHP may fail to reflect the human thinking style. For this reason, F-AHP, a fuzzy extension of AHP, was developed. F-AHP can produce more accurate results in decision-making (Gnanavelbabu & Arunagiri, 2018). F-AHP uses fuzzy numbers or linguistic expressions (equal importance, absolute importance, etc.) for calculations (Sönmez Çakır & Pekkaya, 2020). F-AHP method applications are carried out in the following steps (Sönmez Çakır & Pekkaya, 2020).

Step 1. Pairwise comparison matrices are created.

$$\tilde{A}^k = \begin{bmatrix} \tilde{d}_{11}^k & \tilde{d}_{12}^k & \cdots & \tilde{d}_{1n}^k \\ \tilde{d}_{21}^k & \tilde{d}_{22}^k & \cdots & \tilde{d}_{2n}^k \\ \vdots & \vdots & \ddots & \vdots \\ \tilde{d}_{n1}^k & \tilde{d}_{n2}^k & \cdots & \tilde{d}_{nn}^k \end{bmatrix}$$

Fuzzy equivalents of linguistic expressions are used when constructing this matrix. The triangular fuzzy number equivalents of the comparison expressions 1-9 used in the AHP are given in Table 2.

Table 2

Triangular Fuzzy Number

Value	Definition	Triangular fuzzy number
1	Equally important	(1, 1, 1)
3	Moderately important	(2, 3, 4)
5	Strongly important	(4, 5, 6)
7	Very strongly important	(6, 7, 8)
9	Extremely important	(9, 9, 9)
2;4;6;8	Intermediate values	(1, 2, 3); (3, 4, 5); (5, 6, 7); (8, 8, 9)

Step 2. The geometric mean approach is preferred to obtain the fuzzy geometric mean and weights of each criterion. Equation (1) is used for this calculation.

$$\tilde{r}_i = \left(\prod_{j=1}^{n} \tilde{d}_{ij}\right)^{1/n} \qquad i = 1,2,\ldots,n \qquad (1)$$

Step 3. Fuzzy criterion weights are defined. Equation (2) is used for this calculation.

$$\tilde{w}_i = \tilde{r}_i x(\tilde{r}_i + \ldots + \tilde{r}_n)^{-1} \qquad (2)$$

Step 4. The criterion mean (M_i) and normalized (N_i) weight can be calculated using equations (3) and (4).

$$M_i = (\tilde{w}_1 + \ldots + \tilde{w}_n)/n \qquad (3)$$

$$N_i = M_i/(M_1 + \ldots + M_n) \qquad (4)$$

The F-AHP method is used in many decision-making problems in the literature. Fuzzy supplier selection (Chan et al., 2008), personnel selection (Güngör et al., 2009), risk analysis (Mangla et al., 2015), resource selection (Wang et al., 2020), risk assessment (Ganguly & Guin, 2013), financial performance assessment (Shaverdi et al., 2014), determining student admission criteria (Kustiyahningsih & Aini, 2020) etc. has found application in many fields.

Method

A quantitative research method was used in the study. The aim was to rank the criteria that affect the selection of e-learning systems and to determine the importance levels of the criteria that guide users and developers. For this purpose, ten criteria were determined by the literature review. The obtained pairwise comparison results were analyzed with the Fuzzy Analytic Hierarchy Process (F-AHP), which is a Multi-Criteria Decision-Making Method (MCDM).

Features of Expert Participants

The 10 criteria used in the research were evaluated and determined through expert opinions. The criteria obtained by the literature review were presented to 18 experts/users in the field, and they were asked to rank them. The 10 criteria with the best ranking among the scores were selected this way. In the AHP method, the number of criteria was kept at this level since there should not be too many criteria in order to ensure consistency in pairwise comparisons. After the criteria were determined, 16 experts were asked to compare the 10 criteria determined. Of these experts, 3 (18.75%) were female (3 computer teachers), 13 (81.25%) were male (4 computer teachers, 6

academicians, 2 software engineers, 1 computer engineers). Also the age range of the participants ranges from 28 to 56.

Data Collection

Before these criteria were included in the pairwise comparison, the experts were asked to rank the criteria from the most important to the least important. This provided the possibility of simultaneous control. Therefore, there is no inconsistency in any of the answers received.

Criterion Features

Interaction (C1): The interaction criterion, when designing the e-learning system, indicates the ability of learners to ask questions to instructors and actively participate in the course.Reliability/Security (C2): It refers to the system's safe operation without any external factor's intervention. At the beginning of the Covid 19 period, a widely used e-learning platform for education was faced with different security vulnerabilities.

Interface/Design (C3): An interface is software that allows user and system communication. The interface visual of the designed platform can be an effective factor for the preference of this systemThe distribution of colors and the locations of the tabs can be taken as criteria for preferability.

Ease of Use (C4): Ease of use of a designed program has been determined as a criterion. It is regarded as an important factor that not only the colors and tabs but also the program user can easily reach the place they want to access the program. Quick access is also included in this criterion.

Flexibility (C5): The flexibility of the platform to be created means that it can be redesigned according to the wishes based on users.

Traceability (C6): An important feature in e-learning programmes is that the courses have a retraceable structure and retraceability is determined as a criterion. In addition, there are flow features such as pause, rewind, etc. within this feature.

Technical Support Service (C7): It is important that users are not victimized in case of any technical problems that may arise and that technical problems are eliminated, especially for live lessons. For this reason, having a support team available was considered a criterion.

Content (C8): Content factor is also considered as an important criterion among the reasons for preferring a platform. The fact that the platform contains information about the subject of interest, that it can direct to other interesting trainings, that the content is up-to-date, etc. are also included in this criterion. The platform must support several languages in order for various users to access the same material on the same platform in today's more globalized society.

Whether Paid or Not (C9): Another feature that those using the platform may be interested in is the price. Subscription requests, inclusion of ads for free programs, etc., are included in this criterion. Some platforms may be paid, while others may be free with advertisements.

Working Offline (C10): The ability to work offline has also been seen as an important criterion for the designed system to be accessible to everyone. Even in places where there is no internet service, users will be able to access training.

Ethical Procedures

In this study, ethics committee approval is required within the scope of the "Higher Education Institutions Scientific Research and Publication Ethics Directive," and all the rules stated to be followed were followed. In the meeting numbered 18 of the Social and Human Sciences Research and Publication Ethics Committee of Bartın University, the application number 2022-SBB-0347 was found to comply with the ethical principles. Ethics Committee Approval is attached.

Results

The pairwise comparison matrix obtained from 16 experts was translated into the fuzzy linguistic equivalents given in Table 2, their geometric averages were taken, and the initial matrix was formed. The first given matrix is the pairwise comparison matrix of the first expert. For example, the fuzzy number equivalent of "5" in the pairwise comparison of the C1 and C2 criteria of the first expert is obtained as (4,5,6). The fuzzy number values to be entered in the pairwise comparison of C2 and C1 for the same expert are (1/6,1/5,1/4). The fuzzy number matrix of the first expert is given in Appendix 1. This matrix is presented in Table 3. Subsequent operations were continued with the general initial matrix formed from geometric means.

Step 1. Pairwise comparison matrices are created

Table 3

Pairwise Comparison Values of the First Expert (1-9 scale)

Criteria	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
C1. Interaction	1	5	3	1	7	6	2	2	4	9
C2. Reliability	1/5	1	1/2	1/4	2	1	1/4	1/3	1	2
C3. Interface/Design	1/3	2	1	1/4	3	2	1/3	1	1	5
C4. Ease of Use	1	4	4	1	6	5	2	3	3	7
C5. Flexibility	1/7	1/2	1/3	1/6	1	1	1/5	1/5	1/3	1
C6. Traceability	1/6	1	1/2	1/5	1	1	1/2	1/3	1/2	2
C7. Technical Support Service	1/2	4	3	1/2	5	2	1	2	2	7
C8. Content	1/2	3	1	1/3	5	3	1/2	1	2	4
C9. Whether Paid or Not	1/4	1	1	1/3	3	2	1/2	1/2	1	4
C10. Working Offline	1/9	1/2	1/5	1/7	1	1/2	1/7	1/4	1/4	1

The initial matrix obtained by taking the geometric mean of the opinions of 16 experts according to the fuzzy numbers is given in Table 4. In order to obtain this matrix, all expert opinions were tabulated with their fuzzy number equivalents. Table 4

was obtained by taking the geometric mean of the comparison values of all experts. The complete version of Table 4 is given in Appendix 2.

Table 4

Fuzzy Number Averages of All Expert Opinions (General initial matrix)

	C1			C2			…	C10		
	l	m	u	l	m	u	…	l	m	u
C1	1.00	1.00	1.00	2.17	2.89	3.52	…	6.34	7.11	7.82
C2	0.28	0.35	0.46	1.00	1.00	1.00	…	2.17	2.91	3.57
C3	0.20	0.26	0.37	0.80	0.87	1.00	…	1.68	2.46	3.47
C4	0.49	0.61	0.87	1.43	1.89	2.27	…	3.52	4.72	5.83
C5	0.13	0.14	0.15	0.25	0.33	0.52	…	0.70	0.87	1.15
C6	0.17	0.21	0.27	0.41	0.56	0.79	…	1.32	1.82	2.46
C7	0.20	0.26	0.36	0.58	0.87	1.38	…	1.15	1.70	2.35
C8	0.39	0.46	0.58	0.76	1.15	1.64	…	2.55	3.20	3.81
C9	0.21	0.27	0.39	0.52	0.76	1.05	…	1.97	2.70	3.35
C10	0.13	0.14	0.16	0.28	0.34	0.46	…	1.00	1.00	1.00

Steps 2 and 3. Using Equation (1) and Equation (2), the fuzzy geometric mean and weights of each criterion were obtained. The results are presented in Table 5.

Table 5

Fuzzy Number Averages and Fuzzy Weights of All Expert Opinions

	Geometric Means			Fuzzy Weights		
Criteria	l	m	u	l	m	u
C1. Interaction	2.524	3.241	3.849	0.164	0.266	0.412
C2. Reliability	0.877	1.153	1.499	0.057	0.095	0.160
C3. Interface/Design	0.737	0.952	1.246	0.048	0.078	0.133
C4. Ease of Use	1.564	2.084	2.613	0.102	0.171	0.280
C5. Flexibility	0.335	0.407	0.530	0.022	0.033	0.057
C6. Re-Traceability	0.545	0.687	0.886	0.035	0.056	0.095
C7. Technical Support Service	0.656	0.878	1.185	0.043	0.072	0.127
C8. Content	1.067	1.378	1.736	0.069	0.113	0.186
C9. Whether Paid or Not	0.711	0.925	1.221	0.046	0.076	0.131
C10. Working Offline	0.341	0.422	0.545	0.022	0.035	0.058

Step 4. The criterion means (M_i) and normalized (N_i) weights were calculated using equations (3) and (4) and the obtained values are given in Table 6.

Table 6

The Criterion Means (M_i) and Normalized (N_i) Weights

Criteria	M_i	N_i	Rank
C1. Interaction	0,281	0,260	1
C2. Reliability	0,104	0,096	4
C3. Interface/Design	0,086	0,080	5
C4. Ease of Use	0,184	0,170	2
C5. Flexibility	0,037	0,035	9*
C6. Re-Traceability	0,062	0,058	8
C7. Technical Support Service	0,080	0,074	7
C8. Content	0,123	0,114	3
C9. Whether Paid or Not	0,084	0,078	6
C10. Working Offline	0,038	0,035	9*

*: have the same priority values

When the F-AHP procedures were finalized, the ranking among the criteria became clear.

Ten criteria, created with the criteria obtained through the literature review and the current opinions and suggestions from the experts, were again given to an expert group to make pairwise comparisons. Experts were asked to perform pairwise comparisons with the 1-9 scale given in Table 2. These obtained comparison matrices were converted to fuzzy numerical values given in Table 2. and F-AHP steps were applied. As a result of this application, the Interaction (C1) criterion was obtained as the most important criterion among the ten criteria. Ease of Use (C4), Content (C8), Reliability (C2), Interface/Design (C3), Availability (C9), Technical Support Service (C7), Re-Traceability (C6), Working Offline (C10) and Flexibility (C5). Interaction was found to have the greatest weight with 26% in the ranking. The total weight of the first 4 criteria was 64%. These first four criteria have a 64% effect on the decision. Flexibility, Offline Operation, and Re-Traceability criteria were the three criteria with the lowest weight; their total weight was determined as approximately 1%. These results were compared with the literature, the differences were determined, and the reasons were discussed.

Discussion and Conclusion

With the study, the criteria to be considered in the selection of an e-learning system are listed. According to the results obtained, it is a very important criterion for students to be able to ask questions to the trainers simultaneously and to actively participate in the lesson. This highlights that a designed e-learning system should be interactive. It can be said that during online education periods, live broadcasting during lectures, asking questions, and opening the trainer's camera increase the education's effectiveness. The most important distinction between face-to-face education and e-learning is realized in this criterion. The interaction feature, which can be counted

among the disadvantages of e-learning systems, has also emerged as a very important criterion in system selection. The interaction feature has not been studied much, especially in the pre-Covid period. This study revealed how important the interaction criterion is for e-learning systems, which have become mandatory during the Covid period. The interaction criterion has been found to be effective for the habitual student-teacher relationship to be experienced in these systems, which have become more popular with Covid-19 and are no longer used as a choice but as a necessity. In addition to other criteria, interaction criteria were also sought in distance education for English learning before the epidemic. However, the disappearance of the interaction in the traditional education process for all courses is thought to be very effective in ranking this criterion.

The second criterion is that a designed program is easy to use and understandable by everyone. Accordingly, not only the colors or design on the screen, but also the ease of reaching the desired destination affects the choice of the e-learning system. The fact that it has fast access facilities is also evaluated within this criterion. This criterion appears in many studies in the literature. Alias et al., (2012) ranked first with 70.34% of their study's ease of use criterion. In other studies, this criterion is at the top.

According to experts, among these criteria, content is the other feature that is questioned in a system. The third criterion seems to be that it contains information about the subject it is related to, that it is up-to-date or can be updated, and that it is a guide for other training. One of the ways that education received in the globalizing world is equal and accessible to everyone is that it has content accessible to everyone. Having different language options can make the distribution of education more equitable. Language options are also added to this criterion besides the explanations of other publications in the literature. Jain et al., (2016) stated that the complete and correct content criterion is the most important and gave the highest weight value to it in their article. Alojaiman (2021) claims that content accuracy is the most important criterion in content quality.

One of the system selection criteria is reliability. It is an important factor that it is designed reliability so that it is not open to outside interference. It should be resistant to cyber-attacks, password cracking and system infiltration. The entry of unauthorized persons into the meeting on a platform used during the Covid epidemic caused a significant vulnerability. Upon this situation, the platform has given the meeting owner the authority to take the people they want to the meeting. This criterion is the most used criterion in selecting the e-learning system in the literature review. Alojaiman (2021) claimed that reliability is the second important criterion in content quality. Guldes et al. (2021) stated that the weight of this criterion is higher than the other criteria compared and is the most important criterion. In our study, this criterion took its place at the top.

The interface design or other system design is an important selection criterion. Even in psychological tests, the effects of colors on the human brain are mentioned. At the same time, people want to find the program tabs they use the most more quickly. For this reason, the tabs that are thought to be used the most should be made easier to find or the user should be given the opportunity to be customized, and at the same time, the effects of colors in the design should not be neglected. Shee and Wang (2008) determined the interface criterion as the most important criterion in their study.

Interface criteria in this study: It is divided into sub-dimensions of Ease of use, User-friendliness, Ease of understanding, and Operational stability.

Among the selection criteria, the criterion of whether the application is paid or not was considered important by the experts. It ranked sixth among the top ten criteria. Some programs are sold or used for a fee. How much this fee is a criterion that affects the selection. Advertisements in similar and free programs negatively affect concentration during the lesson. For this reason, systems with reasonable fees and/or few advertisements may be preferred more. Technical support service is also important especially for online platforms. If this technical support program is caused by itself, the system manufacturer is expected to solve the problem. The absence of a service that will interfere with systemic problems will affect the choice.

Re-traceability, offline operation and Flexibility criteria, which are in the last three ranks, are also among the ten most important criteria chosen by experts. Features such as re-watching the lesson, rewinding, slowing down and stopping were important. In places where there is an internet problem or in case of financial difficulties, the ability of the system to work offline can also be taken into account. Personalization is the last among the ten criteria. This feature means the user can shape the system according to their needs and tastes. It was ranked tenth according to other criteria.

When the current ranking of the study is examined, the first five criteria's C1: Interaction (0.260), C4: Ease of Use (0.170), C8: Content (0.114), C2: Reliability/Security (0.096) and C3: Interface (0.080) values and the selection criteria are 0.72. It can be seen that part of current situations may have brought some selection criteria to the fore. However, criteria such as ease of use, content, reliability are still at the top.

It should not be forgotten that there are different criteria apart from these, but these have been examined since they are among the first ten criteria among the criteria. Student preferences, location, internet infrastructure, computer literacy knowledge are among the other criteria that can be listed in the system selection. The results obtained can be used directly to evaluate e-learning systems and provide important information to designers and users to improve e-learning application.

It is very important to adapt to the requirements of the age for e-learning systems that have developed over the years and technology advances. Many studies have been done on this before the Covid process, but this process has revealed more clearly the need for e-learning systems. The results obtained may differ according to the countries and the infrastructure characteristics of the countries. For example, offline working can be achieved as a higher criterion where internet infrastructure is not developed. As in many studies, ease of use, content and reliability were at the top in this study.

Implications

Differences can be obtained even if the same methods are used in the ranking results obtained in this and similar studies. The most important reasons are; the characteristics of the environment, the characteristics of the country where the study was conducted, and the differences of opinion of the experts participating in the study. E-learning systems, which were also used in the pre-Covid-19 period, were not used as a necessity at that time. In other words, people preferred one of these systems with their

preferences. However, using these systems has become mandatory during and after the Covid-19 period. For this reason, the order of the criteria may differ in the studies before and after the pandemic. While offline work is an important criterion in studies conducted in countries with poor internet infrastructure, it is natural that this criterion does not rank high in countries that do not have infrastructure problems. In societies accustomed to face-to-face education, it may become important for e-learning systems to be interactive. When the studies were examined, the security and content criteria were obtained as an important criterion in almost all studies. We can say that these two features are indispensable features of the e-learning system. For these reasons, this study reflects the views in Turkey and the post-Covid-19 situation.

Statement of Responsibility

Yasemin SÖNMEZ GÜMÜŞHAN; Literature review, data collection and data entry, writing the conclusion.

Fatma SÖNMEZ ÇAKIR; Literature review for analysis, analysis of expert opinions, data analysis and interpretation, writing the conclusion.

Conflicts of Interest

This research has no financial, commercial, legal or professional relationship with other organizations or those working with them. There is no conflict of interest that would affect the research.

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Appendix 1. First Expert Pairwise Comparison Matrix

Expert 1	C1			C2			C3			C4			C5			C6			C7			C8			C9			C10		
C1	1,00	1,00	1,00	4,00	5,00	6,00	2,00	3,00	4,00	1,00	1,00	1,00	6,00	7,00	8,00	5,00	6,00	7,00	1,00	2,00	3,00	1,00	2,00	3,00	3,00	4,00	5,00	9,00	9,00	9,00
C2	0,17	0,20	0,25	1,00	1,00	1,00	0,33	0,50	1,00	0,20	0,25	0,33	1,00	2,00	3,00	1,00	1,00	1,00	0,20	0,25	0,33	0,25	0,33	0,50	1,00	1,00	1,00	1,00	2,00	3,00
C3	0,25	0,33	0,50	1,00	2,00	3,00	1,00	1,00	1,00	0,20	0,25	0,33	2,00	3,00	4,00	1,00	2,00	3,00	0,25	0,33	0,50	1,00	1,00	1,00	1,00	1,00	1,00	4,00	5,00	6,00
C4	1,00	1,00	1,00	3,00	4,00	5,00	3,00	4,00	5,00	1,00	1,00	1,00	5,00	6,00	7,00	4,00	5,00	6,00	1,00	2,00	3,00	2,00	3,00	4,00	2,00	3,00	4,00	6,00	7,00	8,00
C5	0,13	0,14	0,17	0,33	0,50	1,00	0,25	0,33	0,50	0,14	0,17	0,20	1,00	1,00	1,00	1,00	1,00	1,00	0,17	0,20	0,25	0,17	0,20	0,25	0,25	0,33	0,50	1,00	1,00	1,00
C6	0,14	0,17	0,20	1,00	1,00	1,00	0,33	0,50	1,00	0,17	0,20	0,25	1,00	1,00	1,00	1,00	1,00	1,00	0,33	0,50	1,00	0,25	0,33	0,50	0,33	0,50	1,00	1,00	2,00	3,00
C7	0,33	0,50	1,00	3,00	4,00	5,00	2,00	3,00	4,00	0,33	0,50	1,00	4,00	5,00	6,00	1,00	2,00	3,00	1,00	1,00	1,00	1,00	2,00	3,00	1,00	2,00	3,00	6,00	7,00	8,00
C8	0,33	0,50	1,00	2,00	3,00	4,00	1,00	1,00	1,00	0,25	0,33	0,50	4,00	5,00	6,00	2,00	3,00	4,00	0,33	0,50	1,00	1,00	1,00	1,00	1,00	2,00	3,00	3,00	4,00	5,00
C9	0,20	0,25	0,33	1,00	1,00	1,00	1,00	1,00	1,00	0,25	0,33	0,50	2,00	3,00	4,00	1,00	2,00	3,00	0,33	0,50	1,00	0,33	0,50	1,00	1,00	1,00	1,00	3,00	4,00	5,00
C10	0,11	0,11	0,11	0,33	0,50	1,00	0,17	0,20	0,25	0,13	0,14	0,17	1,00	1,00	1,00	0,33	0,50	1,00	0,13	0,14	0,17	0,20	0,25	0,33	0,20	0,25	0,33	1,00	1,00	1,00

Appendix 2. Fuzzy number averages of all expert opinions (General initial matrix) Complete Version

	C1			C2			C3			C4			C5			C6			C7			C8			C9			C10		
C1	1,00	1,00	1,00	2,17	2,89	3,52	2,37	3,57	4,66	1,15	1,64	2,05	6,51	7,24	7,92	3,73	4,84	5,90	2,64	3,76	4,82	1,72	2,17	2,54	2,55	3,73	4,75	6,34	7,11	7,82
C2	0,28	0,35	0,46	1,00	1,00	1,00	1,00	1,15	1,25	0,44	0,53	0,70	1,93	3,03	4,08	1,27	1,78	2,43	0,72	1,15	1,72	0,58	0,82	1,22	0,95	1,32	1,93	2,17	2,91	3,57
C3	0,20	0,26	0,37	0,80	0,87	1,00	1,00	1,00	1,00	0,37	0,48	0,61	1,64	2,40	3,06	1,00	1,32	1,90	0,85	1,18	1,74	0,53	0,67	0,82	0,64	0,92	1,39	1,68	2,46	3,47
C4	0,49	0,61	0,87	1,43	1,89	2,27	1,64	2,09	2,72	1,00	1,00	1,00	3,23	4,44	5,56	2,17	3,31	4,38	1,64	2,76	3,82	1,15	1,58	2,05	1,64	2,11	2,49	3,52	4,72	5,83
C5	0,13	0,14	0,15	0,25	0,33	0,52	0,33	0,42	0,61	0,18	0,23	0,31	1,00	1,00	1,00	0,53	0,67	0,82	0,31	0,38	0,53	0,24	0,29	0,37	0,35	0,45	0,64	0,70	0,87	1,15
C6	0,17	0,21	0,27	0,41	0,56	0,79	0,53	0,76	1,00	0,23	0,30	0,46	1,22	1,50	1,89	1,00	1,00	1,00	0,66	0,80	1,00	0,45	0,54	0,66	0,58	0,76	1,00	1,32	1,82	2,46
C7	0,20	0,26	0,36	0,58	0,87	1,38	0,57	0,85	1,18	0,26	0,36	0,61	1,89	2,61	3,25	1,00	1,25	1,52	1,00	1,00	1,00	0,47	0,66	1,00	0,83	1,08	1,32	1,15	1,70	2,35
C8	0,39	0,46	0,58	0,76	1,15	1,64	1,22	1,50	1,89	0,47	0,61	0,83	2,70	3,45	4,10	1,52	1,86	2,24	1,00	1,52	2,14	1,00	1,00	1,00	1,06	1,64	2,22	2,55	3,20	3,81
C9	0,21	0,27	0,39	0,52	0,76	1,05	0,72	1,08	1,57	0,40	0,47	0,61	1,57	2,21	2,86	1,00	1,32	1,72	0,76	0,92	1,20	0,45	0,61	0,94	1,00	1,00	1,00	1,97	2,70	3,35
C10	0,13	0,14	0,16	0,28	0,34	0,46	0,29	0,41	0,60	0,17	0,21	0,28	0,87	1,15	1,43	0,41	0,55	0,76	0,43	0,59	0,87	0,26	0,31	0,39	0,30	0,37	0,51	1,00	1,00	1,00

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Scale Development Study for Willingness to Obtain Legal Power*

Yasal Güç Elde Etme İsteği Ölçek Geliştirme Çalışması

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ABSTRACT: The main purpose of this research is to develop a valid and reliable scale for the perception of the desire to obtain legal authority in education administration. The research sampling consists of 390 education administrators and teachers with different statuses. Using the convenience sampling technique, the types of official primary, secondary, and different high schools in the central province of Van in Turkey were determined. The scale draft was applied to the education administrators and teachers determined by using the purposeful cluster sampling method. The data were analyzed with descriptive statistical analysis methods. Validity analyses and reliability analyses of the obtained data were made. As a result of the analysis, the scale consisted of 4 factors and 32 items, and item factor loads consisted of values between "*.61*" and "*.87*". It was determined that the resulting factors explained the perception of obtaining legal power by *77.46%.* The fit index values of the scale revealed that the scale provides construct validity. While the scale's internal consistency coefficient was found to be "*.95*", the test-retest reliability coefficient was determined as "*.92*". The findings show that the developed scale can be used as a measurement tool with its validity and reliability.

Keywords: Educational administrator, legal power, willingness to obtain power.

ÖZ: Araştırmanın temel amacı, eğitim yönetiminde yasal güç elde etme isteği algısına yönelik geçerli ve güvenilir bir ölçek geliştirmektir. Araştırmanın örneklemini farklı statüdeki 390 eğitim yöneticisi ve öğretmen oluşturmaktadır. Kolay ulaşılabilir örnekleme tekniği kullanılarak Türkiye'nin Van ili merkez ilçelerindeki resmi ilkokul, ortaokul ve farklı lise türleri belirlenmiştir. Ölçek taslağı amaçlı küme örnekleme yöntemi kullanılarak belirlenen eğitim yöneticileri ve öğretmenlere uygulanmıştır. Veriler betimsel istatistiksel analiz yöntemleri ile analiz edilmiştir. Elde edilen verilerin geçerlilik analizleri ve güvenilirlik analizleri yapılmıştır. Yapılan analizler sonucunda ölçek, 4 faktör ve 32 maddeden, madde faktör yükleri *".61"* ile *".87"* arasında değişen değerlerden oluşmuştur. Elde edilen faktörlerin yasal güç elde etme algısını *%77,46* oranında açıkladığı belirlenmiştir. Ölçeğin uyum indeksi değerleri, ölçeğin yapı geçerliği sağladığını ortaya koymaktadır. Ölçeğin iç tutarlılık katsayısı "*.95*" bulunurken, test-tekrar test güvenirlik katsayısı "*.92*" olarak belirlenmiştir. Elde edilen bulgular, geliştirilen ölçeğin geçerlik ve güvenirliği ile bir ölçme aracı olarak kullanılabileceğini göstermektedir.

Anahtar kelimeler: Eğitim yöneticisi, yasal güç, güç elde etme isteği.

* This study was produced from the doctoral thesis of the first author under the supervision of the second author.

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Power is one of the oldest concepts in human history. The power phenomenon that directs human relations, which is at the basis of social life, has an important place in almost all social and political developments from the first ages to the present.

The phenomenon of power has evoked different meanings among people, and throughout history, people have sought ways to retain power, and power has always been an important value in every society (Bayrak, 2001). Power is a concept derived from the Latin word "potere", which means "power" in English. While the concept of power is briefly defined as achieving goals (Marquis & Huston, 2009), there are many different definitions in the literature. Some of those; "a person's ability to make others do his will, even if by force" (Weber, 1947), "to induce him to act as a result of social pressure applied to the individual regardless of time and place" (Mannheim, 1950), "it is the tool at the center of social relations, changing thoughts and behaviors" (Foucault, 1980) and "the ability of individuals to influence and change their thoughts, attitudes, values, needs" (Rahim, 1989).

The concept of power has always attracted people's attention, and human beings have always tried to achieve power and realize their wishes thanks to the power they have obtained (Mimaroğlu & Özgen, 2008). According to Nietzsche (1974), the existing struggles among people emerged to gain power. In the case of protecting themselves in the struggle of people against others, man has always chosen power; therefore, the will to power has been the main determinant in all areas of life. People who are in search of power have always wanted to enter into a power struggle, and this will to power has always been an ongoing desire, even if it puts their existence at risk (Soysal, 2009).

Individuals' desire to have power and the effect of power on individuals have led to discussion of the sources of power (Robbins & Judge, 2013). There are many power-type classifications in the literature. Weber (1947) classifies power as traditional, legal, and charismatic power; Yukl and Falbe (1991) classify them as institutional and individual power; French and Raven (1959) classify them as coercive, legal, charisma, reward, and expert power. While Erdoğan (2010) classifies them as technical, symbolic, cultural, human relations power, and educational power, Başaran and Çınkır (2011) classify them as legal power, authority power, reward power, punishment power, expertise, and charisma power.

When the power classifications are examined, coercive power expresses all kinds of material and moral pressure used to direct the behavior of those in the organization (Şimşek, 2010); reward power is the use of rewards in order to direct and influence the employees in the organization to the desired behavior (Hoy & Miskel, 2010); charisma power is an effective sanction that enables individuals to feel love and trust without coercion (Bayrak, 2001); the power of expertise is power arising from education and knowledge, skills, skills and experiences of managers (Lunenburg & Ornstein, 1996); legal power, on the other hand, refers to the power given to the administrators, who are appointed to the position of official authority, according to their status and that they derive from their office (Şimşek, 2010).

Administrators who use the power of reward ensure that employees comply with the orders given, even for a short time, by using their desire to win awards (Titrek & Zafer, 2009). Personality traits of administrators with charisma are effective in directing employee behaviors (Karaman, 1999). While the power of expertise is a power that

arises from the characteristics of the individual apart from institutional factors (Erkuş, 2011), legal power is a matter of administrators influencing their employees only with laws and ensuring that they comply with them (Bakan & Büyükbeşe, 2010).

This research aims to develop a scale that will reveal the perceptions and opinions of education administrators and teachers about the perception of legal power, their willingness and reasons for obtaining it, their efforts to protect and direct them, and the individual, political, social and economic obtains that are assumed to be achieved through power.

Theoretical Framework and Literature Review

The concept of power is a necessary feature for all social systems. It is seen as an indispensable basic element for all organizations and is accepted as an important phenomenon that enables the organization to realize its purpose. Power is the ability to influence what emerges in organizations (Mintzberg, 1985). In particular, the perspectives of people who are administrators in organizations and the way they obtain and protect power have been a matter of interest for all organizational components because the way power is perceived and used by administrators directs all activities of organizations and affects organizational components positively or negatively (Hodgkinson, 2008).

Power is also an important management tool that brings people together for certain purposes and enables them to work in line with the determined purpose. The most important tool that administrators have is their power, and without this power, the continuity of the organization cannot be ensured (Koşar & Çalık, 2011). Administrators use different types of power based on their positions and personality traits (Bayrak, 2001). According to French and Raven (1959), the legal power used by administrators has three basic bases. These are: It is possible for those who give importance to cultural structure in the society to exert power on others. In the hierarchical structure, there is a belief that those at the top have the right to command. The fact that sub-managers take over the authority from the top managers creates the belief that they also have power.

As in all other organizations, the existence and use of power in educational organizations is important for the organization to maintain its existence and fulfill its function. Power is the basic building block of the organization, and at the same time, it is like an engine that runs the organization (Yücel, 1999). In this respect, the success of those who have power in their organizations depends on their influencing other organizational members in line with their wishes (Şimşek, 2010). The willingness of the administrators to obtain power and the type of power they use are very important in reaching the goals of the organizations, meeting the needs of the employees, and displaying effective management (Aslanargun, 2009).

Administrators have important duties in the realization of the goals of educational organizations (Bursalıoğlu, 2016). Educational administrators manage all resources in harmony in order for the organization to be successful while reaching the goals of the organization and lead it to the desired goals (Aydın, 2010).

The manager is the most important element that uses the human and material resources of the organization effectively and efficiently (Bulut & Bakan, 2005). The willingness to obtain power and the use of power are important for managers to achieve

their goals, meet the needs of employees, and demonstrate effective management (Aslanargun, 2009).

The concept of power has always attracted people's attention, and people have always tried to obtain power and have power (Mimaroğlu & Özgen, 2008). People who want to gain power should give importance to their relations with individuals, be open to different ideas, be assertive in the work they do, try to be successful in crisis management, and always act rationally by using the ways of accessing information effectively (Can et al., 2006). Power increases with use. The positive results obtained as a result of the power used increase the desire to obtain and use power (Başaran, 2008).

The way education administrators obtain power and the way they use power affect the perspectives and behaviors of employees towards their organizations (Altınkurt et al., 2014). The ability of managers to implement organizational decisions effectively is directly proportional to the power of directing employees to targets and making their requests (Zafer, 2008).

It will be ensured that the scale obtained will measure many factors such as the personal, political, social, and economic obtains that the legal power will provide to the individual and the disadvantages it will bring. Thus, the developed scale will contribute to the field in terms of determining the advantages and disadvantages of legal power to the manager in organizations and analyzing the willingness for educational administration.

This research aims to develop a measurement tool with tested validity and reliability to determine the reasons for the willingness to obtain legal power in education administration. The main problem of the research can be explained as follows: Can a valid and reliable measurement tool be made that can measure the willingness of education administrators and teachers to obtain legal power?

Method

Scale of Willingness to Obtain Legal Power (SWOLP) was developed to determine the perceptions of education administrators and teachers about their willingness to obtain legal power. The research was found ethically appropriate with the decision of the 3rd session of Inonu University RPEC dated 27.07.2021 and numbered 7. The scale was developed in stages such as defining the scope of the scale, literature review, interviewing the education administrators, creating an item pool, taking the opinions of field experts, determining the content validity, developing the draft form of the scale, and conducting the analysis of validity and reliability (Balcı, 1995).

Participants

The participants of this research consist of 390 education administrators and teachers with different statuses. While exploratory factor analysis was performed with 206 educators, confirmatory factor analysis was performed with 184 educators. Education administrators and teachers voluntarily participated in the research. By using the convenience sampling method, the types of official primary, secondary, and different high schools in the central districts of Van province in Turkey were determined.

The draft form of the scale was applied to educational administrators and teachers of different statuses working in these schools. Of the educational administrators and teachers who participated in the study, 51.5% were male and 48.5% were female. 69.2% of the participants were teachers, 22.8% were assistant principals and 8% were school principals. Of the educational administrators and teachers, 39.5% had a professional seniority of 1-5 years, 26.7% had a professional seniority of 6-10 years, 17.9% had a professional seniority of 11-15 years and 15.9% had a professional seniority of 16 years or more. 91.3% of them have undergraduate education, 8.7% have postgraduate education, 41.8% work in primary schools, 32.6% in secondary schools and 25.6% in different types of high schools.

Development of the Measurement Tool

In the process of developing the Scale of Willingness to Obtain Legal Power (SWOLP) trial form, first of all, the relevant literature was examined (Aslanargun, 2009; Aslanargun & Eriş, 2013; Başaran, 2008; Bayrak, 2001; Foucault, 1980; Karakaş, 2020; Koşar, 2016; Kutlu, 2019; Mannheim, 1950; Özkalp & Kırel, 2011; Pfeffer, 1999; Weber, 1947). Types of power in the literature, approaches to organizational power, sources of power, and scales based on these approaches have been reviewed. As a result of the examination, no scale was found for the willingness to obtain legal power in the country and abroad.

In addition to the theoretical information, the current practices of educational administration in Turkey and the relevant legislation prepared over the years on this subject were examined in the literature review. While preparing the scale draft form, besides the personal experiences and observations of the researchers, open-ended questions about the status of educational administrators, the process of obtaining them, the authorities and responsibilities of the status holders, and the personal views of the education administrators on the administrative processes were used.

In accordance with the scope and construct validity studies of the prepared scale, it was given to a total of six experts, three of which are education administration field experts, one assessment and evaluation specialist, and two language specialists, to be evaluated in terms of scope, clarity, measurability, and clarity. The draft form was finalized according to the suggestions received. For expert evaluation, a form was prepared using the Davis technique. In this form, which was sent by e-mail for expert evaluation, the statements in the scale were evaluated as "very appropriate," "appropriate," "somewhat appropriate," and "not appropriate." The number of those who marked "very appropriate" and "appropriate" for the content validity index (CGI) value was divided by the total number and found to be *0.88.*

As a result of the comprehensive evaluations, an item pool of 42 items was created by paying attention to the equal distribution of positive and negative items. Tezbaşaran (2008) states that it would be appropriate to keep the number of positive and negative expressions in the scale close to each other in order to prevent the meaning load of attitude expressions from directing the respondents. While creating the items with this reference, the number of positive and negative expressions was kept equal. One item was removed from the scale because its content validity index was less than *.80*. Thus, a draft form consisting of 41 items was created.

Before applying the validity of the scale, a pilot application was made to 50 participants by the researchers. With this pilot application, corrections were made about the questions the participants had difficulty understanding, and the application was started on the sample determined for the research.

The draft scale form was arranged as a five-point Likert scale, as "1- Strongly Disagree, 2- Agree Little, 3- Agree Slightly, 4- Agree Strongly, 5- Agree Completely" in order to determine the degree of agreement of education administrators and teachers with the expressions. A high score on the scale was evaluated as a high level of willingness to obtain legal power, while a low score was evaluated as a low level of willingness to obtain power.

Data Collections and Analysis

The trial form was applied to the education administrators and teachers working in the official primary, secondary, and different types of high schools located in the central province of Van districts in Turkey. While the trial form of the scale was applied face to face by the researchers to some of the education administrators and teachers who agreed to participate in the research, an explanatory briefing was given to the others, and the scale link prepared with Google Form was sent, and answers were received.

In the literature, there are different opinions regarding the ratio of scale items regarding the number of the research group. Kline (1994) determined the number of research groups at least twice the number of items in the scale; Nunnally (1978), at least ten times; Cattell (1978), three or six times; Hair et al. (2010) state that it should be at least five times or more. The proportion of the research group and the number of items can provide an appropriate estimate of the population. Parameters lower than the specified proportions may give misleading results (Tavşancıl, 2006; Karasar, 2010; Tabachnick & Fidell, 2001). In this context, the pre-application of the prepared scale form was carried out with a total of 400 educators, including 122 education administrators and 278 teachers. Among the collected forms, 10 forms that were not suitable for processing due to different reasons (incomplete and incorrect marking, etc.) were excluded from the evaluation. Therefore, 390 scale forms were used in total.Thus, data from 206 education administrators and teachers were subjected to exploratory factor analysis, and data from 184 education administrators and teachers were subjected to confirmatory factor analysis.

The data were analyzed using descriptive statistical analysis methods. Validity and reliability analyses were applied to the resulting data. Exploratory and confirmatory factor analysis was performed for the construct validity studies of the scale. The internal consistency coefficient (Cronbach's Alpha) and test-retest reliability were calculated for reliability analysis.

Before applying the factor analysis, the Kaiser-Meyer-Olkin (KMO) coefficient of the data was calculated. Data were analyzed using Barlett's Test of Sphericity. Exploratory Factor Analysis (EFA) was first applied based on the findings. In EFA, "Promax," one of the oblique rotation methods, was used. Then, the scale was examined by Confirmatory Factor Analysis (CFA) using the maximum likelihood technique.

In the evaluation of the fit between the model resulting from the factor analysis and the data, criteria such as chi-square value (CMIN), chi-square degrees of freedom

ratio (CMIN/*df*), adjusted index of fit (AGFI), goodness of fit index (GFI), normed fit index (NFI), incremental fit index (IFI) were used to evaluate the fit between the model and the data resulting from the factor analysis, comparative fit index (CFI), root mean square error of approximation (RMSEA) were used. The square root of the mean explained variance values were analyzed within the scope of discriminant validity analysis. In the content validity analysis, the Content Validity Ratios (CVR) and Content Validity Indexes (CGI) of the items were examined based on expert opinions.

Findings

In this section, there are findings related to the validity analysis and reliability analysis conducted to develop the "Scale of Willingness to Obtain Legal Power" (SWOLP) *(for details, see Annex 1).*

Construct Validity

Construct validity includes analyses made in the form of determining whether the questions formed to measure any variable are related to the variable and whether they measure the variable. Hypothesis testing and factor analysis are frequently used methods to determine construct validity (Büyüköztürk et al., 2008). In order to reveal the construct validity, the factor analysis method was applied. Factor analysis is the creation of general variables called factors as a result of bringing together highly correlated variables (Kalaycı, 2010). Factor analysis comes in two forms: EFA and CFA.

In the research, first of all, the data of the KMO coefficient and Bartlett's Sphericity Test were reviewed to reveal the data's suitability for factor analysis. The results of KMO and Bartlett's Sphericity Test are given in Table 1.

Table 1

KMO Test and Bartlett's Sphericity Test Results

KMO Test		.92
Bartlett's Test of Sphericity	x^2	1689.82
	Df	496
	sig.	.00*

p<.05

According to Table 1, the result of the KMO test was determined as *.92*. *Barlett's Test of Sphericity* was found to be significant (x^2=1689.82; *df*=496; *p*<.05). While the KMO test is used to determine the suitability of the number of samples taken while performing the factor analysis, the significance of the Bartlett's Sphericity test indicates that it is appropriate to perform the analysis. KMO value is defined as "*.50-.70*=intermediate level", "*.70-.80*=good level", "*.80-.90*=very good level" and "*.90* and above=excellent level" (Field, 2002). The fact that the KMO value obtained is .92 and Bartlett's Test of Sphericity is significant (*p*<.05) indicates that the research group is sufficient and the data are suitable for factor analysis.

Exploratory Factor Analysis (EFA)

EFA determines the similarity of the factors that emerge as a result of the analysis with the determined theory structures (Çokluk et al., 2014). In the study, data collected from 206 education administrators and teachers were subjected to exploratory factor analysis. In the exploratory factor analysis, while constructing the factor structure, item factor loading values of *.45* or higher, eigenvalues of 1 or higher for each factor, and a difference of at least *.10* between the load values of the two items were taken into consideration, among the criteria specified by Büyüköztürk (2009). According to these criteria, nine items that were determined to be unsuitable were removed from the scale. The remaining 32 items were analyzed. The results of factor analysis for scale items are shown in Table 2.

Table 2

Scale of Willingness to Obtain Legal Power Factor Analysis

Item Number	Factor Load	Item Total Correlation Coefficient	Item Number	Factor Load	Item Total Correlation Coefficient
1	.75	.57	17	.87	.57
2	.73	.66	18	.87	.57
3	.75	.58	19	.73	.59
4	.69	.62	20	.81	.54
5	.63	.55	21	.76	.54
6	.79	.56	22	.80	.58
7	.84	.64	23	.77	.63
8	.85	.62	24	.76	.57
9	.77	.52	25	.75	.59
10	.68	.57	26	.70	.60
11	.75	.62	27	.73	.61
12	.76	.65	28	.84	.67
13	.72	.64	29	.76	.61
14	.61	.51	30	.84	.63
15	.83	.60	31	.85	.64
16	.83	.61	32	.84	.66

As seen in Table 2, factor loads of 32 scale items range from "*.61*" to "*.87*". The total correlation coefficients of the items are between "*.51*" and "*.67*" values. Basic axes factor analysis Promax rotation technique was applied to determine which factors (dimensions) the scale items were in. The promax rotation technique is the most appropriate method used to obtain a meaningful structure and several factors by revealing the factors related to each other (Tatlıdil, 1992). In order for the research data to yield appropriate results, after the horizontal rotation analysis, the factors were

clearly revealed. The factors and factor loads of the scale items resulting from Promax rotation are given in Table 3.

Table 3

Factor Loads Obtained by Promax Rotation of Scale Items

1 Individual Obtain		2 Political Obtain		3 Social Obtain		4 Economic Obtain	
Item Number	Factor Load	Item Number	Factor Load	Item Number	Factor Load	Item Number	Factor Load
8	.93	30	.96	17	.97	20	.93
7	.90	29	.87	18	.94	24	.88
9	.88	28	.86	16	.92	25	.83
1	.88	31	.85	15	.86	21	.83
6	.88	27	.84	14	.84	23	.74
3	.87	32	.82	19	.79	22	.72
12	.85	26	.80	13	.68		
11	.84						
2	.82						
10	.80						
5	.80						
4	.77						

As seen in Table 3, 32 items in the scale were divided under 4 factors as a result of Promax rotation. There are 12 items under the first factor, 7 under the second and third factors, and 6 under the fourth factor. In the first factor, there are 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 items with load values between .77 and .93. In the second factor, there are 26, 27, 28, 29, 30, 31, 32 items with load values between .80 and .*96*. In the third factor, there are 13, 14, 15, 16, 17, 18, 19 items with load values between .*68* and .*97*. In the fourth factor, there are 20, 21, 22, 23, 24, 25 items with load values between .*72* and .*93*.

The common features of the items revealed by the analyses should be examined, and a suitable naming should be made according to the factors in which they are included (Karagöz & Köstereliođlu, 2008). In this context, based on the common characteristics of the items, the first factor was named as “individual obtain”, the second factor as “political obtain”, the third factor as “social obtain” and the fourth factor as “economic obtain”. Table 4 shows the eigenvalues of these factors.

Table 4

Eigenvalues of the Scale of Willingness to Obtain Legal Power Factors

Factor	Eigenvalue	Variance (%)	Cumulative (%)
1. Individual Obtain	13.03	24.36	65.18
2. Political Obtain	7.53	18.09	36.72
3. Social Obtain	2.57	11.04	25.09
4. Economic Obtain	1.65	9. 17	77.46

When Table 4 is examined, the eigenvalue of the first factor in the scale consisting of four factors is *13.03*, the eigenvalue of the second factor is *7.53*, the eigenvalue of the third factor is *2.57* and the eigenvalue of the fourth factor is *1.65*. Considering the values obtained, the first factor of the scale is *24.36%* of the perception of the desire to gain legal power; the second factor is *18.09%;* the third factor is *11.04%;* the fourth factor explains *9.17%*. The total variance of the scale factors is *77.46%*. It was found that the factors obtained in this case explained the perception of the willingness to obtain legal power by *77.46%*.

Confirmatory Factor Analysis (CFA)

CFA is an analysis method applied to ensure that the previously created structure is verified by looking at the resulting data (Yaşlıoğlu, 2017). The scale structure, which was determined as four factors by EFA, was examined by CFA, and findings supported by the results of the first analysis were obtained. Data from 184 education administrators and teachers were subjected to confirmatory factor analysis. The factor structure that emerged after the analysis is given in Figure 1.

As can be seen in Figure 1, when the scale items are examined, the *1.-3., 1.-5., 8.-10., 13.-17., 14.-16., 20-22.* and *27.-28.* The error covariances among the items were quite high. According to this result, confirmatory factor analysis was repeated by correlating error covariances. After the analysis, chi-square value (CMIN), chi-square degree of freedom ratio (CMIN/*df*), root mean square error of approximate errors (RMSEA), normed fit index (NFI), comparative fit index (CFI), incremental fit index (IFI), root mean square value (RMR), goodness of fit index (GFI), and adjusted fit index (AGFI) were examined. The goodness-of-fit measures of the scale are shown in Table 5.

Figure 1

Factor Structure of the Scale of Willingness to Obtain Legal Power

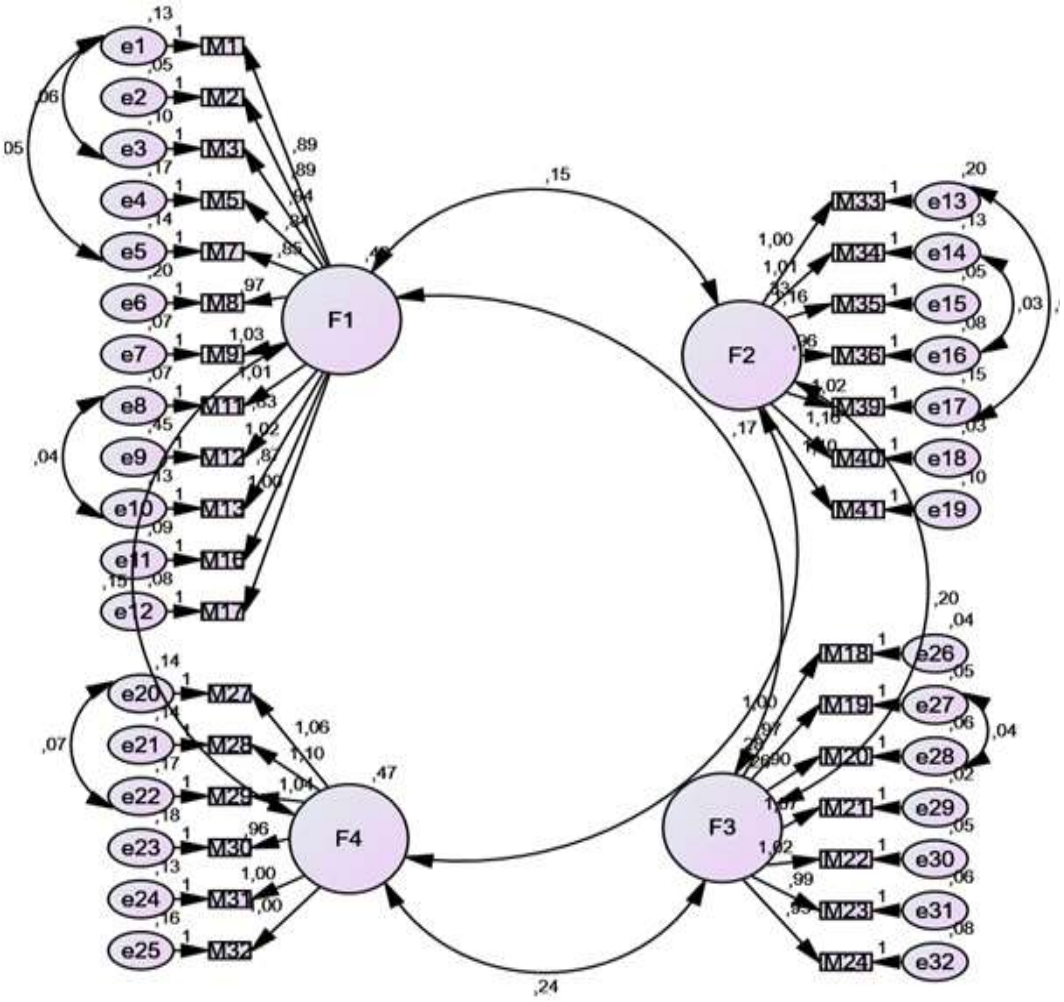

Table 5

Standard Goodness of Fit Criteria of the Scale of Willingness of Obtain Legal Power

CMIN	df	CMIN/ df	RMSEA	NFI	CFI	IFI	RMR	GFI	AGFI
634.48	451	1.40	.04	.92	.97	.97	.02	.82	.80

As seen in Table 5, *CMIN*= 634.48, *df*=451, *CMIN/df*=1.40; *RMSEA*=0.4; *NFI*=.92; *CFI*=.97; *IFI*=.97; *RMR*=.02; *GFI*=.82; *AGFI* = .80. According to Şimşek (2007), "CMIN/*df*" should be two or less than two, RMR and RMSEA should be less than *.08,* and NFI, IFI and CFI higher than *.90* indicate that the model is good. According to Segars and Grover (1993), it is acceptable for *AGFI* and *GFI* values to be greater than *.80.* The analysis results reveal that the scale provides construct validity and has good goodness-of-fit values. In terms of discriminant validity values of the scale, Table 6 shows the correlation matrix between the scale factors and the square root of the mean explained variance values.

Table 6

Correlation Matrix Between Scale Factors and Square Root of Mean Explained Variance Values (SREMEV)

Factor	1	2	3	4	SREMEV
1.Individual Obtain	**.88**				.74
2.Political Obtain	.01	**.82**			.68
3.Social Obtain	.45	.30	**.78**		.55
4.Economic Obtain	.55	.06	.35	**.76**	.69

When Table 6 is examined, the dark values represent the square root of the mean explained variance values as the diagonals of the matrix; on the other hand, open values express the correlation values between the factors as those outside the diagonal of the matrix. Accordingly, since the diagonal values calculated in all dimensions are larger than the off-diagonal values, it shows that the discriminant validity of the scale is provided.

Content Validity

Content validity is the determination of whether the scale items are suitable for the purpose and whether they contain the feature to be measured, with the opinions of field experts (Karasar, 2010). This study examined the literature in detail, and a 42-item draft scale form was prepared for the desire to gain legal power. This form, which was created later, was examined by a total of 6 experts, 3 of which are educational administration field experts, 1 assessment and evaluation specialist, and 2 language specialists, in order to be evaluated in terms of scope, comprehensibility, measurability, and clarity. After the opinions received, the Content Validity Ratio (CVR) of the scale was calculated as *.94*, while the Content Validity Index (CVI) for the whole scale was calculated as *.59*. Based on the content validity rates developed by Yurdugül (2005), 1 item below *.80* was removed from the scale. The scale draft form, which was determined as 41 items, was determined as 32 items after the analysis.

Reliability Analysis

Reliability is that the measurement tool can give the same results when repeated under the same conditions (Ergin, 1995). It consists of reliability, sensitivity, consistency, and stability sub-dimensions. Of these, the sensitivity depends on the units included in the measuring instrument. The small gap between these units increases the sensitivity. Consistency is expressed as that the measured property of each item is close to the property measured by the whole test. On the other hand, stability is getting similar results in subsequent measurements (Tezbaşaran, 2008). The reliability coefficient is between *0-1*. As this value approaches 1, the scale becomes reliable (Ural & Kılıç, 2006). In order to ensure the reliability of the scale, the internal consistency coefficient and test-retest reliability coefficient were calculated. Table 7 shows the factors of the scale and the reliability coefficients for the whole.

Table 7

Reliability Coefficients of the Scale of Willingness to Obtain Legal Power

Factors	Number of Items	Internal Consistency Coefficient (Cronbach's Alpha)	Structural Reliability
Factor 1	12	.97	.92
Factor 2	7	.96	.86
Factor 3	7	.95	.82
Factor 4	6	.94	.80
SWOLP	32	.95	.94

When the data in Table 7 are examined, the internal consistency of the four-factor scale is *.94-.97*. The structural reliability coefficient of the four factors varies between *.80* and *.94*. The internal consistency coefficient of the entire scale was found to be *.95*. The structural reliability was found to be *.94*. As another analysis to ensure reliability, the test-retest reliability coefficient was calculated. In this context, data obtained from 16 education administrators and 24 teachers who did not participate in the first survey two weeks after the first survey were analyzed. The test-retest coefficient was calculated as "*.92*". This coefficient reveals that the scale is stable.

Discussion and Conclusion

While power is a very important concept both in daily life and in the field of organizational management, it is a phenomenon that is present in all relations between people in society. There is no social environment in which the individual with power does not exist. According to Russell (1990), it is a relational concept in the form of the ability to direct others to behave in the direction desired by the individual. Anderson and Brion (2014), on the other hand, defined it as having asymmetrical control over valuable resources. These resources are monetary, such as salaries and bonuses; social, such as dignity and social participation; and physical, such as working conditions and places.

Regarding the sources of power and where it comes from, it is possible to say that the social, political, economic, and individual activities that make up this power affect the formation of power (Bayrak, 2001). Research findings by Greene and Elffers (2005) and Liu and Fang (2006) stated that individuals want more power because of their personal characteristics. The study conducted by Özkalp and Kırel (2011) revealed that individuals with a high need for power exhibit behaviors to influence others and show their power by keeping their personal characteristics in the foreground and using their status.

This study aimed to develop a scale to determine why people are willing to obtain legal power in education administration. The developed "Scale of Willingness of Obtain Legal Power" (SWOLP) is a scale developed as a five-point Likert scale with 32 items and four factors, the validity and reliability of which have been ensured. The scale development work was started with a literature review, an open-ended interview form was prepared, and the views of education administrators and teachers were used.

A draft containing 42 items was prepared by synthesizing both the literature information and the views of education administrators and teachers. The scale, which was prepared to measure the perceptions of researchers about their willingness to obtain legal power, was evaluated in terms of scope, clarity, measurability, and clarity to the opinion of a total of 6 experts, 3 of which are education administration field experts, 1 assessment and evaluation expert and 2 language experts. As a result of the Content Validity Ratio (CVR) evaluation, 1 item with a value below *.80* was removed from the pool. Using the remaining 41 items in the draft form, it was applied to 390 participants.

Content validity and construct validity analyses were applied for the validity analysis of the scale. CVR and CVI were calculated based on expert opinions in content validity studies. EFA and CFA were performed in construct validity studies. In the study, the KMO test was determined as *.92*, and Barlett's Test of Sphericity was significant (p<.05). The data were at a suitable level for factor analysis. Within the scope of EFA, 9 items were removed from the scale because some items were below *.45*.

In order to determine the factor number of the scale, basic axes factor analysis Promax rotation technique was applied, and the scale consisted of 32 items and 4 factors. Under the first factor, 12 items had load values between *.77* and *.93*. In the second factor, 7 items had load values between *.80* and *.96*. In the third factor, 7 items had load values between *.68* and *.97*, and in the fourth factor, load values There were 6 items between *.72* and *.93*.

The factors obtained were named by taking into account the common characteristics of the items. In this context, the first factor was named as "individual obtain", the second factor as "political obtain", the third factor as "social obtain" and the fourth factor as "economic obtain". In the "individual obtain" dimension, educational administrators and teachers gain power based on legal power, job performance, responsibility, professional competence, vision, leadership, rational decision making and conflict management skills. The "political obtain" dimension includes educational policy, professional career opportunities, and sanctioning power, while the "social obtain" dimension includes the expansion of the social circle, acquisition of communication skills, and increased social prestige. The "economic obtain" dimension consists of increased income, improved living standards and working conditions.

The total variance of the scale factors is *77.46%*. It was found that the factors obtained in this case explained the perception of the willingness to obtain legal power by *77.46%*. The goodness of fit values obtained from the research were *CMIN= 634.48, df=451, CMIN/df=1.40, RMSEA=0.4, NFI=.92; CFI=.97; IFI=.97; RMR=.02; GFI=.82; AGFI=.80* that the scale provides construct validity. The fact that the diagonal values calculated as a result of the research are larger than the off-diagonal values indicates that the discriminant validity of the scale is provided. While the scale's internal consistency coefficient (*Cronbach's Alpha*) was found to be "*.95*," the test-retest reliability coefficient was determined as "*.92*".

The findings of this research show that the Scale of Willingness to Obtain Legal Power (SWOLP) can be used as a valid and reliable scale. This scale can be used in research to measure the perceptions of educational administrators about their

willingness to obtain legal power, or it can be adapted to measure the perceptions of different occupational groups regarding their willingness to obtain legal power.

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Statement of Responsibility

The research was produced from the doctoral thesis titled "The Willingness to Legal Power in Education Management resolution in the Context of Political Behaviors Exhibited" conducted by Yalçın Varol YILDIZBAŞ under the supervision of Assoc. Prof. Sevim Öztürk.

Conflicts of Interest

This research is derived from a doctoral thesis. There is no conflict of interest between the authors.

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Annexes

Annex 1: Scale of Willingness of Obtain Legal Power (SWOLP)

After carefully reading each of the following statements, To what extent you agree, mark the appropriate option with an "X". by marking (X). **Legal power, individual/individual;**	**Never Agree**	**Little Agree**	**I Agree A Little**	**I agree a lot**	**I totally agree**
1. It enables them to make rational decisions at the organizational level.	①	②	③	④	⑤
2. Increases work performance	①	②	③	④	⑤
3. Increases responsibilities	①	②	③	④	⑤
4. Increases professional competence	①	②	③	④	⑤
5. Allows you to achieve your goals	①	②	③	④	⑤
6. Enhances your vision	①	②	③	④	⑤
7. Prevents professional burnout	①	②	③	④	⑤
8. Increases enterprise uptime	①	②	③	④	⑤
9. Develops leadership skills	①	②	③	④	⑤
10. Provides problem solving skills	①	②	③	④	⑤
11. Affects mental health	①	②	③	④	⑤
12. Provides conflict management skills	①	②	③	④	⑤
13. Improves social relations	①	②	③	④	⑤
14. Makes it difficult to establish informal relationships	①	②	③	④	⑤
15. Increases communication skills	①	②	③	④	⑤
16. Makes it easy to collaborate	①	②	③	④	⑤
17. Makes it tolerant towards stakeholders	①	②	③	④	⑤
18. Increases social reputation	①	②	③	④	⑤
19. Makes it easier to establish authority over others	①	②	③	④	⑤
20. Increases the income	①	②	③	④	⑤
21. It raises the standard of living	①	②	③	④	⑤
22. Improves working conditions	①	②	③	④	⑤
23. Causes unfair advantage	①	②	③	④	⑤
24. Provides an opportunity to earn additional income	①	②	③	④	⑤
25. Causes more spending	①	②	③	④	⑤
26. Provides opportunity to determine education policy	①	②	③	④	⑤
27. Strengthens relationships with top management	①	②	③	④	⑤
28. Provides professional career opportunities	①	②	③	④	⑤
29. Increases organizational recognition	①	②	③	④	⑤
30. Facilitates participation in union activities	①	②	③	④	⑤
31. Increases enforcement power	①	②	③	④	⑤
32. Causes political behavior	①	②	③	④	⑤

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Self-compassion and School Burnout in Adolescents During the Lockdown Period: The Parallel Mediator Role of Intolerance of Uncertainty and Positivity

Karantina Döneminde Ergenlerde Öz-şefkat ve Okul Tükenmişliği: Belirsizliğe Tahammülsüzlük ve Pozitifliğin Paralel Aracı Rolü

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ABSTRACT: This research aims to investigate the parallel mediating role of intolerance of uncertainty and positivity on the relationship between self-compassion and school burnout. Hypotheses were tested in a sample of 304 Turkish adolescents using mediation analysis). The research consists of data obtained during the lockdown caused by Covid-19 in Türkiye. School Burnout Inventory, Positivity Scale, Self-Compassion Scale Short Form, and Intolerance of Uncertainty Scale measurement tools were applied online. Data were analyzed using correlation and parallel mediation analysis (Hayes's PROCESS). The results showed that intolerance of uncertainty and positivity mediated the indirect effect of self-compassion on school burnout. Investigating both negative and positive psychological variables in explaining school burnout can support interventions and policies to be planned in the school environment.

Keywords: Self-compassion, intolerance of uncertainty, positivity, school burnout, adolescent.

ÖZ: Bu araştırma, belirsizliğe tahammülsüzlük ve pozitifliğin öz-şefkat ile okul tükenmişliği arasındaki ilişkideki paralel aracı rolünü araştırmayı amaçlamaktadır. Hipotezler, aracılık analizi kullanılarak 304 Türk ergenden oluşan bir örneklemde test edilmiştir. Araştırma, Türkiye'de Covid-19'un neden olduğu karantina sırasında elde edilen verilerden oluşmaktadır. Okul Tükenmişlik Ölçeği, Pozitiflik Ölçeği, Öz-Şefkat Ölçeği Kısa Formu ve Belirsizliğe Tahammülsüzlük Ölçeği katılımcılara online olarak uygulandı. Veriler korelasyon ve paralel aracılık analizi (Hayes'in PROCESS) kullanılarak analiz edilmiştir. Sonuçlar, öz-şefkatin okul tükenmişliği üzerindeki dolaylı etkisinde, belirsizliğe tahammülsüzlük ve pozitifliğin aracılık etkisi olduğunu göstermiştir. Okul tükenmişliğini açıklamada hem olumlu hem de olumsuz psikolojik değişkenlerin araştırılması, okul ortamında planlanacak müdahale ve politikaları destekleyebilir.

Anahtar kelimeler: Öz-şefkat, belirsizliğe tahammülsüzlük, pozitiflik, okul tükenmişliği, ergen.

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Adolescents experience negative emotions more frequently than children and adults (Gross, 2014), and there are fluctuations in self-perceptions (Temel & Aksoy, 2010). Students spending most of their day in school (Kaynak & Işık, 2019) can also experience these fluctuations in a school setting. In the recent COVID-19 global pandemic, which has affected all areas of life, it is observed that students have negative feelings of stress (Ellis et al., 2020), anxiety (Bakioğlu et al., 2021), depression (Fazeli et al., 2020), intolerance of uncertainty (Deniz, 2021; Satıcı et al., 2020). School burnout is another harmful practical problem often referred to in educational environments (Salmela-Aro & Tynkkynen, 2012; Yıldız & Kılıç, 2020). The study of internal processes that lead to burnout is essential to provide insight into what hampers the development of burnout (Lee & Lee, 2020).

The concept of burnout had to wait until 1970-1980, when it became notable in the scientific world (Freudenberger, 1974; Maslach & Jackson, 1981). In the following years, there was a growing perception that burnout could occur in any area of life (Salmela-Aro et al., 2009; Schaufeli et al., 2002). School burnout is a term when there is a lack of self-sufficiency due to intense academic demands in which the student is required to use their psychological resources effectively (Aypay, 2011; Salmela-Aro et al., 2009; Salmela-Aro & Tynkkynen, 2012; Salmela-Aro & Upadyaya, 2014).

According to the social cognitive theory (Bandura, 1977), widely used in explaining school burnout, the feelings of self-sufficiency, an internal resource, play an essential role in school burnout. From this theory's perspective, self-aware perceptions affect school burnout. Because school burnout occurs when self-expectations conflict with external expectations (Schaufeli et al., 2002), another school burnout model, the Demand/Resource Model, argues that when the emotional compulsion-causing effects (demands) cannot be met through internal or external resources, they reveal school burnout due to negative mood such as failure, stress, and anxiety (Bakker & Demerouti, 2017; Salmela-Aro, & Upadaya, 2014). Accordingly, it is possible that self-compassion, which affects self-acceptance with strengths and weaknesses and conscious-awareness status (Neff, 2003), may be associated with school burnout. Students who may be harsh in their reasoning and criticism (Gilbert & Irons, 2009), particularly in the face of pain and discomfort, are likely to feel tired, exhausted, and consumed (McNamara, 2000). The decline in their self-compassion sets the stage for the establishment of beliefs that the school is not necessary or beneficial for them, and the student is unable to perform the work required by the school (Aypay & Eryılmaz, 2011; Aypay & Sever, 2015; Kahill, 1981; Schaufeli et al., 2002). Self-compassion makes it easier for the person to cope with adverse events, and it is seen that it is negatively related to the variables anxiety, depression, anxiety, and anger (Allen & Leary, 2010). Few studies have shown a negative relationship between self-compassion and school burnout (Barnett & Flores, 2016). The compassion and understanding of individual attributes to his/her self may be a key means of coping with the feelings of guilt, unhappiness, hopelessness, desperation, and loneliness experienced as a result of burnout (Kahill, 1981). So, a strong linear relationship between self-compassion and school burnout is envisaged. There is a negative relationship between self-compassion and school burnout (H1).

Intolerance of uncertainty as a mediating role

Intolerance of uncertainty can be briefly expressed as negative automatic reactions/trends to unforeseen circumstances (Buhr & Dugas, 2002; Carleton et al., 2007; Freeston et al., 1994). These reactions may involve erroneous interpretations and lead to altered thoughts, feelings, and behaviors (Carleton, 2012). Possible emotional reactions can be fear or anxiety, and similar negative reactions can be generalized or deflected into an individual's emotional and cognitive functions (Furnham & Marks, 2013). Anger and anxiety directed at oneself and intolerance of uncertainty may play a role in burnout (Barnett & Flores, 2016). Especially considering the remote education obligations and effects of COVID-19's post-pandemic uncertainty (i.e., lockdown), it recently revealed that students' intolerance of uncertainty has increased and may mediate burnout in the school environment. Indeed, a study found that intolerance of uncertainty is instrumental in the relationship between technostress and school burnout (Zhao et al., 2022). Similarly, it has been found that intolerance of uncertainty predicts academic self-sufficiency negatively (Uzun & Karatas, 2020). This is why intolerance of uncertainty in reducing burnout in the educational environment is striking (Xu & Ba, 2022). Stress reactions accompany intolerance of uncertainty, and individuals may feel powerless against difficulties (Chen & Hong, 2010). These emotions, which cause a decrease in self-compassion, can increase intolerance towards uncertainty and lead to school burnout.. Intolerance of uncertainty is associated with self-compassion (Deniz, 2021; Tang, 2019) and burnout (Poluch et al., 2022; Zhao et al., 2022). Both the theoretical structure and research suggest that intolerance of uncertainty may play a mediating role between the two variables. Therefore, the second hypothesis is the intolerance of uncertainty mediating between self-compassion and school burnout (H2).

Positivity as a mediating role

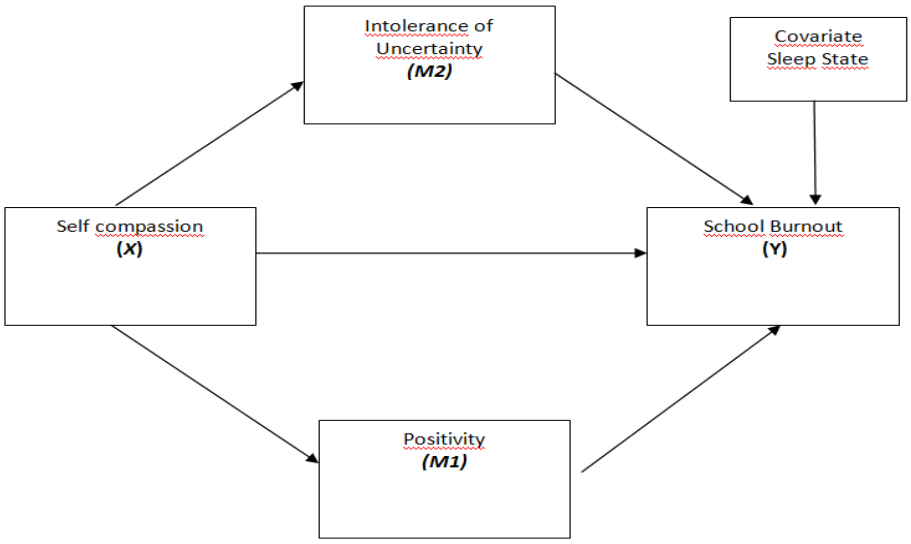
Positivity is individuals' tendency to consider themselves, their ongoing life events, and their future positively (Caprara et al.,2010). Studying the effects of positivity in school, which is for most of life, will help understand students' problems in adulthood. Positivity, a mediating variable in this study, is evaluated from the perspective of a positive education approach (Waters, 2011) and positive youth development (Lerner et al., 2003), considering the impact of positive psychology on education. Indeed, it is known that positive emotions have a meaningful effect on learning behavior (Holzer et al., 2021), and positivity has a mediating role in models that are linked to student's academic achievements (Zhou et al., 2021). Additionally, adolescents with high positivity communicate better with both peers and teachers (Luengo Kanacri et al., 2017). Because positivity includes a somewhat unified notion of well-being (Caprara et al., 2017), the negative meaningful relationship between subjective good and school burnout (Aypay & Eryılmaz, 2011); moreover, the finding that school burnout will be reduced in adolescents through subjective good behavior (Aypay, 2017) suggests that positivity may predict school burnout, too.

Moreover, self-compassion seems to develop a positive psychological process, helping get protection against the negative effects of challenging life events such as stress (Allen & Leary, 2010). We hope that the increase in self-compassion and the decrease in school burnout will be through increased positivity. Evidence suggests that low positivity leads to burnout in business life (Dönmez & Tuğba, 2021; Meyers & van

Woerkom, 2017). A limited number of studies examining school burnout in students demonstrate that positivity significantly predicts burnout (Boyacı & Özhan, 2021). However, no studies have examined the relationship between positivity and school burnout in Turkish adolescents. Therefore, the third hypothesis is as follows: Positivity is a mediating between self-compassion and school burnout (H3).

Figure 1

Hypothetical Model



Present Study

Adolescents are more at risk of burnout than those who suffer from an occupational domain (Bask & Salmela-Aro, 2013; Salmela-Aro & Tynkynen, 2012). School burnout has many negative outcomes, such as academic underperformance (Seibert et al., 2017), school dropout (Bask & Salmela-Aro, 2013), and diminished cognitive performance (May et al., 2015). Several studies emphasize that self-compassion development can help prevent burnout, and it negatively correlates (Barnett & Flores, 2016; Coaston, 2017). However, the study of the relationship between self-compassion and burnout has often been shown to address health and occupational burnout (Dönmez & Tuğba, 2021; Satake & Arao, 2020; Yu et al., 2021). Additionally, there is a gap in the literature about decreasing school burnout and investigating its reasons for Turkish adolescents. There is no research on the superficial relationships between self-compassion and school burnout in Turkish adolescents. It is hoped to make a start by exploring these relationships. Furthermore, examining these four variables in an integrated framework not only explains how self-compassion affects school burnout but also provides insights into the differential effects of each mechanism under parallel mediation. In this research, we based the theory of Self-efficacy when examining school burnout. The main purpose of this research is to investigate the role of intolerance of uncertainty and positivity in the relationship between self-compassion and school burnout.

Control Variable

During the COVID-19 pandemic, school holidays have altered the sleep status of students (Stern et al., 2020). Inadequate sleep may lead to burnout (Söderström et al., 2012). Studies have shown that adolescents with sleep disorders are more likely to experience school burnout, and sleep quality predicts school burnout (Lehto et al., 2019; Liu et al., 2021). Students who have uncertainties about how long the epidemic will last might also have an affected sleep status. Research on the relationship between school burnout and sleep status in Turkish adolescents is limited. However, the literature suggests that sleep states affect school burnout. Therefore, adolescents' sleep state is defined as a control variable to improve the validity of this study and assess the model holistically.

Method

Participants and Ethical Procedures

We collected data online (Google Form) between May and June 2021 following the approval of the Inönü University's Scientific Ethics Review Board (12/10/2021-E.97177) and the National Education Directorate. Conditions required for collecting data online. Because at that time, there was a lockdown caused by COVID-19. The parents were informed about the research through the WhatsApp app. Volunteer students from eight schools in Eastern Türkiye participated in the research. The schools in the sample were selected using the convenience sampling method. Approval for participation was obtained from the parents of the students. The questionnaires took approximately 15-20 min to complete. Vocational high schools (n = 114, 37.5 %), Science high schools (n = 70, 23.0 %), Anatolian high schools (n = 92, 30.3 %), and Imam-Hatip high schools (n = 28, 9.2 %) had a total of 304 Turkish adolescent participants, 50.7 % of whom were female and 49.3 % were male (M_{age} = 14.63, SD_{age} = 0.97).

Instruments

Demographic Information: This form included the respondents' gender, school type, and class level. A rating tool, rated from 1 (I often fall asleep) to 3 (I often have difficulty falling asleep), was used to determine the participants' sleep status.

School Burnout Inventory: The School Burnout Inventory (SBI) is a scale developed by Salmela-Aro et al. (2009) and adapted into Turkish by Seçer et al. (2013). It is a nine-item, three-dimensional scale (emotional burnout, depersonalization, and low personal success perception) developed to determine school burnout levels for primary and secondary education students. A sample item from the School Burnout Inventory : "I feel like I'm losing interest in school." Scale is a Likert scale scored from 1 (Disagree at all) to 4 (Fully Agree). STI's demonstrated evidence (α = .75; Seçer et al., 2013). This study also demonstrated (α = .89) good internal consistency. The exploratory factor analysis results for the sample consisting of primary and secondary school students revealed that the scale explained 66.85% of the total variance. The model fit of this structure was tested with confirmatory factor analysis, and the fit indices were found to be at a good level [RMSEA=.042, RMR= .013, NFI=.98, NNFI= .98, CFI=.99, IFI=.99, RFI= .96, AGFI=.93, GFI=.97].

Positivity Scale: Originally developed by Caprara et al. (2012) and adapted by Cıkrıkcı et al. (2015) to Turkish, the Positivity Scale is a one-dimensional 8-point Likert scale, scored from 1 (Strongly Disagree) to 5 (Strongly Agree), developed to measure the level of positivity of individuals. A sample item from the Positivity Scale " I have a strong faith in the future." High scores signal high positivity. PS's demonstrated evidence (α = .73; Çıkrıkçı et al., 2015). This study also demonstrated good internal consistency (α = .82). The exploratory factor analysis of the adapted scale showed that the scale explained 47.58% of the total variance. The fit indices of this construct show good fit [χ2/sd= 2.92; RMSEA = .06; CFI = .95; IFI = .95; AGFI = .94; GFI = . 97; NNFI = .92; NFI = .92; SRMR = .04; RFI = .88]. On the other hand, Caprara et al. (2012) re-adapted the scale to Turkish, Duy & Yıldız (2020) showed that the scale can be used in both adolescents and adults. In addition, according to the results of the confirmatory factor analysis for the sample group of this study, it shows that the fit indices confirm the structure [χ2/sd= 2.65, RMSEA=.074, SRMR= .03, NFI=.95, CFI=.96, IFI=.96, AGFI = .95 GFI=.96].

Self-Compassion Scale Short Form: The Self-compassion Scale was developed by Neff (2003) to measure self-compassion, and its short form was created by Raes et al. (2011). The scale, which was adapted for Turkish by Yıldırım and Sarı (2018), is rated from 1 (*Almost Never*) to 5 (*Almost Always*), is an 11-item Likert scale. A sample item from the Self-compassion Scale is "I try to see my failures as a natural part of being human." SCS-SF has demonstrated evidence (α = .73; Yıldırım & Sarı, 2018). This study also demonstrated (α = .73) good internal consistency. According to the Explanatory Factor Analysis results of the study conducted on 800 adolescents, the scale explains 44.87% of the total variance. The fit index values were found as [χ2/sd=2.28, CFI=.93, NNFI=.91, RMSEA=.064, SRMR=.087].

Intolerance of Uncertainty Scale: The scale first originated from Carleton et al. (2007) and has been adapted to Turkish by Sarıçam et al. (2014). It is a 12-point item consisting of two sub-scales (prospective anxiety and inhibitory anxiety) developed to identify levels of uncertainty for individuals. An example item from the Intolerance of Uncertainty Scale is " I have to stay away from all uncertain situations. " The scale utilizes a 5-point Likert scale from 1 (Not at all characteristic of me) to 5 (Very Characteristic of me). IUS's demonstrated evidence (α = .88; Sarıçam et al.,2014). This study also demonstrated (α = .81) good internal consistency. The adaptation study of the scale was carried out in the sample group aged 16 years and over. The scale explains 78.57% of the total variance. The fit index values were found to be good [χ2/sd = 3.06, RMSEA=.073, CFI=.95, IFI=.95, GFI=.94, SRMR=.046]. In addition, it shows that the construct validity of the DFA fit index was also confirmed for the sample group of this study [χ2/sd= 1.64, RMSEA=.046, SRMR= .04, NFI=.90, CFI=.95, IFI=.95, AGFI=. .94 GFI=.95].

Results

Preliminary analyses

First, missing data and normality assumptions were investigated with preliminary analysis. As Kline (2011) suggested in the study, observations with more than 5 % of missing data for any variable or more than 10 % of the total number of

items in the study were excluded from the data set. At this point, when scale batteries of 30 students are removed from the data set, the final sample is 304 people. The data provided multivariate normality assumptions (skewness ≤ |1.5|, kurtosis ≤ |1.5|; Tabachnick & Fidell, 2007), and it was seen that there is no multi-connection problem (r < .85; Kline, 2011). Finally, the study analyzed bivariate correlations and descriptive statistics. Bivariate correlations and descriptive statistics are reported in Table 1.

Table 1

Means, Standard Deviation, Range, Cronbach Alpha Coefficient, Correlations Between the Variables

Variables	1	2	3	4	5	*M*	*SD*	Range	α
1. Self-compassion	—					31.98	8.03	1-5	.73
2. School burnout	-.44**	—				26.83	9.90	1-4	.89
3. Intolerance of uncertainty	-.49**	.43**	—			42.55	9.15	1-5	.81
4. Positivity	.53*	-.38*	-.18*	—		25.68	2.86	1-5	.82
5. Sleep State	.13*	.07	.18**	.36**	—	2.00	0.77	1-3	

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

As seen in Table 2, self-compassion is negatively related to both school burnout (r = -.44; p < .01) and intolerance of uncertainty (r = -.49; p < .01). In addition, self-compassion and positivity are positively related (r = .53; p < .01). While positivity is negatively associated with school burnout (r = - 38; p < .01), on the contrary, intolerance of uncertainty is positively associated with school burnout (r = .61; p < .01). Finally, school burnout was not statistically significant according to gender (t = 0.82, p > .05) and school (vocation, science, anatolian, imam-hatip) education (F = 1.36, p > .05). For this reason, mediation was analyzed in the same model for all participants.

Data Analysis Plan

The study tested the parallel mediating role of intolerance of uncertainty and positivity in the relationship between self-compassion and school burnout using the PROCESS macro (Model 4, Hayes, 2018) in IBM SPSS 23 statistical software. As Hayes (2018) suggested, the parallel mediation model was used because examining each mediating variable separately will cause a difference in the effect of the independent variable on the dependent variable, and the margin of error will increase. In addition, it should be known that each of these mediating variables does not causally affect the other. In the mediation analysis, the condition that the indirect effects do not include zero within the 95% confidence interval was taken into account (Hayes, 2018; Preacher & Hayes, 2008). In accordance with Hayes's (2018) recommendation, we reported unstandardized coefficients. As shown in Figure 1, the self-compassion independent variable (X), school burnout dependent variable (Y), intolerance of uncertainty (M1), and positivity (M2) were defined as mediating variables. Sleep state is included in the model as a covariate.

Parallel Mediational Analyses

A positive correlation was observed in the relationship between the control variable (sleep state) and the outcome variable. All the hypotheses of the research have been analyzed by the conditional effect of sleep state variables. In Hypothesis 1, it was confirmed (without including variables) that self-compassion had a significant negative effect on school burnout (B = -.45, p < .001 Self-compassion predicted intolerance of uncertainty negatively (B = -.56, p < .001), and positively predicted positivity (B = .43, p < .001). Intolerance of uncertainty predicted school burnout positively (B = .32, p < .001). Moreover, positivity predicted school burnout negatively (B = -.26, p < .001). Finally, as a result of the parallel mediation analysis using the bias-corrected bootstrapping method, indirect effect of self-compassion on school burnout through intolerance of uncertainty (B = -.18, SE = .04, [BC] 95% CI [-.263; -.100]), and positivity (B = -.11, SE = .04, [BC] 95% CI [-.018; -.004]) is negatively significant. These results support hypotheses 2 and 3. The mediation effect size was found to be 24%. The results are as in Table 2.

Table 2

Indirect Effect of Self-Compassion on School Burnout via Intolerance of Uncertainty and Positivity

Model paths	*β*	*SE*	*P*	95% CI [LL; UL]
Direct effect				
SC → IoC	-.56	.06	.000	[-.667; -.440]
SC → P	.43	.05	.000	[.339; .526]
IoC → SB	.32	.06	.000	[.201; .438]
P → SB	-.26	.08	.000	[-.405; -.106]
SC → SB	-.45	.08	.000	[-.584; -.324]
Indirect effect				
SC → IoC →SB	-.18	.04	.000	[-.263; -.100]
SC → P → SB	-.11	.04	.000	[-.018; -.004]
Total indirect effect	.29	.06	.000	[-.399; -.75]
Control variable				
SS → SB	-.04	.19	.007**	[1.428; 4.146]
R^2	.24**		.000	

Note: Control Variables = Sleep State (SS); CI = confidence interval; LL = lower limit; UL = upper limit; SC = Self-compassion; SB = School Burnout; IoC = Intolerance of uncertainty; P = Positivity; B = unstandardized coefficients; SE = standard error. N= 304, k= 5000, *p < .05, **p < .01, ***p < .001

Discussion

In this research, we explored the role of parallel meditation in the relationship between self-compassion and school burnout, which mediates uncertainty of intolerance and positivity. We first suggested and confirmed the negative correlation between self-compassion and school burnout, as mentioned in H1. These results are supported by the literature findings (Aypay, 2017; Barnett & Flores, 2016; Ponkosonsirilert et al., 2020). Similarly, in the relationship between self-compassion and school burnout, the role of uncertainty and positivity is consistent with the literature and the theoretical structure (Bandura, 1977, 1982; Bandura et al., 1996; Buhr & Dugas, 2002; Neff, 2003, 2015). While including them in the model as the control variable, it is observed that sleep states predict school burnout positively. Literature similarly indicates that the sleep states of adolescents (e.g., excessive sleep or excessive sleeplessness) are important parameters for school burnout (Lehto et al., 2019; Liu et al., 2021; Toker & Melamed, 2017). In light of these findings, based on the negative results of students' feelings towards their self-consciousness and their perspective towards the future, this model is considered a source for education and psychology. Moreover, these findings in the COVID-19 closure period may strengthen the researchers' hands in facing further challenges.

The first finding supports the negative association of self-compassion with school burnout. Students sometimes (e.g., during Covid-19) are overly judgmental and ruthless when things go wrong (Neff, 2003; Neff, 2015). This means insufficient self-compassion, which can lead to burnout when felt at a high level (Beaumont et al., 2016; Hashem & Zeinoun, 2020). Not only external circumstances but imprudent actions or personal failures are equally relevant in self-compassion (Neff & Costigan, 2014). Assessing youths' pain (e.g., separation in romantic relationships) and failures (e.g., low exam results) as a natural and collective sense of humanity through experiences includes self-compassion and can help prevent burnout (Barnard & Curry, 2012). Previous research appears to be coherent with the results of this study. Neff et al. (2005) stated that a decrease in self-compassion may occur after academic failure, which is one of the causes of school burnout. For example, a study conducted with adolescents from Thailand was one of the few that specifically emphasized the negative relationship between self-compassion and school burnout, finding that self-compassion plays an intermediate role in the relationship between school burnout and stress (Ponkosonsirilert et al., 2020). Still, a relationship between self-compassion and burnout appears to occur based on the studies conducted with university students (Beaumont et al., 2016) and professionals in business life (Dönmez & Tuğba, 2021; Satake & Arao, 2020). Moreover, the belief that Self-efficacy theory (Bandura, 1982; Bandura et al., 1996) is enough to believe that students will learn, succeed, and overcome difficulties, and the theoretical links that Neff (2003) treats himself with compassion in the face of failures claims. Neff (2022) argues that seeing students' mistakes as shared human experiences to learn from will lead them to good health and success. From the self-sufficiency theory perspective, which is frequently seen as effective in dealing with school burnout, our model appears to merge on the theoretical base. Students may have suffered from emotional fatigue as the academic activity of their schools began at regular intervals as the activity was carried out during the COVID-19 period, which the whole world was trying to cope with. Being cruel to himself or herself in dealing with the imperfections of this disordered direction (Li et al., 2021) and may have formed the idea that you do

not need school (Salmela-Aro & Upadyaya, 2014) as part of the distance education. So, the evidence in this study could provide some additional resources to be built while supporting school burnout models because the literature seems to have overlooked the relation between self-compassion and school burnout in adolescents for the time being.

Secondly, as we have mentioned in H2, intolerance of uncertainty has an indirect role in the relationship between self-compassion and school burnout. These results are consistent with the literature and the theoretical infrastructure (Bandura et al., 1996; Neff, 2003; Ponkosonsirilert et al., 2020). The success and failure of school exams, the course of teacher-peer relations, and more initially uncertain. When this initial normal state of uncertainty becomes intolerable, students may be unwilling to develop social connections and disinclined to explore their abilities (Tynan, 2020). Budner (1962), one of the theorists of intolerance of uncertainty, argues that if uncertainty is perceived as a threat, individuals have distortions to deny it. Uncertainty about the failure to fulfill academic responsibilities reveals school burnout in students (Aypay & Sever, 2015; Bask & Salmela-Aro, 2013). Parallel to these, the decline in self-compassion leads to increased intolerance of uncertainty (Poluch et al., 2022). Research shows that intolerance to increasing uncertainty also increases burnout in the learning environment (Di Trani et al., 2021; Zhao et al., 2022). A study conducted in parallel with this study showed that intolerance of uncertainty played a mediating role in the relationship between self-compassion and well-being (Deniz, 2021). Adolescents with low self-compassion may feel inadequate and exhausted when they have no compassion for handling uncertainty (Barnett & Flores, 2016). Therefore, consistent with the literature, while low self-compassion causes adolescent school burnout, it appears to be experiencing intolerance of uncertainty. This study has consistently shown that intolerance of uncertainty has a negative association with self-compassion and an intermediate role in the school burnout relationship. This suggests that it would be useful for her to emphasize the school environment by considering the burnout of adolescents in understanding school burnout and focusing her efforts in this direction.

Third and finally, as mentioned in H3, positivity indirectly affects the relationship between self-compassion and school burnout. Students being positive triggers their potential (Fredrickson, 2001). If he can transform his potential into kinetic performance, he will feel socially and academically promising. In support, a longitudinal study of Colombian adolescents revealed a bidirectional relationship between positivity and the perceived positive school climate. This helped the adolescents' prosocial behavior over time (Luengo Kanacri et al., 2017). This finding is socially based evidence that suggests that school burnout can be reduced in a school environment through positivity. Zhou et al. (2021) In their study with Chinese preschoolers, positivity also suggests an indirect (i.e., mediating) role in linking students' psychological needs to academic levels of achievement, which supports the findings as academic evidence. Research on positive young see adolescents as "resources to be developed," not alongside problems (Lerner et al., 2003; Waters, 2011). Larson (2006) suggests, "Help youth internet the capacity to navigate for themselves in the future." If students can positively influence their perspectives, this will also positively affect their academic life (Waters, 2011). Adolescents may not know how to organize their efforts and may become overwhelmed (Corno & Kanfer, 1993). At this point, positivity can help adolescents build healthy beliefs about themselves and

the school. Also, positivity plays a significant role in school burnout when they feel overwhelmed by a decline in self-compassion and do not know what to do.

Positive young people have high academic satisfaction, and their academic stress decreases over time (Shek & Chai, 2020). This gives an idea that the positivity and the ingredients in the disabilities on learning will contribute. It can also be considered a structure that builds academic success while breaking down the structure that blocks positive learning (Zhou et al., 2021). Meyers and van Woerkom (2017) suggested and confirmed that a person's preoccupation with his strengths (joy, pride, gratitude) might cause a decrease in the enjoyment of work and burnout, while positivity contributes to the intermediary role in this matter. Additionally, our findings support and contribute to the positive model proposed by Aypay (2017) to reduce school burnout among high school students. Because the implications were that, for adolescents, increasing their subjective well-being would help reduce school burnout. Thus, positivity played a role in the strength of the individual, namely the self-compassion and the burnout of the school. The findings support and contribute to the theory of positive psychology (e.g., positive response and views that the models protect mental health). It is important to include the student, focusing on student strengths and positivity in their education policies (Shek & Chai, 2020). We believe this study can also be a resource for preventing school burnout in positive youth development.

If a person feels compassion for himself or herself, his or her sense of proficiency will become more robust, and his or her feelings of inadequacy will decrease in the school, which is included in the school's burnout. So, reducing the level of intolerance for uncertainty may reduce the amount of school depletion. Similarly, we believe that positivity will decrease school burnout. In sum, Bandura (1977) states that his/her thoughts shape human behavior and that he/she estimates future scenarios of optimism or pessimism about them based on their self-sufficiency. Therefore, it was observed that the model concept was supported with theoretical infrastructure and confirmed with an intermediary model. Finally, we believe the present study's findings will shed light on the thoughts and efforts of managers, educational organizations and organizations, and school psychological counselors.

Limitations and Future Research

This study has some limitations. The first study data were collected during the lockdown. The results cannot be considered independent of the COVID-19 impact. Therefore, the study is recommended to be repeated when the effects of the COVID-19 pandemic are reduced. Secondly, the sample of the hypothetical model represents adolescents with the internet (because the data was collected online) in Eastern Anatolia RegionTürkiye. This model can be tested in different regions of Türkiye. We do not have information on cross-regional and cross-cultural comparisons.

Thirdly, this study examined school burnout with limited variables. There are strong relationships between students experiencing school burnout and families with low socioeconomic levels, and the cultural environment is highly predictive of learning burnout (Luo et al., 2016). Also, in this study, it has been found that sleep states are a significant predictor of school burnout. However, the study also found that the sleep states of the students in this study are mostly centralized (mean value = 1.90), and there is limited information about sleep states in the literature. Therefore, future researchers

may examine school burnout in terms of multiculturalism, socioeconomic level, parental pressure, family climate, and school-related myths and sleeping situations (i.e., as a regulatory role or intermediary role), mainly to develop our limited knowledge of self-compassion and school burnout. In addition to this study, where we study the role of positivity as a mediating, other positive psychology concepts can be included in the model. Fourth, our findings suggest that school burnout and the self-compassion relationship could be explored by other factors related to adolescents' self-interest to undermine school depletion. In the future, in addition to this research, which is limited to quantitative data, qualitative studies can be conducted on the very essence of school burnout by the feelings and thoughts of students, particularly given the rapid technological change.

Finally, in this study, school burnout was detected only by the self-reporting of students, and the family climate and the role of parents were ignored. For this reason, future studies could compare the perceived school burnout in the family with the student's perception of school burnout. Additionally, it would be beneficial to practice psycho-education in adolescents to prevent school burnout, especially by school psychological counselors with intolerance and positivity-based intolerance.

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Ethical Approval

Ethics committee approval was obtained from the Inönü University (12/10/2021-E.97177). The authors declare that all the procedures of the study were conducted in compliance with the Helsinki Declaration.

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Examination of the Variables Explaining School Effectiveness by CHAID Analysis

Okul Etkiliğini Açıklayan Değişkenlerin CHAID Analizi ile İncelenmesi

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ABSTRACT: In parallel with the increase in social expectations regarding education and its outcomes, studies on school effectiveness continue unabated. The ability of educational organizations to provide qualitatively higher education has become the focus of the research. In this direction, school governance, the adaptation of governance principles to educational organizations, has come to the fore. The purpose of this research is to examine school effectiveness and to determine the significant variables in explaining school effectiveness. The study group of this research consists of 502 teachers working in Yozgat. Within the scope of this research, CHAID analysis was used to explain school effectiveness with school governance with the factors *-participation, transparency, rule of law -* and teachers' demographic variables. In terms of demographic variables, teachers' page, gender, union membership, education degree, seniority, working time with the current manager, and year of employment at the current school were analyzed. As a result of the analysis, it was determined that the first significant variable in explaining school effectiveness was the rule of law. Participation was found to be the second significant variable in predicting school effectiveness. It was inferred from the finding that adopting accountability within the rule of law dimension at school means taking steps to monitor the school's performance. Therefore, the rule of law has an impact on school effect. Furthermore, it was observed that accountability and equality practices positively affect school effectiveness. Based on the results, it was concluded that better school performance can be increased depending on good governance practices like the rule of law and following a participatory policy.

Keywords: School effectiveness, school governance, rule of law, participation.

ÖZ: Eğitime ve sonuçlarına ilişkin toplumsal beklentilerin artmasına paralel, okul etkililiği ile ilgili çalışmalar hız kesmeden devam etmektedir. Eğitim örgütlerinin hem niceliksel hem de niteliksel olarak yüksek çıktılar üretebilmesi, araştırmaların odak noktası haline gelmiştir. Bu doğrultuda yönetişim ilkelerinin eğitim örgütlerine uyarlanmasını savunan okul yönetişimi gündeme gelmiştir. Bu araştırmanın amacı, okul etkililiğini açıklamada istatistiksel açıdan anlamlı değişkenleri ve değişkenlerin okul etkililiğini açıkladıkları varyanslarına göre önem sırasının belirlemektir. Araştırmanın çalışma grubunu Yozgat ilinde görev yapan 502 öğretmen oluşturmaktadır. Araştırma kapsamında okul etkililiğini açıklayan değişkenlerin belirlenebilmesi için CHAID analizi kullanılmıştır. Okul yönetişiminin boyutları olan katılım, şeffaflık, hukukun üstünlüğü ve öğretmenlerin yaşı, cinsiyeti, sendika üyeliği, eğitim durumu, kıdem, mevcut yöneticide çalışma süresi, mevcut okulda çalışma yılı demografik değişkenleri ele alınmıştır. Analiz sonucunda okul etkililiğini açıklamada ilk anlamlı değişkenin hukukun üstünlüğü olduğu belirlenmiştir. Katılım, okul etkililiğini açıklamada ikinci anlamlı değişken olarak bulunmuştur. Okulda hukukun üstünlüğü boyutunda hesap verebilirliğin benimsenmesinin, okulun performansının izlenmesine yönelik adımlar atılması anlamına gelmektedir. Bu doğrultuda hesap verebilirlik ve eşitlik uygulamalarının okul etkililiğini olumlu yönde etkilediği belirlenmiştir. Elde edilen sonuçlara göre, okullardaki uygulamalarda yönetişim ilkelerinden hukukun üstünlüğünün benimsenmesi ve katılımcı bir politika izlenmesine bağlı olarak okul performansının artırılabileceği sonucuna varılmıştır.

Anahtar kelimeler: Okul etkililiği, okul yönetişimi, hukukun üstünlüğü, katılım.

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School effectiveness, in a simplified manner, can be defined as the relationship between observed outcomes and expected outcomes in the context of education systems (Lenkeit & Caro, 2014). Şişman (2002) expresses that in effective schools, students are encouraged to make decisions about the issues that affect them, and learning activities that improve students' cultural, social, and psychological perspectives are organized alongside academic activities. Effective schools emphasize all students' improvement without neglecting any of them, with the cooperation of leaders, teachers, and parents. In other words, effective school movements require the participation of all stakeholders and acceptance of students' holistic perspective improvement. Consequently, it can be inferred that effective schools are expected to have good governance.

The relationship between school effectiveness and school governance is symbiotic. Effective governance structures can facilitate and support school effectiveness by providing leadership, accountability, resources, and community engagement. Conversely, school effectiveness can drive improvements in governance by highlighting areas in need of reform and demonstrating the impact of governance decisions on student outcomes. Therefore, a well-functioning education system requires a harmonious and dynamic interaction between school governance and effectiveness to ensure all students have access to high-quality education.

Literature Review

The Coleman report (1966) investigating how the educational system affects students' academic achievements proclaimed an unexpected finding. It revealed that socio-demographic factors accounted for nearly all the variation in student scores, while school factors had no noticeable impact on academic performance. This conclusion elicited a strong reaction from educational researchers and initiated a line of investigation exploring the role of socioeconomic and school-level characteristics on student achievement (Chapman et al., 2016). Since then, studies that (Lenkeit & Caro, 2014; Murillo, 2007; Niemann et al., 2017; Scheerens, 1991; Şişman, 2002) contributed to the effective school movement have increased dramatically. These studies have focused on the characteristics of effective schools, such as positive school climate, participatory leadership, clear educational vision, adoption of the vision and mission by the stakeholders, stakeholder participation, and high and attainable academic expectations (Murillo, 2007; Niemann et al., 2017; Scheerens, 1991).

Verhelst et al. (2021), in their review article on school effectiveness for education for sustainable development, state that one of the characteristics of an effective school is pluralistic communication. Pluralistic communication entails the acknowledgment encompassing divergent perspectives and conceptual paradigms (Boeve-de Pauw et al., 2015; Lijmbach et al., 2002). Pluralistic communication engenders an atmosphere of communication that fosters and eases the process of garnering insights from the diverse experiences, standpoints, and arguments put forth by interlocutors. Such an ambience in communication augments various attributes, such as enhancing democratic decision-making by ensuring that stakeholders are well-informed about each other's viewpoints. Therefore, it can be stated that creating an effective school is associated with participation, mutual relationships, transparency, and accountability, which are the main principles of governance.

The concept of governance, distinct from administration, involves the collaboration of public institutions, private companies, and non-governmental organizations in promoting accountability, transparency, and the rule of law to support social and economic development (World Bank, 1994; Yüner & Burgaz, 2019). Good governance was defined as 'a process of decision making and the process by which decisions are implemented' (Sheng, 2009, p. 1). It is part of the New Public Management (NPM) paradigm, which considers public institutions as enterprises that can respond to demands for increased quality, transparency, and accountability (Kefela, 2011; Vyas et al., 2017). Graham et al. (2003) defined governance as a process by which societies or organizations determine whom to include in the decision process and how they hold accountability. Good governance in education requires the implementation of participatory, democratic, transparent, accountable, and law-based policies (Yüner & Burgaz, 2019). These policies should take into account the needs of the school community (Risteska et al., 2010). The participatory principle of governance includes the participation of students, teachers, school principals, parents, local government representatives, the private sector, and non-governmental organizations that make up the school community in the decision-making process.

The basic principles to be followed in the implementation of good governance in educational organizations are participation, transparency, and the rule of law. The principle of participation means that all stakeholders of the school participate in the decision-making process on issues that concern them. It is important that representatives of the school community, the business world, or local government who affect and are affected by the education process actively participate from the planning to the evaluation of the process. It is obvious that the educational process carried out in cooperation will positively affect the quality of the outputs. The principle of transparency, on the other hand, means that stakeholders can access the necessary information on issues that concern them. The principle of transparency brings open communication channels and responsiveness. The principle of the rule of law includes equality, which means the fair application of laws to all and the accountability of authorized persons. Accountability involves taking responsibility for one's actions in relation to others. It includes being answerable and enforcing good governance practices to achieve goals effectively and efficiently. High accountability not only instills confidence in stakeholders but also implies a moral responsibility to provide quality services. Transparency and accountability are necessary to ensure good governance. These aspects are critical for evaluating the school's overall performance, not just its quantitative progress but also its qualitative development.

The expectation for effective schools is increasing, and demands for participation, transparency, justice, and accountability from teachers, parents, and students require a reevaluation of school processes. This has led to a focus on school governance, which involves conducting the teaching process transparently and lawfully with the participation of relevant school actors. Good school governance is about competent management of resources, including openness, accountability, fairness, and responsiveness to society's needs. It involves participatory, democratic, transparent, accountable, and law-based policies, including multidirectional communication channels, financial and administrative transparency, and community participation in decision-making (Yüner & Burgaz, 2019).

Good governance in schools can enhance institutional performance in delivering education services, increase participation, accountability, transparency, and effectiveness of school management, and ultimately improve school performance. Studies revealed that school governance enhances the quality of producing effective school governance performance (Lewis & Pettersson, 2009; Lingard et al., 2002). Implementing good governance at school would increase participation, accountability, and transparency, which would lead to effectiveness. The evaluation of school effectiveness is mostly based on outcomes. The main output of education is student success. Teachers have a primary role in students' learning and success in schools. Therefore, it can be assumed that getting the opinions of teachers for the evaluation of the effectiveness of a school and the practices in the school would give more accurate results. In this context, it is aimed to examine school governance and school effectiveness from the perspective of teachers.

The aim of this research is to determine the level of teachers' opinions about school effectiveness and the variables that are effective in determining teachers' opinions about school effectiveness. For this purpose, the research questions sought to be answered are as follows:

1. What are the teachers' views on school effectiveness?

2. What are the demographic and school governance variables that explain teachers' views on school effectiveness, respectively?

Methodology

Model of the Research

This research, which aims to determine teachers' views on school effectiveness, is in the correlational model. The relational survey model is the examination of the relevant variables in their current conditions. It aims to investigate the existence of the relationship between the variables and the direction and degree of the relationship (Fraenkel et al., 2012).

The Study Group

The study group of this research consists of 502 teachers working in schools affiliated with the Ministry of National Education in Yozgat. Information about the participants is presented in Table 1.

As can be seen from Table 1, 58.4% of the participants are female and 41.6% are male. 61.7% of teachers are union members. When examined in terms of education levels, 81.3% of the teachers have a bachelor's degree. Only four teachers have doctoral degrees. The majority of the participants (35.8%) have between six and ten years of experience. While 28.5% of the teachers have been working with the school principal for one year, 34.1% of them have been working at their current school for four to six years.

Table 1
Participants

Demographic Variables		N	Percentage (%)
Age	23-27	73	14.5
	28-32	118	23.5
	33-37	116	23.2
	38-42	111	22.1
	43+	84	16.8
Gender	Female	293	58.4
	Male	208	41.6
Union membership	Yes	310	61.7
	No	192	38.3
Education Degree	Bachelor	408	81.3
	Master degree	90	17.9
	Philosophy of doctorate	4	.8
Seniority	1-5 years	98	19.6
	6-10 years	180	35.8
	11-15 years	92	18.4
	16+ years	132	26.3
Working time with the current manager	1 year	143	28.5
	2 years	99	19.8
	3 years	106	21.2
	4 years	77	15.4
	5 years +	77	15.1
Year of employment at current school	1-3 years	98	19.6
	4-6 years	171	34.1
	7-10 years	74	14.8
	11 years +	43	8.4

Data Collection Tools

School Governance Scale: The School Governance Scale, developed by Yüner (2019), was composed of 28 items. The scale has three factors: *rule of law*, *participation*, and *transparency*. The results of the validity and reliability analyses of the scale are within the accepted limits in the literature χ2/df=1.29, RMSEA=.04, SRMR=.43, GFI=.98, AGFI=.97, NFI=.97, CFI=.99]. The Cronbach alpha coefficients-.93 for the *rule of law*, .91 for *participation*, 85 for *transparency*, and .95 for the whole scale, showed that the scale is highly reliable. Reliability and validity analysis were reconducted for this study, and the results [χ2 = 429.83; df = 296; χ2/df =1.45; RMSEA = .051; CFI = .98; NFI = .96; Cronbach= .79, .90, .82, respectively for factors] were within the acceptable limits.

School Effectiveness Index: The School Effectiveness Index, developed by Hoy (2009) and adapted into Turkish by Demirkasımoğlu and Taşkın (2015), is a 5-point Likert scale. The scale is used to determine teachers' views on perceived school effectiveness. It consists of 8 items and one dimension. The confirmatory factor analysis results obtained in the adaptation study into Turkish are as follows: [χ2 = 44.07; df = 20; χ2/df =2.2; GFI = .91; AGFI = .85; RMSEA = .10; CFI = .99; NFI = .97]. Researchers used Cronbach's alpha to determine the reliability of the scale. Reliability and validity analysis were reconducted for this study and the results [χ2 = 339.460; df = 280; χ2/df

=1.212; RMSEA = .06; CFI = .90; NFI = .90; Cronbach= .93] were within the acceptable limits.

Data Analysis

Within the scope of this research, Chi-squared Automatic Interaction Detection (CHAID) analysis was used to explain teachers' views on school effectiveness with school governance with the factors -participation, transparency, rule of law - and teachers' demographic variables. In terms of demographic variables, teachers' age, gender, union membership, education degree, seniority, working time with the current manager, and year of employment at the current school were analyzed.

CHAID analysis is one of the decision tree methods used in data mining. CHAID analysis is one of the data mining methods used to create homogeneous subclasses according to the predicted variable. Decision trees created by CHAID analysis not only explain the predicted variable through predictive variables such as the branches of a tree but also divide the data into homogeneous subclasses and show all possible relationships in the form of trees (Samar Ali et al., 2019). CHAID analysis does not have the assumptions required by parametric statistics and is quite a powerful algorithm (Kayri & Boysan, 2007). CHAID analysis is a very powerful statistical technique in that it can analyze data from all scale types simultaneously and reveal the relationships between predicted and predictive variables hierarchically (Avsar & Yalcin, 2015).

Limitations and Ethical Procedures

The independent variables discussed in this study to explain school effectiveness are limited to the dimensions of school governance -participation, transparency, rule of law - and teachers' demographic variables, including their age, gender, union membership, education degree, seniority, working time with the current manager, year of employment at the current school.

Before data collection, necessary permission was obtained from the ethics committee of Yozgat Bozok University (No: E-55005497-605.01.21073479; Date: 22.02.2021).

Results

As a result of the CHAID analysis carried out to determine the variables that predict school effectiveness, a decision tree consisting of five nodes was obtained. The decision tree is presented in Figure 1.

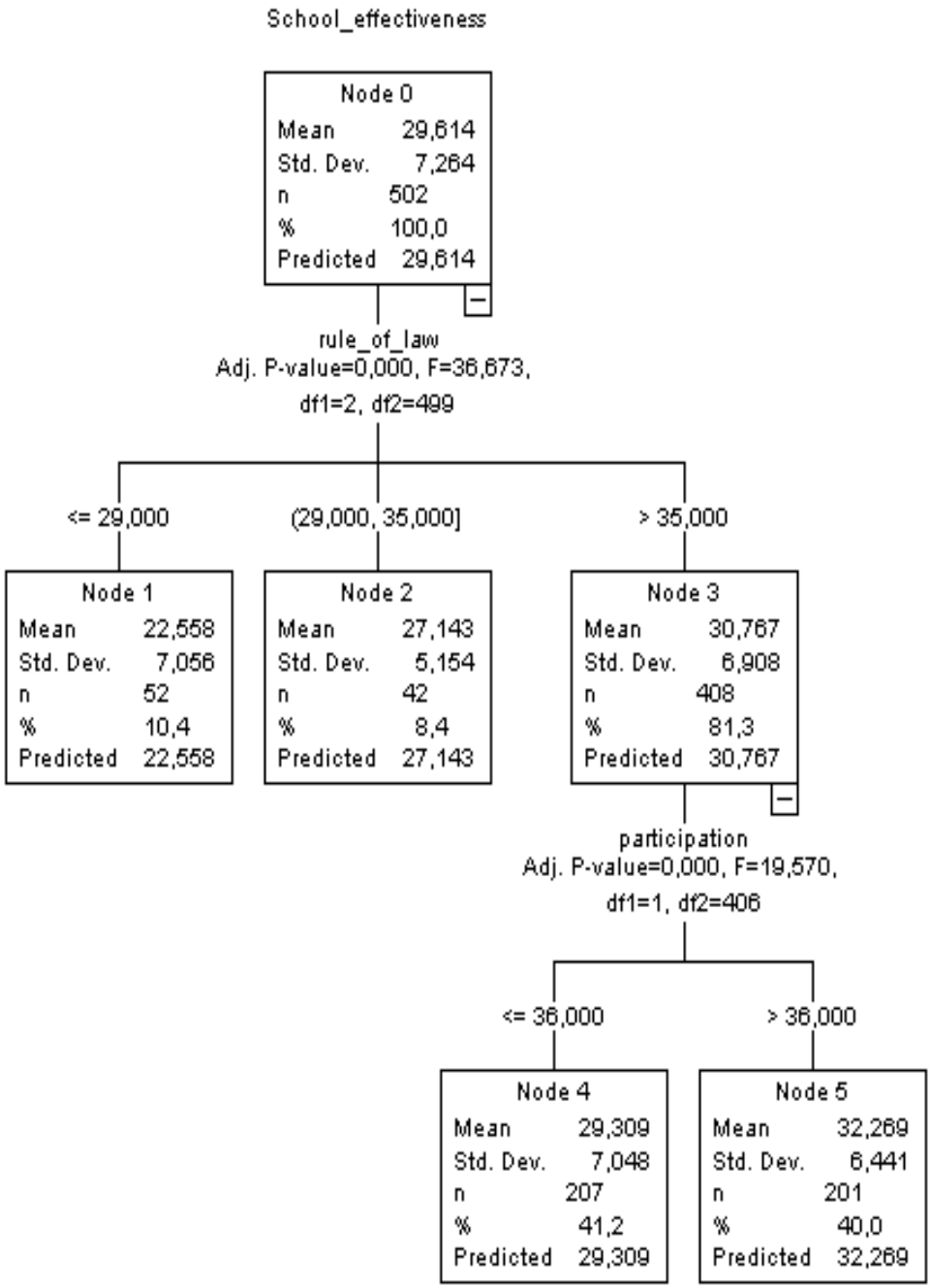
As can be seen from Figure 1, the average score of teachers regarding school effectiveness as a result of the CHAID analysis is 29.614. Considering the highest score (40.00) and the median score (18.00) that can be obtained from the school effectiveness scale, it can be stated that the level of teachers' perception of their school as effective is above average.

Based on the decision tree generated by the CHAID procedure, it was determined that the variable that best explains the school effectiveness is the variable of the rule of law ($F_{(499.2)} = 36.673$; $p<0.05$). Under the rule of law dimension, teacher opinions were collected in three nodes. The first node is formed by those whose school effectiveness average scores are below 29.00. The average score of these teachers' rule

of law is 22.558, which is below the median score (24.00). In this node, there are 52 teachers who constitute 10.4% of the sample. The second node consists of teachers whose school effectiveness average is between 29.00 and 35.00. There are 42 teachers in this node that constitute 8.4% of the data set. The average score of the rule of law of the teachers in this node is 27.143.

Figure 1

Nodes Explaining School Effectiveness



In the third node, there are 408 teachers who are the ones that are closest to the full score on school effectiveness. Teachers constitute 81.3% of the data set. School effectiveness mean scores in this node are higher than 35.00. Considering the highest score that can be obtained for school effectiveness (40.00), this group of teachers has an

average score that is close to the full score. The average score for the rule of law of teachers in this node is 30.767.

The third node was further segmented by the CHAID into two subgroups with significant values. These subgroups were defined according to the participation variable. It was determined that the participation variable was a significant predictor of the opinions of teachers with a high perception of the rule of law regarding school effectiveness. It was found that the participation variable was associated with school effectiveness ($F_{(1.406)} = 19.570$; $p<.05$). As a result of the analysis, two nodes were formed of those with school effectiveness mean scores lower than 36.00 and those with higher than 36.00. In the fourth node, where the average score is lower than 36.00, there are 207 teachers who make up 41.2% of the data set. The average participation score of the teachers is 29.309. When the median value (20.00) in the participation variable is evaluated, it is seen that the participation scores of the teachers are above the average. There are 201 teachers in the fifth node, which consists of those with a school effectiveness score above 36.00 and explains 40% of the data set. The average score of participation of the teachers in this node is 32.269.

Discussion, Conclusion and Recommendations

As indicated above, the aim of the research was to find the variables that significantly explain school effectiveness. In the study, participation, transparency, and rule of law factors of school governance scale, teachers' age, gender, union membership, education degree, seniority, working time with the current manager, and year of employment at the current school were analyzed as independent variables. As a result of the analysis, it was determined that the first significant variable in explaining school effectiveness was the rule of law.

The two main points emphasized by the rule of law dimension are accountability and equality. The rule of law is a prerequisite for the principle of accountability. Accountability means being willing to accept the authority and responsibility assigned within an institution. It entails taking responsibility for the outcomes of the tasks assigned, including acknowledging shortcomings and failures when results are negative. School accountability should be evaluated as a reflection of NPM, which emphasizes the management of public services like the private sector (Ambrosio 2013; Gunter et al. 2016). In NPM, the quality of the outputs and customer satisfaction are important criteria.

Adopting accountability within the rule of law dimension at school means taking steps to monitor the school's performance. Therefore, the rule of law has an impact on school effectiveness. The explicit function of accountability is to measure performance to initiate improvement, and it cannot be separated from its latent functions, such as performativity. Studies also reveal the effect of adequate accountability in achieving positive school outcomes (De Fraine et al., 2002; Ordofa & Asgedom, 2022; Rosenblatt & Wubbels, 2021).

Based on the principles of justice and equality, the rule of law must be implemented effectively and impartially (Gözlügöl, 2013). Justice and equality in governance are not left to the mercy and discretion of the administration. Within the framework of the rule of law principle, institutions like individuals have to act in accordance with the law (Yüner & Burgaz, 2019). Every individual and actor is free to

use the rights granted to him by law. For the rule of law in school governance, it is expected that every student and parent should be treated equally, no discrimination among school employees according to gender, branch, and the union they are a member of, and accountability related to the goals reached or not reached.

The rule of law is a requirement of democratization and an indicator of the quality of governance. Today, citizens' demand for information about the services offered in both the public and private sectors has increased. This situation obliges the authorities to be more careful while making decisions and performing their duties (Yüner & Burgaz, 2019).

It was observed that when the teachers' average scores in the rule of law dimension in the nodes formed according to the school effectiveness are examined, it is seen that there is a parallel relation between the two variables. In the first node, which consists of teachers with the lowest average score on school effectiveness, the average score for the rule of law is also low. On the other hand, in the third node, which consists of teachers with the highest average score on school effectiveness, the average score for the rule of law is also high. In this respect, it can be concluded that accountability and equality practices within the scope of the rule of law positively affect school effectiveness.

Participation was found to be the second significant variable in predicting school effectiveness. The node formed by the teachers with the highest perception of effectiveness was further segmented into two subgroups with participation. The participation dimension refers to the participation of the school community and stakeholders in the whole process, from the decision stage to the evaluation, in matters that concern them.

The school should encourage the participation of the relevant actors (Backman & Trafford, 2007). The participation dimension is important in terms of evaluating school effectiveness. Opinions of teachers, students, and parents regarding the current process and alumni's views on the outputs of the process are sources of information. Governance is a process in which institutions constantly evaluate themselves. The schools are expected to correct their deficiencies in line with the opinions and increase their effectiveness. The participation of the primary actors, such as students, teachers, the principal, and the parents, in the decision-making process would make significant improvement. Studies have revealed that participation improves decision-making quality (Supriadi et al., 2021) and increases human capital by stimulating them to recognise the needs, desires, and potentials of collaborative work towards their fulfilment (Denhardt & Denhardt, 2011; Widanto & Satrya, 2019). Therefore, the participation of the aforementioned actors is critical for better outcomes that will lead to school effectiveness. Family support is also important for students' social and cognitive development (Roksa & Kinsley, 2019). Behaviors taught at school cannot be permanent unless they are supported by the family. For this reason, cooperation between students, teachers, and parents is required for the student to win and be successful.

The rule of law occupies a central position in democratization and serves as a litmus test for governance quality. In the context of the modern world, where citizens' information demands have escalated, its importance is accentuated. The availability of information fosters an environment of transparency, accountability, and public

engagement. These demands are also increasing in educational organizations, as the principles of governance, such as transparency, rule of law, and participation, are now recognized as requirements for the effectiveness of schools. The result of the study reveals that good governance practices play an important role in school performance. In addition, it can be stated that better school performance can be increased depending on good governance practices like the adoption of the rule of law as one of the governance principles and following a participatory policy. It can be stated that the outputs of school performance will be higher and more qualified in a school environment where teachers do not have concerns about justice, think that the practices are in compliance with the law, and believe that they can contribute to the process with their ideas.

The independent variables discussed in this study to explain school effectiveness are limited to the dimensions of school governance -participation, transparency, rule of law - and teachers' demographic variables, including their age, gender, union membership, education degree, seniority, working time with the current manager, year of employment at the current school. Reconsidering the subject with different variables can produce meaningful results. Based on the findings of the study, it can be declared that school governance is critical in improving school performance and increasing effectiveness. Therefore, these suggestions would be useful to ensure effectiveness. School management should be open to evaluation and provide opportunities to other actors for this. The point reached in terms of targeted academic success, social and cultural gains, and desired behavioral changes should be evaluated by all actors, and deficiencies should be determined together. School administration and teachers should also be prepared to be accountable during the evaluation phase. There should be no discrimination between students, teachers, or parents at school for any reason. Legal rights apply to every individual. Those who are in the same situation at school should be treated in the same way, under the same conditions. In a fair evaluation process, it is accepted that the evaluation criteria are standard and the rewards and punishments are given fairly.

Author Bio

The author was born in Kayseri in 1985. The author completed her undergraduate and graduate studies at Erciyes University, Department of English Language and Literature; completed her doctorate in Hacettepe University, Department of Educational Administration, Inspection, Planning and Economics. Between 2007 and 2017, she worked as a teacher in schools affiliated to the Ministry of National Education. She started working at Yozgat Bozok University in 2017. The author, being married and having three children, is still a faculty member at the Educational Faculty, Educational Sciences Department, Educational Administration Department. Her fields of study are leadership, governance, organizational behavior. The author has chapters and articles in books in related fields.

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Behavioral Problems in Children with Hearing Loss: A Comparative Analysis with Children with Typical Development and Autism Spectrum Disorder*

İşitme Kayıplı Çocuklarda Davranış Sorunları: Tipik Gelişim Gösteren ve Otizm Spektrum Bozukluğu Olan Çocuklarla Karşılaştırmalı Bir Analiz

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ABSTRACT: Research findings on behavioral problems in children with hearing loss (HL) have produced inconsistent results regarding their prevalence and characteristics. The aim of this study was to compare the behavioral problems of children with HL with typical development (TD) and with autism spectrum disorder (ASD) and to determine the factors affecting behavioral problems in the HL group. Data were collected by using two scales based on the reports of 273 teachers of children with TD, HL, and ASD: Child Behavior Checklist-Teacher Report Form (CBCL-TRF) and Social Skills Rating System-Problem Behaviors (SSRS-PB). ANOVA results showed that there was no difference between children with HL and TD, and children with ASD had more behavioral problems than these two groups. In the HL group, children using hearing aids exhibited more behavioral problems than children with cochlear implants. Children with additional problems displayed more behavioral problems than those without. Age at onset of hearing aid use and age at implantation were found to be significant predictors of behavioral problems. The findings point to the role of early intervention in preventing behavioral problems in children with HL.

Keywords: Behavioral problems, hearing loss, deafness, cochlear implants, autism spectrum disorder.

ÖZ: İşitme kayıplı (İK) çocukların davranış problemlerinin yaygınlığı ve özelliklerine dair araştırma bulguları tutarlı değildir. Bu çalışmanın amacı, işitme kayıplı, normal gelişim gösteren (TD) ve otizm spektrum bozukluğu (OSB) olan çocukların davranış sorunlarını karşılaştırmak ve TD grubunda davranış sorunlarını etkileyen faktörleri belirlemektir. Veriler TG, İK ve OSB çocukların 273 öğretmenin bildirimine dayalı iki ölçek ile toplanmıştır: Çocuk Davranış Kontrol Listesi (Child Behavior Checklist [CBCL-TRF]) ve Sosyal Beceri Derecelendirme Sistemi-Problem Davranış Alt Ölçeği (SBDS-PD). ANOVA sonuçları İK ve TG çocuklar arasında fark yokken, OSB çocukların davranış problemlerinin iki gruptan fazla olduğunu göstermiştir. İK grup içinde işitme cihazı kullanan çocukların koklear implantlılardan, ek problemi olanların olmayanlardan daha fazla davranış problemi sergilediği belirlenmiştir. İşitme cihazı kullanmaya başlama yaşı ve koklear implant ameliyat yaşı davranış problemlerinin anlamlı yordayıcısı bulunmuştur. Bulgular İK çocuklarda erken müdahalenin davranış problemlerini önlemedeki rolüne işaret etmektedir.

Anahtar kelimeler: Davranış problemi, işitme kaybı, işitme engelli çocuklar, otizm spektrum bozukluğu.

* This study is derived from Abdullah Genç's master's thesis titled "*Investigation of Behavior Problems of Children with Hearing Loss in Preschool And Primary School Period*".

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Many reasons may count for behavior problems in children with special needs. Drossos (2004) discussed the factors that may cause behavioral problems under the titles of demographic, biological, psychosocial, and cognitive risk factors. Although having special needs due to disabilities is classified among biological risk factors, it also includes social risks. The literature shows that individuals with special needs are deficient in social skills compared to their peers and have more behavioral problems than their peers (Yavuz et al., 2010). In the comprehensive meta-analysis study of Simo-Pinatella et al. (2019), the prevalence of behavioral problems was examined according to disability groups, for example, behavioral problems were reported between 48-60% in those with intellectual disability and 82-94% in those with autism spectrum disorder (ASD). This situation negatively affects the interaction of children with special needs with typically developing (TD) peers and adults. Therefore, individuals with special needs may have problems in seeing and modeling appropriate behaviors accepted in society.

Behavioral problems associated with a lack of social skills in children with special needs are considered to be predictors of social communication problems and academic difficulties that can be seen in later ages (Tomblin et al., 2000; Walker et al., 2009). When students have problems with social skills, they may exhibit behaviors that are easier for them, such as taking their friends' hands instead of asking for them or pushing their friends to avoid waiting in line (Gresham, 1997; Sucuoğlu & Özokçu, 2005). These and similar behaviors, which are seen as prerequisites for peer acceptance, can be considered as an indication that social skills deficiency and behavioral problems are mutually interactive, in other words, cyclical.

Social skills are defined as the ability to develop behavior appropriate to the social context in which one is involved (Patton, 2004). Children develop social skills by observing role models who represent their environment's social and cultural norms with their behaviors. Thus, they acquire socialization behaviors such as expressing and managing themselves, delaying their desires and impulses, acquiring self-control skills, and realizing moral development (Friedman-Krauss et al., 2014). In case of a lack of social skills, the risk of externalizing behavioral problems such as anger and aggression and internalizing behavioral problems such as fear and unhappiness increases. For this reason, social skills and interpersonal relationships should be developed from childhood to prevent behavioral problems that will negatively affect the child's development and interaction (Choi & Kim, 2003; Herrera & Little, 2005; Squires, 2003).

Behavioral Problems and Children with HL

Studies on behavioral problems of children with hearing loss (HL) contain conflicting findings (Stevenson et al., 2015). It is possible to categorize the studies into two groups: Studies suggesting that children with HL have more behavioral problems than their peers (e.g., Remine & Brown, 2010; van Eldik, 2005) and studies suggesting that they are at the level of their peers (e.g., Edwards et al., 2006; Khan et al., 2005; Theunissen et al., 2014b).

Studies in the first group show a relationship between HL and behavioral problems (Bigler et al., 2019). While approximately 20% of children in the general population exhibit behavioral problems, this rate may be higher in children with HL despite appropriate device usage, cochlear implantation, and educational interventions

(Chao et al., 2015; Patterson et al., 1989; Theunissen et al., 2014a). Problems in language development in children with HL can lead to communication problems and negatively affect the development of age-appropriate social skills (Moeller, 2000; Tüfekçioğlu, 2005). As a result, delayed language development is an underlying mechanism of problem behaviors because it leads to communication problems (Quittner et al., 2010; Theunissen et al., 2012). For this reason, it has been suggested that children with HL are more at risk than their TD peers in terms of developing behavioral problems (Barker et al., 2009; Quittner et al., 2010; Theunissen et al., 2014a; van Eldik, 2005).

Remine and Brown (2010) conducted a comparative study with TD children to determine the prevalence and nature of behavior problems in children and adolescents with HL. The study involving 65 parents, 65 teachers, and 35 HL adolescents used teacher-reported scales. As a result, adolescents with HL exhibited more aggressive and delinquent behaviors than TD peers. Van Eldik (2005) found that adolescents with HL between the ages of 11-18 had three times more externalizing, internalizing, and general mental problems than the TD sample.

Inadequacies in interaction with the social environment due to limited language performance disrupt the child's social adaptation and lead to social isolation (DeLuzio & Girolametto, 2011; Nunes et al., 2001; Wake et al., 2004). Research shows that children with HL may experience significant social difficulties compared to their hearing peers (Batten et al., 2014). Children with HL are more withdrawn and less cooperative than their TD peers and may experience problems in friendships and communication (Wauters & Knoors, 2008). Different studies have also stated that problems in communication and interaction negatively affect social skills and adaptation and can lead to behavioral problems (Dilshad et al., 2016; Hoffman et al., 2016; Xie et al., 2014). Due to HL, children may exhibit behavioral problems such as depression, social isolation, aggression, introversion, apathy, low self-perception, and insecurity. These problems may have negative effects on the learning skills and academic development of children with HL, just as in TD children (Ademokoya & Olujide, 2007).

The second group of studies suggests that the difference between children with HL and TD children in terms of developing behavioral problems is gradually decreasing and even disappears when familial, educational, audiological, and personal variables are controlled (Edwards et al., 2006; Khan et al., 2005; Theunissen et al., 2014b). According to this view, early intervention, which includes early screening and diagnosis followed by appropriate hearing technology implementation, early implantation, and parent guidance, directly positively affects all developmental areas of the child with HL, especially language development. Early intervention improves communication skills by providing quality parent-child interaction. This leads to the development of social competencies in the child, resulting in decreased problem behaviors (Edwards et al., 2006; Marschark, 2007; Theunissen et al., 2014b).

The studies in this group predominantly included children diagnosed early, provided with early hearing devices, and received cochlear implants in the early period. It has been suggested that with the development of hearing proficiency after cochlear implantation and education, a significant reduction in behavioral, social, and emotional problems in children with HL has been observed (Edwards et al., 2006; Houston & Miyamoto, 2010; Quittner et al., 2010; Quittner et al., 2007). For example, Khan et al.

(2005) compared age-matched cochlear implant users (*n*= 25), hearing aid users (*n* = 13), and TD (*n* = 18) children. In the study in which teacher-reported scales were used, no difference was found between the groups in terms of behavioral problems. Theunissen et al. (2012), using the Child Symptom Inventory-4, reported that children with cochlear implants (*n* = 32), hearing aids (*n* = 51), and TD (*n* = 127) did not differ in terms of anxiety symptoms, a type of internalized behavior. Furthermore, the implant increased self-sufficiency and stabilized family and social relationships in children with HL (Filipo et al., 2004; Nicholas & Geers, 2003). Despite the positive contribution of cochlear implant implementation to behavioral problems, there are also studies showing these children's behavioral problems. However, it has been suggested that this is associated with limited oral language performance and delayed age at implantation (Beer et al., 2012; Chao et al., 2015; de Giacomo, 2013).

School is where children have their first social experiences outside the family. Especially preschool and primary school play an important role in the development of children's personalities and the behaviors they will exhibit throughout their lives (Low et al., 2015). For this reason, it becomes important to determine the level and types of behavior problems of children with HL and the factors affecting behavior problems. This determination is thought to pave the way for studies such as the prevention and reduction of behavioral problems exhibited by children with HL in preschool and primary education and social skills teaching. On the other hand, considering that there are limited studies on the subject in Türkiye, the findings obtained in this study have the potential to contribute to the elimination of the previously mentioned contradictory findings in the international literature.

The study aimed to compare the behavioral problems of preschool or primary school-aged children with hearing loss to those of children with TD and ASD. In addition, variables that play a role in the behavioral problems of children with HL were determined. This study did not aim to determine the behavioral problems of children with ASD. It is known that children with ASD are one of the groups that exhibit extremely intense behavioral problems among children with special needs (Jang et al., 2011; Simo-Pinatella et al., 2019). The reason for including the ASD group in the comparisons is to understand the position of possible behavioral problems in children with HL compared to TD children and a type of disability (ASD) in which behavioral problems are seen intensely. To achieve this aim, the following research questions were sought to be answered:

1) Is there a significant difference between children with HL, TD children, and children with ASD in terms of behavior problems measured?

2) Do the behavior problems of children with HL differ according to the educational stage, parent guidance, hearing technology, and additional problems?

3) Is there a significant correlation between the behavior problems of children with HL and HL-specific audiological and educational variables?

4) Which audiological and educational variables predict the behavior problems of children with HL?

Method

Research Design

In this quantitative study, the need to examine the differences between groups, the intercorrelations, and the prediction rates of variables leads the research to both causal-comparative and correlational research models (Mills & Gay, 2019). The problem behaviors at the focus of the study were obtained with two scales for the same characteristic in accordance with the multi-measure approach.

Participants

The participants were 273 special education and general education (classroom and preschool) teachers working at preschool and primary schools in 48 provinces of Turkey. There were 273 students with TD, HL, and ASD whose information was provided. Participants were reached through convenience sampling (Mills & Gay, 2019). Information about the participants is presented in Table 1.

Table 1

Descriptive Statistics of Participant Characteristics

Groups	*n*	*%*				
Teachers						
Special Education	158	57.9				
General Education	115	42.1				
Total	273	100				
Children						
TD	103	37.7				
HL	84	30.8				
ASD	86	31.5				
Total	273	100				
Variables	TD		HL		ASD	
	n	*%*	*n*	*%*	*n*	*%*
Gender						
Girls	47	45.6	38	45.2	16	18.6
Boys	56	54.4	46	54.8	70	81.4
Educational Stage						
Preschool	25	24.3	29	34.5	23	26.7
Primary School	78	75.7	55	65.5	63	73.3
Age						
M(SD)	7.43(1.48)		7.73(2.21)		8.06(1.69)	
Minimum-Maximum	5.5-11		5-13		6-13	

Note. TD = Typical Development, HL = Hearing Loss, ASD = Autism Spectrum Disorder

As can be seen in Table 1, there are slightly more special education teachers than general education teachers. The distribution of student groups is close to each other. The gender distributions of the students are similar in the TD and HL groups, while the ratio of boys in ASD is approximately four times that of girls. Primary school students outnumbered preschool students in all three groups. The mean ages of the students were 7.43 years for TD, 7.73 years for HL, and 8.06 years for ASD. There was no significant difference between the mean ages of the groups [F (2-270) = 2.900, p > .05]. Detailed information about children with HL is presented in Table 2.

Table 2

Descriptive Statistics for Hearing Loss-Specific Variables

Categorical Variables	*n*	*%*
Degree of Hearing Loss*		
20-40 dBHL (Mild)	10	11.9
41-70 dBHL (Moderate)	16	19.0
71-95 dBHL (Severe)	23	27.4
96+ dBHL (Profound)	35	41.7
Hearing Technologies		
Hearing Aids	49	58.3
Cochlear Implants	32	38.1
None	3	3.6
Parent Guidance		
Received	39	46.4
Not Received	45	53.6
Additional Problem**		
Had	19	22.62
Had not	65	77.38
Continuous Variables	*M(SD)*	Minimum-Maximum
Age at Diagnosis (Months)	13.67 (15.33)	1-78
Age at Onset of Hearing Aid Use (Months)	19.14 (15.14)	1-72
Age at Implantation (Months)	30.78 (17.13)	11-66
Duration of Cochlear Implant Use (Months)	58.50 (25.95)	20-108

Note. * = Depending on the British Association of the Teachers of the Deaf (BATOD) classification. ** = Children diagnosed medically and/or reported by the teacher as having additional learning problems. dBHL = decibel Hearing Loss

Table 2 shows that in children with HL, those with severe and profound hearing loss outnumber those with moderate and mild hearing loss. More than half of the children use hearing aids, and almost half use cochlear implants. Approximately one-quarter of children have been diagnosed or had teacher-reported additional problems. Children were diagnosed at an average age of 13.67 months, started using hearing aids

at an average age of 19.14 months, underwent cochlear implant surgery at an average age of 30.78 months, and have been using cochlear implants for 58.50 months.

Data Collection Tools

Participant information forms, the Child Behavior Checklist for Ages 4-18 Teacher's Report Form (CBCL-TRF), and the Problem Behaviors Subscale of the Social Skills Rating System Teacher's Form (SSRS-PB) were used to collect data.

Participant Information Forms

Information forms were developed to determine the demographic, educational, medical, and audiological characteristics of children in each group (TD, HL, ASD). Before distributing forms, informed consent forms were presented to the participants, and their written declarations of voluntary participation were obtained.

CBCL-TRF

The CBCL-TRF is a standardized scale comprising 113 items that assess children and youth's school adaptation and problem behaviors in line with teacher reports. The scale focuses on the problem behaviors exhibited by the child in the last two months and received from the child's teacher. Three separate behavioral symptom scores are obtained from the scale: 'Internalizing Problems,' 'Externalizing Problems,' and 'Total Problems'. The scale is graded by giving 0, 1, or 2 points to the items in the item. The scale, originally developed by Achenbach and Edelbrock (1986), was revised in 1991, 2001, and 2007. The last reliability study of the scale in Turkey used in the present study was conducted by Erol and Şimşek (2010) with 732 clinical and 2310 normal samples. The scale's internal consistency coefficients (Cronbach Alpha) were determined as .89 in Internalizing Problems, .93 in Externalizing Problems, and .96 in Total Problems. The internal consistency coefficients in the current study were .88, .92, and .96, respectively.

SSRS-PB

SSRS consists of three subscales: 'Social Skills', 'Problem Behaviors' and 'Academic Competence'. This study used the 'Problem Behavior' subscale consisting of 18 items. The scale is based on teacher-reported behaviors of children aged 0-12 in the last two months. The original version of the SSRS was developed by Gresham and Elliott in 1990 and adapted in Turkey by Sucuoğlu and Özokçu (2005). In the adaptation study, the 'Problem Behaviors' dimension, which consisted of three sub-factors in the original form, was transformed into a two-factor structure by including the hyperactivity section in the externalized behaviors subscale without changing the number of questions. Cronbach's alpha coefficients were .90 for the total score of the Problem Behaviors Scale, .93 for Externalizing Behaviors, and .86 for Internalizing Behaviors. The internal consistency coefficients in the current study were .82, .88, and .89, respectively.

Data Collection Process

A toolkit consisting of participant information form, CBCL-TRF, and SSRS-PB was created for each group. Written permission was obtained from the developers for the use of the scales. Ethics committee approval was obtained from the Anadolu

University Social and Human Sciences Scientific Research and Publication Ethics Committee (Protocol no: 46724). After the permissions, informed consent was obtained from the participants. Then, the toolkit suitable for each participant group was delivered to the participants both online and in printed form. Nine participants were excluded from the study in accordance with the criterion "If more than eight items are left blank except for items 56a-56g in the CBCL-TRF, the scale is not included in the scoring" (Erol & Şimsek, 2010, p. 143). Data collection took two months.

Data Analysis

Before running the analyses, data control was ensured by visually checking the digitized values, missing values, and items left blank, identifying outliers, and reviewing basic descriptive statistics. The assumptions of the analyses were tested by conducting the Kolmogorov-Smirnov normality test and checking skewness and kurtosis values, histograms, and Q-Q and P-P graphs for univariate normality (Tabachnick et al., 2013). In addition to normality tests, it is stated that if the skewness and kurtosis values are between -1.5 and 1.5, it can be accepted that the data obtained from the scales show a normal distribution (Hair et al., 2013; Tabachnick et al., 2013). According to these criteria, it was accepted that the data were normally distributed. However, nonparametric analysis (Mann Whitney U) was used to compare children with HL due to the decrease in the number of participants and the increase in skewness kurtosis values.

Results

This study aimed to evaluate the behavioral problems of children with HL in comparison with children with TD and ASD, to differentiate behavioral problems in the HL group according to audiological and educational variables, and to determine the predictive power of hearing loss-specific variables on behavioral problems. In this framework, the findings are presented in accordance with the order of the research questions.

Triple Comparison: TD, HL, ASD

Firstly, the comparison of the scores of children with TD, HL, and ASD on the CBCL-TRF and SSRS-PB was included. The findings obtained by the analysis of variance (ANOVA) are presented in Table 3.

Table 3

ANOVA Results of CBCL-TRF and SSRS-PB Scores by TD, HL and ASD Groups

Scale/Subscale	Group	*n*	*M*	*SD*	*F*	*p*	η^2	Comparisons	*p*
CBCL-TRF Total	TD	103	38.78	34.51	24.72	.000***	.155	TD-HL	.934
	HL	84	37.29	25.02				TD<ASD	.000***
	ASD	86	64.40	24.11				HL<ASD	.000***
Internalizing Problems	TD	103	8.20	9.40	8.427	.000***	.059	TD-HL	.575
	HL	84	7.10	6.14				TD<ASD	.006**
	ASD	86	11.60	6.06				HL<ASD	.000***
Externalizing Problems	TD	103	9.75	10.75	10.54	.000***	.072	TD-HL	.981
	HL	84	9.49	8.59				TD<ASD	.000***
	ASD	86	15.24	8.32				HL<ASD	.000***
SSRS-PB Total	TD	103	7.58	2.57	26.70	.000***	.165	TD-HL	.502
	HL	84	6.52	2.61				TD<ASD	.000***
	ASD	86	13.15	3.56				HL<ASD	.000***
Internalizing Behaviors	TD	103	2.14	2.26	5.294	.000***	.038	TD-HL	.218
	HL	84	1.52	1.05				TD-ASD	.194
	ASD	86	2.76	2.79				HL<ASD	.004**
Externalizing Behaviors	TD	103	5.45	2.42	35.14	.000***	.207	TD-HL	.796
	HL	84	5.01	2.00				TT<ASD	.000***
	ASD	86	10.38	3.91				HL<ASD	.000***

Note. * = $p \leq .05$, ** = $p \leq .01$, *** = $p \leq .001$, CBCL-TRF = Child Behavior Checklist-Teacher Report Form, SSRS-PB = Social Skills Rating System-Problem Behavior, TD = Typically Developing, HL = Hearing Loss, ASD = Autism Spectrum Disorder

Table 3 shows a significant difference between the groups in all sub-dimensions and total scores of CBCL-TRF and SSRS-PB scales ($p \leq .001$). The effect sizes were small in internalizing behaviors, medium in internalizing and externalizing problems, and high in CBCL-TRF total, externalizing problems and SSRS-PB total.

Post-hoc (Tukey HSD) analysis was conducted to ANOVA results for multiple comparisons. According to the results of multiple comparisons, there was no significant difference in the pairwise comparison of the subscales and total scores of the CBCL-TRF and SSRS-PB scales. The group with the highest mean scores in all scales and subscale total scores were children with ASD. The mean scores ranged from ASD > TD > HL in all scales from higher to lower scores. In addition, in all subscales except internalizing behaviors, the scores of children with ASD were significantly higher than those of children with HL and TD.

Differences in HL-Specific Variables

Pairwise comparisons regarding the demographic, educational, and audiologic characteristics of children with HL are presented in Table 4. Since the normality assumption could not be met in subgroups, comparisons were made with the Mann-Whitney U Test.

Table 4

Comparisons by Variables Specific to Children with HL

Scale/Subscale	Education Stage	*n*	*M*	*SD*	Mean Rank	Rank Sum	*U*	*p*	η^2
CBCL-TRF Total	Preschool	29	38.59	25.78	43.53	1262.50	767.50	.778	.001
	Primary	55	36.60	24.82	41.95	2307.50			
Internalizing Problems	Preschool	29	7.21	4.87	45.36	1315.50	714.50	.434	.007
	Primary	55	7.04	6.76	40.99	2254.50			
Externalizing Problems	Preschool	29	9.97	9.47	43.71	1267.50	762.50	.741	.001
	Primary	55	9.24	8.17	41.86	2302.50			
SSRS-PB Total	Preschool	29	7.48	4.71	48.43	1404.50	625.50	.105	.031
	Primary	55	6.02	5.36	39.37	2165.50			
Internalizing Behaviors	Preschool	29	1.55	1.72	43..76	1269.00	761.00	.720	.001
	Primary	55	1.51	1.89	41.84	2301.00			
Externalizing Behaviors	Preschool	29	5.93	3.47	49.50	1435.50	594.50	.055	.043
	Primary	55	4.51	4.03	38.81	2134.50			
	Parent Guidance								
CBCL-TRF Total	Received	39	33.90	25.65	39.32	1533.50	753.50	.266	.015
	Not received	45	40.22	24.36	45.26	2036.50			
Internalizing Problems	Received	39	1.33	1.84	39.27	1531.50	671.50	.064	.041
	Not received	45	1.69	1.81	45.30	2038.50			
Externalizing Problems	Received	39	8.79	8.01	41.15	1605.00	825.00	.637	.003
	Not received	45	10.09	9.10	43.67	1965.00			
SSRS-PB Total	Received	39	5.89	5.43	38.76	1511.50	731.50	.189	.020
	Not received	45	7.07	4.91	45.74	2058.50			
Internalizing Behaviors	Received	39	1.33	1.84	39.27	1531.50	751.50	.238	.015
	Not received	45	1.69	1.81	45.30	2038.50			
Externalizing Behaviors	Received	39	4.56	3.89	39.59	1544.00	764.00	.306	.012
	Not received	45	5.38	3.88	45.02	2026.00			
	Hearing Technologies								
CBCL-TRF Total	Hearing Aids	49	41.49	25.16	45.67	2238.00	555.00	.027*	.060
	Cochlear Implants	32	29.31	22.34	33.84	1083.00			
Internalizing Problems	Hearing Aids	49	8.10	6.08	46.63	2285.00	508.00	.007**	.088
	Cochlear Implants	32	4.84	5.38	32.38	1036.00			
Externalizing Problems	Hearing Aids	49	10.92	8.84	45.55	2232.00	561.00	.031*	.057
	Cochlear Implants	32	7.00	7.15	34.03	1089.00			
SSRS-PB Total	Hearing Aids	49	7.14	5.01	44.69	2190.00	603.00	.049*	.063
	Cochlear Implants	32	5.41	5.15	35.34	1131.00			
Internalizing Behaviors	Hearing Aids	49	1.86	1.86	45.74	2241.50	551.50	.019*	.092
	Cochlear Implants	32	0.97	1.51	33.73	1079.50			
Externalizing Behaviors	Hearing Aids	49	5.28	3.86	43.14	2114.00	679.00	.307	.031
	Cochlear Implants	32	4.43	3.94	37.72	1207.00			
	Additional Problem								
CBCL-TRF Total	Had	19	48.26	19.37	56.71	1077.50	347.50	.004**	.099
	Had Not	65	34.08	25.69	38.35	2492.50			

Internalizing Problems	Had	19	8.95	6.42	50.05	951.00	474.00	.124	.028
	Had Not	65	6.55	6.01	40.29	2619.00			
Externalizing Problems	Had	19	11.32	7.60	50.37	957.00	468.00	.109	.030
	Had Not	65	8.95	8.84	40.20	2613.00			
SSRS-PB Total	Had	19	8.53	5.29	52.82	1003.50	421.50	.036*	.053
	Had Not	65	5.94	5.01	39.48	2566.50			
Internalizing Behaviors	Had	19	1.89	1.88	48.66	924.50	500.50	.191	.019
	Had Not	65	1.41	1.81	40.70	2645.50			
Externalizing Behaviors	Had	19	6.63	4.14	53.16	1010.00	415.50	.029*	.056
	Had Not	65	4.52	3.70	39.38	2560.00			

Note. * = $p \leq .05$, ** = $p \leq .01$, CBCL-TRF = Child Behavior Checklist-Teacher Report Form, SSRS-PB = Social Skills Rating System-Problem Behavior

According to the results of the analysis presented in Table 4, there is no significant difference in any score in terms of educational stage and parent guidance. All mean scores of preschool children were higher than those of primary school children, and those of students who did not receive parental guidance were higher than those who received. In the context of hearing technology, a significant difference was found in both CBCL-TRF and SSRS-PB scores, except for the externalizing behaviors score of SSRS-PB. Accordingly, children using hearing aids had higher mean scores than children using cochlear implants. In the comparisons in terms of additional problem status, a significant difference was found in CBCL-TRF total, SSRS-PB externalizing behaviors, and SSRS-PB total score. Children with additional problems had higher mean scores. A medium effect size was calculated in all comparisons in which a significant difference was obtained.

Correlations of HL-Specific Variables with Scale Scores

Pearson correlation analysis was performed to determine the correlation of HL-specific audiological and educational variables with scale and subscale total scores, and the results are presented in Table 5.

Table 5

Correlations between Participant Variables and Scale Scores

Variables/Scores	Internalizing	Externalizing	CBCL-TRF Total	Internalizing Behaviors	Externalizing Behaviors	SSRS-PB Total
Age	.014	.010	-.039	.036	-.200	-.138
Age at Diagnosis	.222*	.146	.155	.240*	.076	.142
Age at onset of HA use	.386***	.382***	.408***	.381***	.268***	.337***
Age at Implantation	.439*	.367***	.413***	.325	.407*	.409*
Duration of CI use	-.438*	-.166	-.318	-.338	-.360*	-.377*

Note. * = $p \leq .05$, ** = $p \leq .01$, *** = $p \leq .001$, HA = Hearing Aids, CI = Cochlear Implants, CBCL-TRF = Child Behavior Checklist-Teacher Report, SSRS-PB = Social Skills Rating System-Problem Behavior

According to the correlation analysis presented in Table 5, there is no significant relationship between age and other measures. A significant positive relationship was found between age at diagnosis and internalizing problem scores and internalizing behavior scores. There was a significant positive correlation between the age at onset of hearing aid use and all outcome measures. Similarly, there is a significant positive correlation between age at implantation, and all scores except internalizing behaviors score. There is also a significant negative correlation between the duration of cochlear implant use and internalizing externalizing behaviors and SSRS-PB total scores.

Predictors of Behavioral Problems in Children with HL

Hierarchical regression analysis was performed to determine the predictors of behavioral problems in children with HL. The high correlation (r > .75) between the age at diagnosis and the age at onset of hearing aid use and between the age at implantation and the duration of cochlear implant use poses a multicollinearity problem (Tabachnick et al., 2013). Therefore, it was necessary to select one of these variables. A correlation of .57 was found between the age at onset of hearing aid use and the age at implantation. Accordingly, since there was no multicollinearity problem, age at onset of hearing aid use and age at implantation were taken as predictor variables in regression analyses. As a result, the predicted variable was the scale total scores, and the predictors were the age at onset of hearing aid use and the age at implantation. The results of the analysis are presented in Table 6.

Table 6

Predictors of Behavior Problems of Children with HL: Results of Hierarchical Regression Analysis

Predicted	Model	Predictor	B	SH_B	β	t	p	ΔR^2	R^2
CBCL-TRF Total	1	Age at Implantation	.541	.217	.413	2.487	.019*	.171	.171
	2	Age at Implantation	.139	.237	.106	.588	.561	.192	.363
		Age at Onset of HA Use	1.061	.358	.535	2.960	.006**		
SSRS-PB Total	1	Age at Implantation	.123	.050	.409	2.455	.020*	.167	.167
	2	Age at Implantation	7.343	.048	.000	.002	.999	.341	.508
		Age at Onset of HA Use	.325	.073	.713	4.485	.000***		

Note. * = $p \leq .05$, ** = $p \leq .01$, *** = $p \leq .001$, HA = Hearing Aids, CBCL-TRF = Child Behavior Checklist-Teacher Report Form, SSRS-PB = Social Skills Rating System-Problem Behavior

According to Table 6, for CBCL-TRF, the age at implantation, which entered the model first, is a significant predictor, with 17.1% of the total variance explained. In Model 2, the total variance explained increased to 36.3% with the entry of the age at the onset of hearing aid use into the equation. Similarly, for SSRS-PB, age at implantation explained 16.7% of the total variance in model 1, and the total variance explained increased to 50.8% with the addition of age at onset of hearing aid use in the equation in model 2.

Discussion

With the first research question of this study, the behavioral problems of preschool or primary school-aged children with HL were compared to those of children with TD and ASD. The second, third and fourth research questions aimed to determine which factors play a role in the behavioral problems of children with HL. For this reason, the discussion is presented under two headings: the results of the triple comparison and the factors affecting behavioral problems in children with HL.

Triple Comparison

In the comparison of TD, HL, and ASD, children with ASD had the highest scores in all dimensions of the CBCL-TRF. A similar finding was found in the scores of the SSRS-PB scale. Accordingly, children with ASD exhibited more intense behavioral problems than children with TD and HL. No TD-ASD difference was observed in the internalizing behaviors dimension of the SSRS-PB. On the other hand, no significant difference was found between children with TD and HL in any of the subscales or total scores of the scales.

In the current study, it was expected that children with ASD would score higher on scales related to behavior problems compared to the other groups. The comprehensive meta-analysis study of Simo-Pinatella et al. (2019) reported that up to 94% of children with ASD exhibit behavior problems intensely, and almost every child with ASD has at least one behavior problem that requires intervention. Research indicates that behavioral problems of children with ASD can reach clinical levels, and therefore, special intervention programs are required (Jang et al., 2011; Matson et al., 2008; Öztürk et al., 2016; Simo-Pinatella et al., 2019). Although this study did not directly aim to determine symptom intensity, the scale and subscale total scores of children with ASD were approximately twice the scores of children with TD and HL. This shows that the symptom intensity indicating behavioral problems is extremely high in children with ASD. Therefore, this finding is in line with the previous research.

Children with ASD did not differ from their TD peers only in the internalized behaviors dimension of the SSRS-PB. In addition, the scores of these children on the externalizing/externalizing behavior dimensions of both scales were higher than the internalizing/internalizing behavior scores. The scales used in the study were based on teacher reports. When these two findings are considered together, teachers attribute behavior problems more to externalizing behaviors and consider internalizing behaviors as relatively less of a problem (Venetz et al., 2019).

According to the other result from the triple comparison, there was no significant difference between children with HL and TD in terms of behavior problems. While this result is consistent with some of the studies (e.g., Edwards et al., 2006; Filipo et al., 2004; Khan et al., 2005; Quittner et al., 2010; Theunissen et al., 2014b), it is not consistent with others (e.g., Chao et al., 2015; Remine & Brown, 2010; van Eldik, 2005). In line with this finding, Khan et al. compared 38 children with HL with 18 TD children, and Theunissen et al. compared 88 children with HL with 127 TD children. When we look at the common features of these studies, both hearing aid and cochlear implant users were included, and the measurements were taken from similar scales based on teacher reports. It has been suggested that the use of hearing technology may play a role in reducing behavioral problems by increasing the child's self-efficacy level

and language and communication skills (Filipo et al., 2004). In addition, since the use of cochlear implants brings with it family-centered early intervention (Nicholas & Geers, 2003) and this education includes supporting positive parental attitudes and behavior management, it reduces possible behavioral problems in children with HL.

On the other hand, despite the use of hearing technology (Chao et al., 2015), studies report that children with HL show more behavioral problems than their peers (Remine & Brown, 2010; van Eldik, 2005). Remine and Brown, as well as van Eldik's studies, which have contradictory findings with the current study, included individuals in adolescence as a sample despite using similar measurement tools. It is likely that the unique characteristics of adolescence affect individuals with HL more than their TD peers. Youth with HL in this period may have difficulty socializing with their TD peers and accepting themselves to their peers. This may lead to internal emotional-behavioral problems such as anxiety, depression, and feelings of inadequacy or external emotional-behavioral problems such as anger and social maladjustment (Nunes et al., 2001).

Factors Affecting Behavior Problems in Children with HL

In order to determine the factors affecting behavioral problems in children with HL, first, whether behavioral problems differed according to audiological and educational variables was determined. Accordingly, audiological and educational factors affecting behavioral problems in children with HL are the hearing technology used, whether the child has additional problems and parental guidance.

These findings are consistent with the previous studies. In Göl's (2017) study involving children (n = 55) with similar characteristics to this study, although it did not reach statistical significance, behavioral problems of children who received family-centered early intervention were found to have fewer problem behaviors than those who did not.

According to the findings of the hearing technology used, children using hearing aids scored higher than children using cochlear implants in all score types where there was a difference. Similar findings reflecting the positive contribution of cochlear implant use in reducing behavioral problems have been obtained in other studies (Cruz et al., 2012; Theunissen et al., 2014b; Yavuz et al., 2010). The problems experienced by children with HL in accessing sound can lead to potential communication problems and put them at risk in terms of social-emotional development. However, it has been suggested that with the development of hearing proficiency after cochlear implantation and training, a significant decrease in behavioral, emotional, and social problems in children with HL has been observed (Edwards et al., 2006; Quittner et al., 2010; Quittner et al., 2007). This approach also partially explains the lack of a significant difference between children with HL and TD. It has been suggested that behavioral problems may be observed in these children despite cochlear implantation, but this is associated with limited language performance and/or delayed age at implantation (Chao et al., 2015; de Giacomo, 2013).

One of the important variables for children with HL is whether the child has an additional problem that will affect learning. Additional problems affect all performance areas of the child and are also reflected in behavioral problems (Edwards, 2007). As a matter of fact, in this study, according to CBCL-TRF and SSRS-PB total scores, children with HL with additional problems exhibited more intense behavioral problems

than those without additional problems. There is no study directly focusing on this issue in the literature. However, Beer et al. (2012) stated that the use of cochlear implants increased the daily life and socialization skills of children with HL with additional problems. Cruz et al. (2012), on the other hand, reported that the additional problem negatively affected the benefit of cochlear implants for children with HL. The same study observed that behavioral problems of children with HL and ASD as an additional problem increased over time. Therefore, attributing behavioral problems in children with HL only to hearing loss is not considered to be an accurate conclusion.

Another process to determine the factors affecting behavior problems is to reveal the variables associated with behavior problems (correlation) and explain behavior problems (regression). For children with HL, a significant positive correlation was found between the scale scores expressing behavioral problems and age variables (age at diagnosis, age at initiation of hearing aid use, age at cochlear implant surgery). According to regression analyses, the age at onset of hearing aid use and the age at cochlear implantation significantly explained behavioral problems. The summary of the correlation and regression analyses is as follows: The earlier the age at diagnosis, hearing aid implementation, and cochlear implantation, the fewer behavioral problems the child has.

These findings are similar to many studies (Boons et al., 2013; Houston & Miyamoto, 2010; Miyamoto et al., 2008; Yavuz et al., 2010). Only in Göl's (2017) study, while the age at onset of hearing aid use was a predictor of social skill level, the age at implantation was not found to be predictive. The fact that Göl's study included only preschool children and that there were relatively few children with cochlear implants in the sample (n = 31) may have been effective in this result. Although Göl's study focused on social skills rather than behavioral problems, the reciprocal relationship between these two characteristics makes the findings of our study meaningful.

Influence of Early Intervention

At this point, the question "What are the factors affecting behavior problems in children with HL?" can be answered. Within the scope of the findings of this study, behavioral problems in children with HL are affected by age at diagnosis, hearing technology used, age at onset of hearing aid use, age at cochlear implantation, duration of cochlear implant use, additional problems, and parent guidance. When these variables are carefully analyzed, all of them are related to the early intervention process of children with HL. Language is the first developmental area that comes to mind regarding early intervention in children with HL. In simpler terms, although other developmental areas are not excluded, the main aim of early intervention is to support the child's language development (Clark, 2007; Cole & Flexer, 2007; Turan, 2014). However, it seems that early identification of children with HL, early hearing technology implementation, and the accompanying family-centered early education services play a crucial role in supporting emotional-behavioral development as well as language development. The presence of an additional problem to HL in the child reduces the likelihood of benefiting from early intervention at the level of peers.

Conclusion and Recommendations

According to the triple comparisons, behavioral problems in children with ASD are significantly higher than in children with TD and HL. This result is a repetition of the literature (e.g., Simo-Pinatella et al., 2019). However, there is no difference between the behavior problem levels of children with HL and their TD peers. In addition, children with HL without additional problems exhibited lower behavior problems than those with additional problems. These results show that being a child with HL alone cannot be a factor in explaining behavior problems. The findings of this study do not support the understanding that children with HL have more emotional and behavioral problems than their peers.

The second important result of the study is that all factors that play a role in explaining behavioral problems in children with HL clearly represent an early identification and early intervention approach. The variables of age at diagnosis, hearing technology, age at onset of hearing aid use, age at cochlear implantation, duration of cochlear implant use, and parent guidance are all requirements of early intervention practices in the field of education of children with hearing loss. According to this result, which partially explains the lack of difference in the comparison of children with HL-TD, early intervention not only supports language and cognitive development in children with HL, but also has a positive impact on social-emotional development. Early intervention of HL, which includes early screening and diagnosis followed by appropriate hearing technology implementation, early implantation and family-centered early intervention, directly and positively affects all developmental areas of the child, especially language development (Turan, 2014). Therefore, early intervention improves communication skills by providing quality parent-child interaction and plays a role in reducing problem behaviors by leading to the development of social competencies in children (Barker, 2009; Most, 2004; Theunissen et al., 2014b).

In summary, two main conclusions can be made, limited to the findings of this study: (1) The fact that a child has hearing loss does not mean that he/she will develop behavioral problems. (2) Early intervention plays an effective role in preventing behavioral problems in children with HL.

In the study, two scales for the same variable were used in accordance with the multi-measure approach, and in this way, the findings were tried to be strengthened. However, the fact that the instruments are based on teacher reports may have an important limitation (Venetz et al., 2019). Teachers were warned to consider the average child in the classroom when filling out the scales. However, some teachers may have shown a bias towards children with severe or no behavior problems. Therefore, including parent forms of the same scales in future studies may play a role in eliminating possible bias. Since the study included children with HL attending inclusive settings, it was conducted with children using oral language as the mode of communication, and children using sign language could not be included. It is extremely important to address the relationship of this important variable with behavioral problems in future studies in order to interpret the subject in a holistic and unbiased manner.

Children with HL are a heterogeneous sample (Swanwick & Marschark, 2010). The heterogeneous nature of the sample requires strict control in quantitative research.

For this reason, the larger the sample in future studies, the more representative and control probability may increase. In addition, mixed-method studies in which qualitative data follow quantitative data can be designed to reveal the reasons for behavior problems and behavior management methods in future studies. This study showed that additional problems and early intervention were reflected in behavioral problems in children with HL. Designing studies focusing only on these characteristics will provide a detailed understanding of the role of these variables in the development and prevention of behavior problems. The results indicate that both researchers and practitioners should focus on studies aimed at preventing behavior problems.

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Statement of Responsibility

Abdullah Genç and Osman Çolakoğlu in conceptualization, design, data collection, analysis, and literature review; Murat Doğan in supervision, data analysis, and critical review. All authors participated in writing and critical review.

Conflicts of Interest

The authors have no conflict of interest to disclose.

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The Influence of Student-Level Factors on Reading Literacy: A Comprehensive Study*

Öğrenci Düzeyinde Yer Alan Faktörlerin Okuma Okuryazarlığına Etkisi: Kapsamlı Bir Çalışma

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ABSTRACT: The aim of the present study was to examine the factors affecting the students' reading performance in a broad sense. The sample was comprised of a total of 752076 students who participated in PISA studies from OECD member countries during the years 2000 (n = 159095), 2009 (n = 298454), and 2018 (n = 294527) in which reading literacy was the major domain of interest. The causal relationships were examined using a series of multiple linear regressions by using IDB Analyzer software, which creates syntaxes that replicate the analysis 80 times for each plausible value and calculate the average values by taking into account the student weights as suggested in the PISA manuals. The results revealed that enjoyment of reading (at 91%, 100%, and 56% of countries in 2000, 2009, and 2018, respectively) and index of economic, social, and cultural status (at 81%, 91%, and 91% of countries in 2000, 2009, and 2018, respectively) were ranked among the most significant variables that predict reading literacy in all three PISA cycles. While metacognition was not included in 2000, it was among the most important variables (at 100% of countries) in 2009 and 2018.

Keywords: Index of economic, social, and cultural status, metacognition, OECD countries, reading performance, reading enjoyment.

ÖZ: Bu çalışmanın amacı, öğrencilerin okuma performanslarını etkileyen faktörleri geniş ölçekte incelemektir. Örneklem, PISA okuma okuryazarlığının tematik alan olduğu 2000 (n = 159095), 2009 (n = 298454) ve 2018 (n = 294527) yıllarında OECD üyesi ülkelerden PISA çalışmalarına katılan toplam 752076 öğrenciden oluşmaktadır. Nedensel ilişkiler, her olası değer için analizi 80 kez tekrarlayan betikleri oluşturan ve PISA kılavuzlarında önerildiği gibi öğrenci ağırlıklarını dikkate alarak ortalama değerleri hesaplayan IDB Analyzer yazılımı kullanılarak bir dizi çoklu doğrusal regresyon analizi ile incelenmiştir. Sonuçlar, okumadan zevk almanın (2000, 2009 ve 2018'e katılan ülkelerin sırasıyla %91, %100 ve %56'sında) ve ekonomik, sosyal ve kültürel statü endeksinin (2000, 2009 ve 2018'e katılan ülkelerin sırasıyla %81, %91 ve %91'inde) her üç PISA döngüsünde de okuma okuryazarlığını yordayan en önemli değişkenler arasında yer aldığı görülmüştür. Üstbiliş 2000 yılında sonraki yıllardaki gibi bir yapıda yer almazken, 2009 ve 2018 yıllarında (ülkelerin %100'ünde) en önemli değişkenler arasında yer almıştır.

Anahtar kelimeler: Ekonomik, sosyal ve kültürel statü indeksi, OECD ülkeleri, okuma performansı, okumadan zevk alma, üst biliş.

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All of us agree that reading is one of the fundamental tools for understanding people and our world to create personal and national welfare. On the other hand, students with difficulties reading and understanding information tend to experience various problems at school and in society. So, what are the primary predictors of reading skill that is very effective in the development of both individuals as well as societies? Extensive discussions and studies are still ongoing about this issue. Identifying which of these predictors is more effective on the reading skill will shed light to societies and policymakers for improving it further. Especially in recent years, many countries have been revising their own systems by taking part in various assessment studies to test their academic success at the national and international scales (Berberoğlu & Kalender, 2005; Tavsancil et al., 2019). The Program for International Student Assessment (PISA) project conducted by the Organisation for Economic Co-operation and Development (OECD) is one of several such studies that have been attracting attention. These studies, each called the "PISA cycle," have been carried out every three years since 2000. Reading literacy has been considered the major domain of interest in PISA studies in 2000, 2009, and 2018. The present study aimed to examine the variables that predict reading achievement in light of PISA data. Therefore, it seems essential to review related literature in order to understand the rationale and the importance of the study in general.

Literature Review

Factors Influencing Reading Achievement in General

For a successful reading, readers have to first reflect on the words in the written text using the proper knowledge and skills, comprehend the analyzed words, and retrieve the target message after analyzing the sentences comprised of these words (Güldenoğlu et al., 2013). Reading is a difficult and complex process, starting with discerning/realizing the sounds in the written text and comprehending the target message in the text (Fırat, 2020). The foundations of reading achievement are laid during the preschool period, which makes an impact on reading achievement in later stages of schooling. Indeed, it is emphasized that early literacy skills during the preschool period (letter knowledge, vocabulary, rapid naming, phonological awareness) have important impacts on acquiring and improving reading skills (Hulme et al., 2015; Ozernov-Palchik et al., 2017; Suggate et al., 2018; Torppa et al., 2010). Moreover, it has been determined that the skills during this pre-school period affect reading achievement in PISA. As an example, Eklund et al. (2018) illustrated in their study on students with dyslexia risk and no dyslexia risk that the verbal communication skills (e.g., vocabulary) evaluated before starting school predict about 53% of the PISA reading variance for the high-risk group and 31% for the low-risk group. Pre-reading precursors (phonological awareness, rapid naming, letter knowledge) predicted 15% of the PISA reading variance for the high-risk group and 13 % for the low-risk group. Similarly, Manu et al. (2021) found that early literacy skills, excluding phonological awareness are important predictors of reading skills (comprising 28% of the variance) in 9th grade. Whereas vocabulary knowledge was the most important predictor. Considering that these studies were longitudinal, the effect of early literacy skills on PISA reading variance is remarkable.

It has also been determined that many factors have an impact on successful reading during the school period such as fluent reading (Klauda & Guthrie, 2008; Torppa et al.,

2020), knowledge of text structure (Kendeou & Van Den Broek, 2007; Pyle et al., 2017), vocabulary knowledge (Elleman et al., 2009; Quinn et al., 2020), motivation (Guthrie et al., 2007; Troyer et al., 2019), memory (Arrington et al., 2014; Johann et al., 2020), prior knowledge (Kendeou & Van Den Broek, 2007; Ozuru et al., 2009) as well as cognitive and metacognitive strategies (Firat, 2019; Soto et al., 2019).

The Effect of Metacognitive Factors

In recent years, researchers have emphasized the importance of metacognition for reading skills (Fırat & Koçak, 2019; Williams & Atkins, 2009). Metacognition, or simply put, thinking about thinking, plays a key role in successful reading (Baker, 2002; Cummins et al., 2005). Metacognitive skills enable readers to plan prior to reading, monitor themselves and control the process during reading, and evaluate the process and themselves after the reading process (Fırat & Ergül, 2020). Such that, studies carried out have put forth that metacognition strongly separates successful readers from weak readers (Anastasiou & Griva, 2009; Artelt et al., 2001; Fırat & Koçak, 2019; Kuruyer & Özsoy, 2015). Indeed, metacognition, which plays a vital role in reading achievement, has been included among the variables that predict reading in PISA 2009 (see OECD, 2009). Fırat and Koyuncu (2023) used PISA 2018 data and found that students' metacognitive strategy choices are related to their reading proficiency levels. In other words, successful readers use complex and effective strategies, while weak readers use simpler strategies.

The Effect of Motivational Factors

PISA considers reading not only in the school context but in a much more comprehensive manner (Rogiers et al., 2020). In this regard, "reading enjoyment" emerges as another important factor for reading. Reading enjoyment signifies the satisfaction that we get from reading in our daily lives (Tavsancil et al., 2019). Wigfield and Guthrie (2000) have stated that students' reading skills are improved by reading practice, indicating that it is explained through the desire and motivation for reading. It is considered that motivation mediates the time spent reading or the amount of reading (Schiefele et al., 2012). Previous studies have also reported that there is a positive correlation between reading motivation and reading achievement (Lau & Chan, 2003; Miyamoto et al., 2019; Orellana et al., 2020; Taboada et al., 2009).

The Effect of Social, Cultural, and Economic Factors

In addition, socioeconomic status (SES) is another factor impacting reading achievement (Shala & Grajcevci, 2018). Education levels of the parents and home literacy environment are among the variables taken into consideration at the student level within the framework of SES. Whereas the variables of teacher quality, place of residence, number of activities at the school, student-teacher ratio, school type, educational resource, and family engagement attract attention at the school level (OECD, 2018). It was observed when previous studies were examined that the education levels of the parents are related to reading skills (Gülleroğlu et al., 2014; Kotte et al., 2005; Valenzuela et al., 2015; Vázquez-Cano et al., 2020). Families with higher socioeconomic standards can provide their children with a better learning environment and have more educational resources at home (Kır, 2016). It has also been put forth that the home literacy environment (meaning study room, worktable, study environment) is closely related to reading achievement (Gülleroğlu et al., 2014; İnce & Gözütok, 2018; Shala & Grajcevci, 2018). According to İnce and

Gözütok (2018), reading success differs significantly based on home educational resources, and students with rich educational opportunities tend to perform better. In addition, the researchers stated that apart from the course materials, the educational facilities provided to the students at home (desk, computer, novel, poetry, and story books) motivated the students to benefit from rich educational materials and to read different types of books. It is indicated in studies outside of the PISA data that the presence of a library at home (number of books) and support of the literacy skills of the child make positive contributions to the reading achievement of the child in the school environment (Boerma et al., 2017; Gottfried et al., 2015; Griffin & Morrison, 1997; Park, 2008; Sénéchal & LeFevre, 2014). Çoban (2020) reported that families with high SES support their children more, which in turn has a positive impact on reading achievement. In addition, studies have shown that SES has an impact on reading achievement at the school level (Kır, 2016; Rajchert et al., 2014). Children with low SES are less likely to compensate for the myriad difficulties they face when they attend lower-quality schools in stratified school systems (Parker et al., 2021).

Importance of the Study

As can be seen, it is possible to state that there are many variables that predict reading achievement. On the other hand, we are of the opinion that it is important to determine which of these variables are more effective on reading achievement and to what extent they predict reading. For this purpose, the factors affecting the reading performance of students participating in PISA studies from OECD member countries in the years 2000, 2009, and 2018, in which reading literacy was the major domain of interest, were examined. In this context, there are some important points that highlight and make the present study important. First, it is considered an important aspect of this study that the significant predictors of reading performance were determined and ranked according to their significance levels. Secondly, the PISA data used in the present study was highly reliable. It was obtained from well-structured assessment and evaluation processes and has been used in many widely known international outlets. Moreover, it has influenced educational policies in many countries all around the world. Third, selecting all possible variables that could be predictive of reading success after examining all the variables in PISA student questionnaires allowed us to examine and compare all possible predictors of reading performance together. Fourth, the large sample group from all OECD member countries with a time span of 18 years made it possible to acquire more generalizable results with greater precision and set our study apart from others. Last but not least, the present study has important implications for researchers, policymakers, and practitioners working in the field of reading, interested in large-scale assessments such as PISA, and following current studies in the field of education. Longitudinal studies have shown that early literacy skills in early childhood are effective on PISA reading achievement (Manu et al., 2021; van Bergen et al., 2021). Therefore, the results we will obtain in the light of PISA findings will guide us to analyse the factors affecting reading achievement correctly to increase each child's reading achievement from early childhood.

Aim of the Study

The aim of the present study was to examine the variables predicting reading performance of the students from OECD member countries participating in PISA 2000, 2009, and 2018 studies in which reading literacy was the major domain of interest. For this purpose, answers were sought to the following research questions:

- What are the factors that affect the students' reading skills, and what are the total explained variance rates of these variables in predicting reading performance in PISA 2000, 2009, and 2018, separately?
- What are the similarities and differences between the results obtained for each PISA cycle?

Method

Research Design

This study is a quantitative survey research since it aims to describe the existing characteristics of students by using the data collected through PISA student questionnaires. In addition, since the relationship between independent and dependent variables is explained through a regression equation, it is also a correlational study.

Participants

The population of the study was comprised of 15-year-old students from OECD member countries. The sample included a total of 752076 students who participated in the PISA studies in the years 2000 (n = 159095), 2009 (n = 298454), and 2018 (n = 294527). The distribution of the participants by country is given in Table 1.

Table 1

Descriptive Statistics

	Years					
	2000		2009		2018	
Country	f	%	f	%	f	%
Australia	5176	3.25	14251	4.77	14273	4.80
Austria	4745	2.98	6590	2.21	6802	2.30
Belgium	6670	4.19	8501	2.85	8475	2.90
Canada	29687	18.66	23207	7.78	22653	7.70
Switzerland	6100	3.83	11812	3.96	5822	2.00
Chile	.	.	5669	1.90	7621	2.60
Colombia	.	.	.	.	7522	2.60
Czech Republic	5365	3.37	6064	2.03	7019	2.40
Germany	5073	3.19	4979	1.67	5451	1.90
Denmark	4235	2.66	5924	1.98	7657	2.60
Spain	6214	3.91	25887	8.67	35943	12.20
Estonia	.	.	4727	1.58	5316	1.80

Finland	4864	3.06	5810	1.95	5649	1.90
France	4673	2.94	4298	1.44	6308	2.10
United Kingdom	9340	5.87	12179	4.08	13818	4.70
Greece	4672	2.94	4969	1.66	6403	2.20
Hungary	4887	3.07	4605	1.54	5132	1.70
Ireland	3854	2.42	3937	1.32	5577	1.90
Iceland	3372	2.12	3646	1.22	3296	1.10
Israel	.	.	5761	1.93	6623	2.20
Italy	4984	3.13	30905	10.36	11785	4.00
Japan	5256	3.30	6088	2.04	6109	2.10
Korea	4982	3.13	4989	1.67	6650	2.30
Lithuania	.	.	.	.	6885	2.30
Luxembourg	3528	2.22	4622	1.55	5230	1.80
Latvia	.	.	.	.	5303	1.80
Mexico	4600	2.89	38250	12.82	7299	2.50
Netherlands	2503	1.57	4760	1.59	4765	1.60
Norway	4147	2.61	4660	1.56	5813	2.00
New Zealand	3667	2.30	4643	1.56	6173	2.10
Poland	3654	2.30	4917	1.65	5625	1.90
Portugal	4585	2.88	6298	2.11	5932	2.00
Slovak Republic	.	.	4555	1.53	5965	2.00
Slovenia	.	.	6155	2.06	6401	2.20
Sweden	4416	2.78	4567	1.53	5504	1.90
Turkey	.	.	4996	1.67	6890	2.30
United States	3846	2.42	5233	1.75	4838	1.60
Total	159095	100.00	298454	100.00	294527	100.00

Note. The value is approximately 100.00. It was rounded since previous cells also have rounding values.

Participants given in Table 1 were selected by PISA practitioners through stratified and random sampling (see OECD, 2012, n.d.; Ray & Margaret, 2003). According to Table 1, Chile, Estonia, Israel, Slovak Republic, Slovenia, and Turkey did not participate only in the PISA 2000 study, while Colombia, Lithuania, and Latvia did not participate in either PISA 2000 or PISA 2009. By 2018, it is seen that the number of students has almost doubled while the number of participating countries has increased.

Data Collection Tools

The data collection tools used in the present study were student questionnaires and cognitive tests used in PISA 2000, 2009, and 2018 studies in which reading literacy was the major domain of interest. Student questionnaires included non-cognitive items on students' background information, their sociodemographic characteristics, and general or

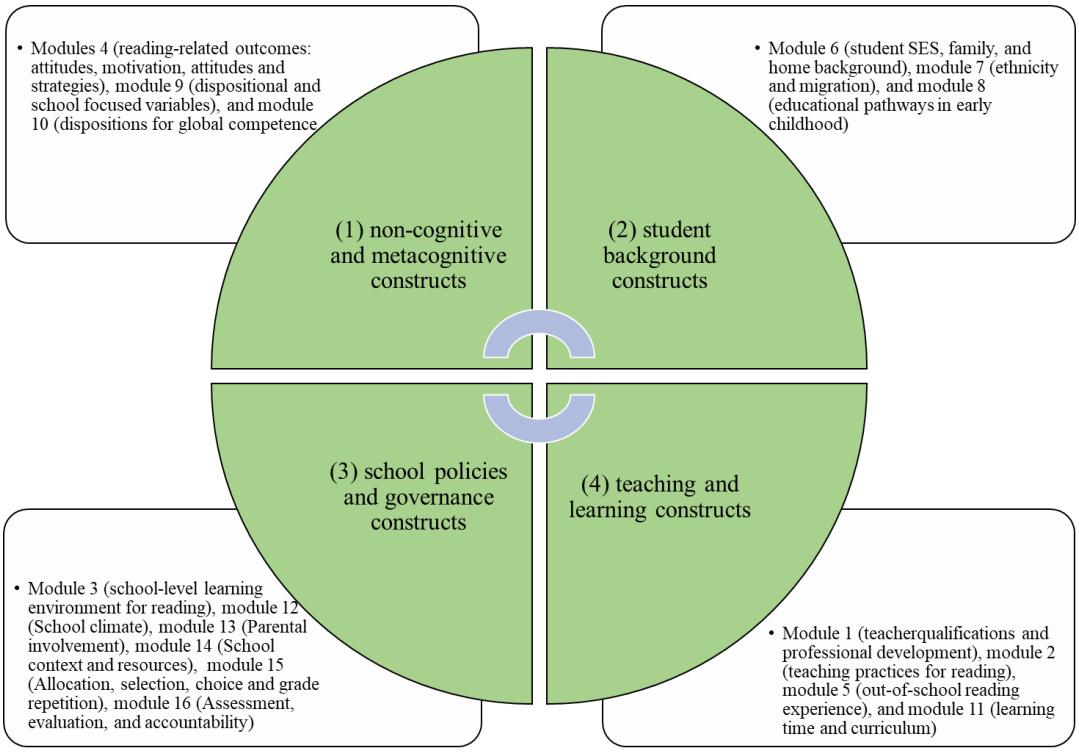
domain-specific tendencies. In comparison, cognitive tests were comprised of questions that measured literacy levels in mathematics, science, and reading. The students' performance levels for these fields are expressed with the scores known simply as 'plausible values' obtained from the posterior distribution of score estimations made in accordance with item response theory. While five plausible values were calculated in PISA 2000 and 2009, ten plausible values were given in PISA 2018.

PISA practitioners conduct comprehensive studies in each cycle regarding the validity and reliability of the data collection tools used in the research and share them in printed publications (see OECD, 1999, 2009, 2012, 2019, n.d.; Ray & Margaret, 2003). Technical reports include detailed information on sample selection, the development and implementation processes of scales, reliable transfer of data to databases, and providing comparability of scoring by using various weighting procedures (see OECD, 2012, n.d.; Ray & Margaret, 2003). Assessment and analytical framework publications included detailed explanations of how skills for each field are defined, how performance levels are determined, and what the questionnaires include (see OECD, 1999, 2009, 2019). By detailing and clarifying all the processes of the studies in this way, the measurement process with high validity and reliability is performed in PISA cycles. Therefore, the validity and reliability of the PISA data used in the present study were high enough to perform further analyses.

The scope of student questionnaires used in PISA studies has been revised over the years to keep psychometric and methodological developments in mind and to develop tools that are more sensitive to cultural differences. However, the framework that can make possible trend comparisons over the years has been tried to be maintained (OECD, 2019). The measured constructs in the questionnaires and the contents of the modules related to those constructs are given in Figure 1.

Figure 1

Constructs to Be Covered in the Questionnaires

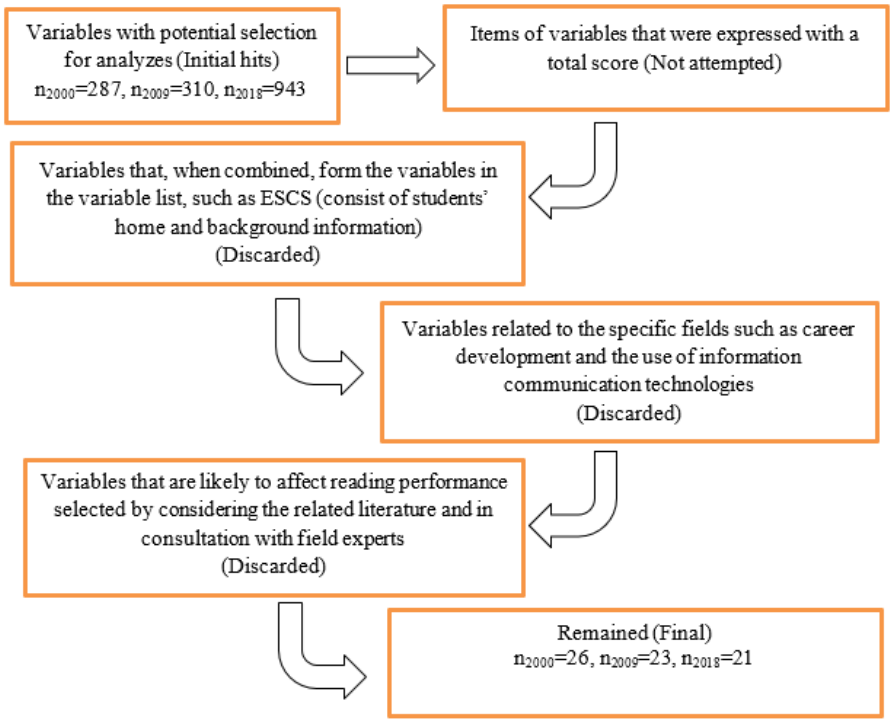


When Figure 1 is examined, the variables used in PISA studies are classified as (1) non-cognitive and metacognitive constructs, (2) student background constructs, (3) school policies and governance constructs, and (4) teaching and learning constructs. A systematic method was followed in the selection of independent variables to be used in the present study for each of the PISA cycles. Figure 2 presents this process.

According to Figure 2, first of all, all variables in the data files that were expressed as a total score with a continuous variable deleted from the data files. Afterwards, variables such as stratum, school type, second language spoken, etc., which are formed in different ways and not interpreted similarly in every country, have been removed from the files. Next, variables such as economic, social, and cultural status index (ESCS), which consists of a combination of more than one variable (parents' educational and occupation status, home and cultural possessions), were selected, and other variables that were used to obtain those variables were discarded. Later, variables related to the fields, such as career development and the use of information communication technologies, were eliminated since they were not applied in all participating countries and all PISA cycles. Finally, variables that are likely to affect reading performance were selected by considering the related literature and in consultation with field experts. The literature related to reading that was given in the introduction part was considered when selecting the factors that may affect reading literacy. The field experts were two academics studying reading comprehension. A regression analysis was not used to eliminate the variables with very small regression coefficients at this point since it was already aimed to determine significant levels of all variables related to reading literacy in the present study. At this stage, the variables that were not clearly related to reading literacy were eliminated. As a result, the variables given in Table 2 for PISA 2000, Table 3 for PISA 2009, and Table 4 for PISA 2018 were obtained.

Figure 2

Flowchart for Variable Selection Process



Although the total number of variables given in Figure 2 has increased over the years (n_{2000}=287, n_{2009}=310, n_{2018}=943), the number of variables selected within the scope of the present study has decreased over the years (n_{2000}=26, n_{2009}=23, n_{2018}=21). Except for gender, all variables included in the analyses were continuous. This situation arises from the fact that the number of variables consisting of the combination of other variables has increased over the years in PISA cycles, and only these derived variables were used instead of many other variables used in PISA student questionnaires.

Data Analysis

In the present study, multiple regression analysis was used as data analysis method. Assumptions (independence of independent variables, normality, linearity, homoscedasticity, independence of errors) of this method were checked prior to the analyses and there were not any significant deviations. The reason why multi-group or multi-level analyses were not performed is that the students in the examined PISA studies were not the same in each cycle (the data does not have a longitudinal structure), and the independent variables were obtained at the student level. SPSS syntaxes, which replicate the analysis 80 times for each plausible value and calculate the average values by taking into account the student weights as suggested in the PISA manuals, were created with IDB Analyzer software. Gender was a categorical variable, and it was dummy coded as given in the SPSS syntax created by IDB Analyzer software. All analyses were performed via IBM SPSS Statistics software.

Results

Significance Levels and Total Explained Variance Rates

Under this subheading, the results are reported separately for each PISA cycle.

Results for PISA 2000

In Table 2, the results obtained by multiple linear regression analysis are given with standardized and unstandardized regression coefficients, and significance test values.

Table 2

Average Regression Coefficient Values for Reading Literacy in PISA 2000

	Variable	*B*	*B* (se)	*t* (*B*)	*β*	*β* (se)	t (*β*)
	(CONSTANT)	447.57	2.98	150.21	.	.	.
1	Enjoyment of reading	17.24	0.6	28.6	0.20	0.01	29.60*
2	Highest in. socio-econ. index	0.92	0.03	33.69	0.16	0.00	34.37*
3	Self-concept (Academic)	12.74	0.49	25.95	0.14	0.01	26.30*
4	Family educational support	-12.08	0.38	-31.6	-0.13	0.00	-31.74*
5	Reading diversity	10.39	0.44	23.39	0.11	0.00	24.47*
6	Gender	-18.02	0.87	-20.81	-0.10	0.00	-21.11*
7	Control strategies	9.21	0.58	15.79	0.10	0.01	16.06*
8	Memorisation	-8.35	0.49	-17.11	-0.09	0.00	-17.66*

9	Mother ISCED qualification	4.71	0.36	13.23	0.07	0.00	13.37*
10	Father ISCED qualification	4.22	0.34	12.36	0.06	0.00	12.00*
11	Effort and perseverance	-5.62	0.54	-10.36	-0.06	0.01	-10.56*
12	School disciplinary climate	-4.55	0.42	-10.93	-0.05	0.00	-11.31*
13	Self-efficacy	4.36	0.57	7.70	0.05	0.01	7.69*
14	Teacher support	-4.27	0.44	-9.79	-0.04	0.00	-9.82*
15	Self-concept (Verbal)	3.37	0.41	8.18	0.04	0.00	8.42*
16	Elaboration strategies	-3.16	0.44	-7.13	-0.03	0.00	-6.80*
17	Achievement press	-2.73	0.4	-6.76	-0.03	0.00	-6.30*
18	Control expectation	2.86	0.52	5.46	0.03	0.01	5.79*
19	Family structure	-4.02	0.72	-5.59	-0.02	0.00	-5.81*
20	Number of minutes per week in language courses	-0.03	0.01	-3.87	-0.02	0.01	-3.34*
21	Sense of belonging	1.36	0.37	3.73	0.01	0.00	3.43*
22	Instrumental motivation	-1.26	0.40	-3.12	-0.01	0.00	-3.21*
23	Competitive learning	1.11	0.39	2.84	0.01	0.00	3.03*
24	Cooperative learning	-0.81	0.40	-2.03	-0.01	0.00	-2.09*
25	Teacher-student relationship	-0.76	0.46	-1.65	-0.01	0.00	-1.73
26	Interest in reading	0.69	0.56	1.23	0.01	0.01	1.46

Note. B: Unstandardized regression coefficient; B (se): Standard error of B; t (B): t value of B; β: Standardized regression coefficient; β (se): Standard error of β; t (β): t value of β.

*Significant at 0.05 level (two-tailed).

According to Table 2, all variables except interest in reading and teacher-student relationship significantly predict reading performance ($p < .05$). Total explained variance rate of all variables in reading performance is 37%. When looking at the standardized regression coefficients, the most significant predictor of reading performance is enjoyment of reading. The least predictive significant variables are a sense of belonging, competitive learning, cooperative learning, and instrumental motivation.

Results for PISA 2009

In Table 3, the results obtained by multiple linear regression analysis are given with standardized and unstandardized regression coefficients and significance test values.

Table 3

Average Regression Coefficient Values for Reading Literacy in PISA 2009

	Variable	*B*	*B* (se)	*t* (*B*)	*β*	*β* (se)	*t* (*β*)
	(CONSTANT)	519.25	1.86	278.88	.	.	.
1	Joy/Like reading	22.86	0.26	87.34	0.26	0.00	91.45*
2	Meta-cognition: Summarising	18.16	0.24	76.16	0.20	0.00	77.58*
3	Index of economic, social and cultural status	17.70	0.28	63.94	0.18	0.00	66.99*
4	Use of libraries	-11.82	0.24	-48.57	-0.13	0.00	-49.59*
5	Reading for school: Functional reading materials	-11.24	0.24	-47.03	-0.12	0.00	-47.08*
6	Meta-cognition: Understanding and remembering	10.37	0.24	43.28	0.12	0.00	44.26*
7	Use of control strategies	10.59	0.29	36.61	0.12	0.00	37.35*
8	Use of memorisation strategies	-8.71	0.25	-34.38	-0.09	0.00	-34.89*
9	Reading for school: Interpretation of literary texts	7.07	0.27	26.18	0.08	0.00	26.44*
10	Reading for school: Traditional literature courses	-6.93	0.29	-24.06	-0.07	0.00	-24.34*
11	Reading for school: Non-continuous materials	5.32	0.24	22.25	0.06	0.00	22.57*
12	Gender	-9.52	0.46	-20.60	-0.06	0.00	-21.09*
13	Immigration status	-14.40	1.38	-10.41	-0.05	0.00	-18.70*
14	Online reading	4.51	0.25	17.98	0.05	0.00	18.36*
15	Diversity reading	4.19	0.25	16.42	0.04	0.00	16.48*
16	Disciplinary climate	3.67	0.24	15.51	0.04	0.00	15.86*
17	Use of elaboration strategies	-3.72	0.25	-14.78	-0.04	0.00	-14.81*
18	Family structure	4.65	0.54	8.55	0.02	0.00	8.67*
19	Teacher student relations	2.01	0.24	8.22	0.02	0.00	8.29*
20	Use of structuring and scaffolding strategies	-1.95	0.29	-6.68	-0.02	0.00	-6.63*
21	Attitude towards school	-1.38	0.24	-5.76	-0.01	0.00	-5.38*
22	Learning time (minutes per week)	-0.02	0.01	-3.36	-0.01	0.00	-3.00*
23	Teachers' stimulation of reading engagement	0.50	0.30	1.68	0.01	0.00	1.78

Note. B: Unstandardized regression coefficient; B (se): Standard error of B; t (B): t value of B; β: Standardized regression coefficient; β (se): Standard error of β; t (β): t value of β.

*Significant at 0.05 level (two-tailed).

R^2 and Adjusted R^2=.48

When Table 3 is examined, all variables except teachers' stimulation of reading engagement significantly predict reading performance ($p < .05$). Total explained variance rate of all variables in reading performance is 48%. According to the standardized regression coefficients, the most significant predictor of reading performance is joy/like reading. The least predictive significant variables are attitude towards school, family structure, and learning time (minutes per week).

Results for PISA 2018

In Table 4, the results obtained by multiple linear regression analysis are given with standardized and unstandardized regression coefficients and significance test values.

Table 4

Average Regression Coefficient Values for Reading Literacy in PISA 2018

	Variable	*B*	*B* (se)	*t* (*B*)	*β*	*β* (se)	*t* (*β*)
	(CONSTANT)	513.08	1.75	293.31	.	.	.
1	Meta-cognition: Assess credibility	22.04	0.31	71.02	0.23	0.00	72.78*
2	Index of economic, social and cultural status	17.20	0.36	47.42	0.17	0.00	48.44*
3	Meta-cognition: Summarising	16.30	0.34	48.02	0.17	0.00	48.52*
4	Self-concept of reading: Perception of competence	13.69	0.38	36.01	0.14	0.00	36.41*
5	Joy/Like reading	9.15	0.31	29.81	0.11	0.00	30.30*
6	Meta-cognition: Understanding and remembering	9.17	0.33	28.15	0.10	0.00	28.47*
7	Self-concept of reading: Perception of difficulty	-9.34	0.35	-26.73	-0.10	0.00	-26.64*
8	Teacher-directed instruction	-9.35	0.39	-23.84	-0.10	0.00	-24.01*
9	Disciplinary climate in test language lessons	4.50	0.30	15.06	0.05	0.00	15.40*
10	Perceived feedback	-4.45	0.35	-12.84	-0.05	0.00	-13.09*
11	General fear of failure	4.06	0.29	13.84	0.04	0.00	13.64*
12	Teacher's stimulation of reading engagement perceived by student	4.00	0.37	10.82	0.04	0.00	10.97*
13	Teacher support in test language lessons	2.73	0.40	6.82	0.03	0.00	6.62*
14	Index immigration status	-13.24	3.22	-4.11	-0.02	0.00	-7.02*
15	Perceived teacher's interest	2.42	0.38	6.43	0.02	0.00	6.25*
16	Learning time (minutes per week) in total	-0.01	0.00	-6.71	-0.02	0.00	-5.83*
17	Parents' emotional support perceived by student	1.48	0.31	4.73	0.02	0.00	4.91*
18	Gender	1.41	0.62	2.25	0.01	0.00	2.17*
19	Subjective well-being: Sense of belonging to school	-0.68	0.31	-2.18	-0.01	0.00	-1.91
20	Duration in early childhood education and care	-0.80	0.31	-2.57	0.00	0.00	-1.02
21	Attitude towards school: Learning activities	-0.14	0.30	-0.47	0.00	0.00	-0.39

Note. B: Unstandardized regression coefficient; B (se): Standard error of B; t (B): t value of B; β: Standardized regression coefficient; β (se): Standard error of β; t (β): t value of β.

*Significant at 0.05 level (two-tailed).

R^2 and Adjusted R^2=.45

According to Table 4, all variables except subjective well-being (sense of belonging to school), duration in early childhood education and care, and attitude towards school (learning activities) significantly predict reading performance ($p < .05$). Total explained variance rate of all variables in reading performance is 45%. When standardized regression coefficients were examined, the most significant predictor of reading performance was meta-cognition (assess credibility). The least predictive significant variable is the gender of the students.

Comparison of Prediction Results Obtained for each of the PISA Cycles

The results revealed that enjoyment of reading and index of economic, social, and cultural status (highest in. socio-econ. index in PISA 2000) were ranked among the most significant predictive variables according to standardized regression coefficients in all three PISA cycles. However, when all three cycles are compared, the order of factors predicting reading literacy shows significant differences. Self-concept variable was among the most significant predictors in PISA 2000 and 2018. Meta-cognition was not included in the PISA 2000 study. However, this variable, which was included in PISA in 2009 and 2018, was among the most important variables. While the variables explained the variability in PISA reading scores in 2000 by 37%, this rate increased to 48% in 2009 and remained at 45% in 2018, with a slight decrease.

The most predictive variables that were used in at least two PISA cycles were examined according to their significance levels in each of the OECD countries. Since the aim of the present was to show the general trend of factors affecting reading literacy, and there was too much data to show and explain by country, we gave only some statistics for the most significant variables as percents. The enjoyment of reading was one of the most significant variables at 91%, 100%, and 56% of OECD countries in PISA 2000, 2009, and 2018, respectively. The highest socioeconomic index was one of the most significant variables at 81% of OECD countries in PISA 2000. The index of economic, social, and cultural status, an equivalence of this index, was one of the most significant variables at 91% of OECD countries in PISA 2009 and PISA 2018. Meta-cognition (Summarising) was one of the most significant variables at 100% of OECD countries in PISA 2009 and 2018. Similarly, meta-cognition (assess credibility) was one of the most significant variables at 100% of OECD countries in PISA 2018. When examining total explained variance ratios (R^2), 62%, %65, and 56% of OECD countries have a variance rate of equal to or greater than .37, .48, and .45 for PISA 2000, 2009, and 2018, respectively.

Considering the PISA Assessment and Analytical Framework (OECD, 2019), the least and/or negative predictors of PISA performance were related to strategy use, test language lessons and school, student-self, family, and reading-related attitudes. The variables that had negative effects on PISA performance were related to strategy use (in 2000: elaboration strategies, memorisation; in 2009: use of memorisation strategies, use of structuring and scaffolding strategies), test language lessons, and school-related factors (in 2000: school disciplinary climate, teacher support, achievement press, cooperative learning; in 2018: teacher-directed instruction perceived feedback), student-self factors (in 2000: gender, number of minutes per week in language courses; in 2009: use of libraries , gender, Immigration status, learning time (minutes per week); in 2018: index immigration status, learning time (minutes per week) in total), family related ones (in 2000: family educational support, family structure), and reading related attitudes (in 2000: instrumental

motivation, effort and perseverance; in 2009: reading for school: functional reading materials, reading for school: traditional literature courses, attitude towards school; In 2018: self-concept of reading: perception of difficulty). Similarly, factors that least affect reading performance were related to strategy use (in 2009: use of structuring and scaffolding strategies), test language lessons, and factors related to school (in 2000: school climate, competitive learning cooperative learning; in 2009: teacher-student relations; 2018 In years: perceived teacher's interest), student-self factors (in 2000: number of minutes per week in language courses; in 2009: learning time (minutes per week); in 2018: index immigration status gender - learning time (minutes per week) in total), family related ones (in 2009: family structure; and in 2018: parents' emotional support perceived by student), and reading related attitudes (in 2000: instrumental motivation; in 2009 and 2018: attitude towards school).

Discussion and Conclusion

The aim of the present study was to examine the variables predicting reading performance of students from OECD member countries who participated in PISA 2000, 2009 and 2018 studies in which reading literacy was the major domain of interest. The results acquired within the scope of the study were interpreted and discussed under the following headings.

The Role of Reading Enjoyment

As a result of the study, it was determined that reading enjoyment is one of the most significant variables predicting PISA reading achievement. This motivational factor helps students in starting the reading process more willingly while also helping them in putting forth greater effort to be successful in this process. Moreover, enjoyment of reading and motivation for reading have a positive impact on the time that students allocate for reading. It was also indicated that reading motivation predicts reading amount and that reading amount predicts reading comprehension at a statistically significant level (Guthrie & Wigfield, 1999). In addition, higher motivation for reading enables students to make more reading practice which in turn improves their vocabulary and reading comprehension skills (Stanovich, 1986). Indeed, previous studies have reported that willingness to read has a positive impact on reading achievement (Lau & Chan, 2003; Miyamoto et al., 2019; Orellana et al., 2020). Brozo et al. (2007) observed a positive correlation between the enjoyment of reading of students and reading achievement within the framework of PISA results in three OECD countries (Ireland, United Kingdom and the United States). Eklund et al. (2018) determined that reading books in their free time is effective on the PISA reading achievements of students.

On the other hand, lack of motivation for reading may lead to students participating less in the school process and may also result in failures at school. Cheema (2018) reported upon examining demographic differences such as gender and socioeconomic status that enjoyment of reading is positively correlated with school achievement in countries with high academic performance and that it is negatively correlated with school achievement in countries with low academic success. Besides, failure in reading may also have an adverse impact on school achievement for students. As an example, Torppa et al. (2020) identified that weak readers have low reading motivation and that they have higher burnout levels and lower school enjoyment compared with typical readers. Similarly, Wolters et al.

(2014) found that weak readers feel more reading anxiety compared with successful readers.

The Role of Metacognition

When PISA reading results since 2009 were examined, metacognition (see Meta-cognition: Assess credibility and Meta-cognition: Summarising) has been an important predictor of reading achievement. Similar results have also been obtained in studies other than PISA (Kim et al., 2012; Lau & Chan, 2003). Artelt et al. (2001) found that metacognitive knowledge, reading speed, and the number of books at home (an indicator of family history) are effective variables in reading comprehension. Researchers found that metacognition has the highest impact (explains 42% of the variance) on reading achievement from among the variables. In this regard, students with higher reading achievement are those who use metacognitive strategies more. Koyuncu et al. (2022) highlighted the importance of teaching students metacognitive strategies in schools to reduce the effect of ESCS on reading achievement.

Reading achievement of students with metacognitive skills can be attributed to several reasons. Firstly, metacognitive skills enable students to establish an internal language for interacting and establishing contact with the text (Bender, 2002). Secondly, students with metacognitive skills use various strategies before (e.g., predicting, skimming), during (e.g., activating prior knowledge, considering reading speed), and after (e.g., summarizing, evaluation) reading for understanding the text (Fırat & Koçak, 2019; Swanson, 1999). These enable the students to read more carefully and think systematically (Allen, 2006). All of these allow the students to take part in the reading process more actively and to regulate themselves during this process. Therefore, teachers need to consider how they might include metacognitive strategies in their regular instruction in order to raise each student's reading proficiency (Memisevic & Cehic, 2022).

The Role of Reading Enjoyment + Role of Metacognition

As a result of the PISA study, students with higher reading achievement are those who enjoy reading and who have metacognitive skills. Actually, it is possible to indicate that these two skills are not independent. When the PISA Assessment and Analytical Framework (OECD, 2019) is examined, motivation (enjoyment of reading, joy / like of reading, interest in reading) and metacognition (assessing credibility, summarising, understanding, and remembering) variables are under the title of non-cognitive and metacognitive constructs (see Figure 1). There are some other studies that emphasize the relationship between motivational factors and metacognition (e.g., Lau & Chan, 2003; Roeschl-Heils et al., 2003; Tavsancil et al., 2019). For example, Roeschl-Heils et al. (2003) found that there is a correlation between metacognitive strategies, reading motivation, and reading comprehension. In addition, Lau and Chan (2003) found that weak readers received lower scores in using all reading strategies especially sophisticated cognitive and metacognitive strategies, compared to good readers. Moreover, successful readers in the study had higher internal motivation for reading than weak readers. This indicates that students who use high-level learning strategies more frequently have higher reading enjoyment (Tavsancil et al., 2019). Miyamoto et al. (2019) determined that internal motivation has statistically significant impacts on internal motivation through metacognitive knowledge. Lau and Ho (2016) have indicated that self-regulation strategies,

as the combination of reading enjoyment and control strategies, were among the important predictors of reading achievement in China in PISA 2009. In conclusion, these studies show that students who use learning strategies with high-level skills enjoy reading more, and these students are more successful in reading comprehension. In this regard, carrying out studies for increasing students' motivations during strategy teaching may facilitate reading advancement.

The Role of SES

Another result obtained from the study was that the impact of SES on PISA reading achievement was at the highest level in all three cycles. In accordance with this result, it has been determined in many studies that SES is effective in reading achievement (Artelt et al., 2001; Erdoğan & Güvendir, 2019; İnce & Gözütok, 2018; Kotte et al., 2005; Valenzuela et al., 2015; Vázquez-Cano et al., 2020). The higher the parents' educational level, professional prestige, and income, the higher their children's reading ability and vice versa (Chen et al., 2018). Hemmerechts et al. (2017) stated that students with lower SES have lower reading literacy and negative reading attitudes than students with higher SES.

The emergence of this result in the current study can be attributed to several reasons. First, families with a high education level are expected to support their children's literacy skills from the preschool period (see Ergül et al., 2020). Studies have determined that children supported in early literacy skills in the home environment are more successful in reading in later years (Sénéchal & LeFevre, 2002; Silinskas et al., 2020). Moreover, studies have determined that the children of families with lower socioeconomic status start the school process more disadvantaged (Aikens & Barbarin, 2008; Hindman et al., 2010). It is stated that the gap in reading success between students who start school with successful and unsuccessful reading skills has increased over time (Ferrer et al., 2015; Stanovich, 1986). Van Bergen et al. (2021) examined 200 students from the age of 5 to 15 and determined that students' exposure to early literacy skills predicted PISA success.

Secondly, families with a high level of education are expected to be more sensitive about the education process of their children (helping with homework, supplying private teachers, etc.). Conversely, parents who are not well-educated may not have sufficient skills for their children's academic success or may not provide the necessary support for their children (Chen et al., 2018). Third, families with higher SES are expected to enroll their children in schools with better opportunities. On the other hand, children with low SES backgrounds have a small advantage in terms of academic interest compared to children with a high SES history, as they generally enroll in poorer-performing schools (Parker et al., 2021). Fourth, families with higher SES are expected to provide the necessary facilities for their children to be successful at home. Parents with higher SES tend to provide a more stimulating home environment to support their children's cognitive development (Güleroğlu et al., 2014). However, low-income families may be unable to provide essential living materials such as a home, workplace, computer, and other supplements for children, such as extracurricular books, newspapers, and magazines (Chen et al., 2018).

The Role of the Other Variables

The results revealed that some variables were negatively related to and/or had very low beta values in predicting PISA reading performance. For example, the learning time

(minutes per week) variable was among those variables. There are two possible reasons why this variable was negatively related to reading performance in all three PISA cycles. First, there might indeed be a negative relationship between this variable and reading performance. The second reason might be that this variable was not powerful enough to predict reading success. In parallel with this assumption, this variable was among the least predictive variables in all three PISA studies. The fact that the time allocated to learning has an effect on reading success (Bloom, 1974; Lavy, 2015; Woessmann, 2003) suggests that this variable is not predictive enough. However, the fact that the regression coefficients tend to be significant due to the large sample sizes may be another reason for this result. A similar interpretation can be made for variables with negative and low regression coefficients, such as school climate, immigration status, structuring and scaffolding strategies, and some motivational factors (instrumental motivation, attitude towards school, and family support). In addition, the low predictability levels of all these variables may have resulted from the specific structure of the PISA data. The reasons for this situation can be examined with empirical studies that can reveal the causal relationship.

In addition, the negative impact of family structure and immigration status on reading performance that was found in this study is consistent with the relevant literature (Arikan et al., 2017; Azzolini et al., 2012). The other variables related to strategy use (elaboration, memorisation, and structuring and scaffolding strategies) had low statistical significance in 2000 and 2009, were later removed from PISA studies, and students' strategy use was handled under the title of metacognition. An interesting result of this study was that the use of library variables was one of the most significant factors that negatively affected reading success. However, some studies have found a positive relationship between library use, reading skills, and attitude (Adkins & Brendler, 2015; Park & Sakong, 2014). This situation might have resulted from the combined effect of other factors due to the multidimensional nature of reading comprehension.

Based on the study findings, gender (girls are more successful in reading than boys), disciplinary climate, and learning time (per week) were significant variables in all three studies. However, while the significance rank of the gender variable decreased over time, learning time (per week) remained among the least significant variables in all three PISA cycles. While immigration status was not present in 2000, it was a significant variable in 2009 and 2018. Self-concept of reading was among the most significant variables in 2000 and 2018. As a result of some other studies, gender (Chiu & McBride-Chang, 2006), disciplinary climate (Guo et al., 2018; Ning et al., 2015), learning time (Fisher et al., 1981; Kidron & Lindsay, 2014). Immigration status (Ma, 2003) and self-concept (McArthur et al., 2020; Zagoto, 2020) had significant effects on reading achievement. Carrying out further studies on why female students are more successful than male students (see Logan & Johnston, 2009), the impact of the immigration factor on reading, and why disciplinary climate increases reading will provide important feedback for education planners and policymakers.

Conclusions and Suggestions

Considering the results of this study, it was seen that reading comprehension is multidimensional, and there are many factors affecting reading performance. Reading enjoyment and economic social status index have remained among the most significant

variables over the years in PISA cycles. Moreover, it was also observed that metacognition has a high impact on reading. In this regard, the impacts of these three factors should be taken into consideration for policies to be implemented to enhance reading performance.

The fact that the ratio of explained variance dropped below 50% indicates that the variables in the PISA studies were limited in explaining reading performance. Variables related to career development and ICT use have not been considered predictors in the present study. Thus, future studies may examine the prediction power of these variables and other school-related variables that may have an impact on reading achievement.

The results of the present study are limited to 15-year-old students from OECD countries who took part in the study as well as PISA student questionnaires, cognitive tests, and other data acquisition tools. Reading performance of students from different age groups can be examined by using different kinds of performance tests in future studies, and their results can be compared with the present study's findings. The results are also limited to the analysis method used in the present study. A series of multiple linear regression analyses were performed for each PISA cycle and country. Average statistics were used to examine factors affecting reading literacy in a broad sense. Therefore, the readers are suggested to take into account this situation while looking at the results and discussions. In future studies, factors affecting reading literacy may also be examined by country with other statistical methods.

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Statement of Responsibility

First author is responsible for conceptualization, investigation, writing-original draft, writing-review & editing, supervision, and project administration. Second author is responsible for methodology, software, validation, formal analysis, investigation, resources, data curation, writing-original draft, writing-review & editing, visualization.

Conflicts of Interest

The authors declare that they have no conflict of interest.

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The Impact of Self-affirmation on Teacher Leadership: An Experimental Design

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ABSTRACT: Teacher leadership has recently gained significant attention in the literature since there is enough evidence that it leads to effective student outcomes. Therefore, many scholars study the antecedents of teacher leadership. This study investigates the impact of self-affirmation on teacher leadership beliefs through an experimental design. Self-affirmation, a well-established construct in psychological science, refers to participants' affirming their self-transcendent (e.g., empathy, justice, honesty) or self-enhancement (e.g., power, status, wealth) values through a writing exercise. In the experiment (n=221), participants were randomly assigned to one of three groups: a self-transcendent value-affirmation group (STVA), a self-enhancement value-affirmation group (SEVA), or a control group. Participants in three groups wrote about their self-transcendent values, self-enhancement values, or their meals and completed the teacher leadership belief scale. Analysis of variance (ANOVA) demonstrated that the STVA group had significantly higher scores on teacher leadership belief scales compared to the SEVA and the control group. This finding suggests that affirming self-transcendent values can lead teachers to adopt leadership beliefs, which in turn is likely to affect their leadership behaviours. School leaders can incorporate self-affirmation exercises into professional development programmes to facilitate teacher leadership.

Keywords: Teacher leadership, self-affirmation, experiment, school leadership.

ÖZ: Öğretmen liderliği, öğrenci sonuçlarını olumlu etkilemektedir. Bu nedenle, birçok sosyal bilimci ve eğitim bilimci öğretmen liderliğini kolaylaştıran etkenleri araştırmaktadır. Bu çalışma, öğretmen liderliği inançları üzerinde öz-olumlamanın etkisini deneysel bir desenle incelemeyi amaçlar. Psikoloji biliminde iyi bilinen bir kavram olan öz-olumlamanın, katılımcıların kendi özgeçmiş değerlerini (örneğin, empati, adalet, dürüstlük) veya özgüçlendirme değerlerini (örneğin, güç, statü, zenginlik) bir yazma egzersizi yoluyla onaylamasını ifade eder. Bu eksersiz eğitim bilimlerinde nadiren kullanılmaktadır. Deneyde (n=221), katılımcı rastgele üç gruba ayrışmıştır: özgeçmiş değer onaylama grubu (ÖD), özgüçlendirme değer onaylama grubu (ÖGD) veya kontrol grubu. İlk grup özgeçmiş değerlerini; ikinci grup özgüçlendirme değerlerini, üçüncü grup son iki haftada yediklerini yazdılar ve daha sonra üç grup da öğretmen liderliği inanç ölçeğini doldurdu. ANOVA analizi, ÖD grubunun, ÖGD ve kontrol grubuna kıyasla öğretmen liderliği inanç ölçeğinde önemli ölçüde daha yüksek puanlara sahip olduğunu gösterdi. Bu bulgu, özgeçmiş değerlerini onaylamanın öğretmenleri liderlik inançlarını benimsemeye yönlendirebileceğini ve bunun da liderlik davranışlarını etkileyebileceğini göstermektedir. Okul liderleri, öğretmen liderliğini kolaylaştırmak için profesyonel gelişim programlarına özsaygı egzersizlerini dahil edebilirler.

Anahtar kelimeler: Öğretmen liderliği, öz-olumlama, deney, okul liderliği.

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There is enough convincing evidence in the literature that school leadership has a significant impact on students' learning (Bush et al., 2018; Darling-Hammond et al., 2022; Leithwood, 2021; Leithwood et al., 2020; Liebowitz & Porter, 2019; Robinson & Gray, 2019). Therefore, leadership is important to any school improvement initiative (Bolat, 2013). However, most studies on school leadership focused on the principal (Hallinger et al., 2017). The conventional concept of school leadership, based on principal leadership, has recently been challenged (Pan & Chen, 2021). The sources of school leadership have been broadened, and school leadership is now treated as an overarching construct that incorporates different sources of leadership, including teachers (Hallinger & Heck, 2010).

Teacher leadership is a crucial part of the international discourse on school leadership and school improvement. Therefore, various initiatives aim to promote teacher leadership in educational settings. In line with these initiatives, this study aims to make a valuable contribution by providing experimental evidence that self-affirmation could be a crucial antecedent for teacher leadership. Self-affirmation is the practice of affirming oneself by reminding one's values or positive qualities (Sherman & Cohen, 2006). Teacher leadership refers to teachers exercising leadership while teaching in the classroom (Wenner & Campbell, 2017). Since self-affirmation enables people to focus on their values and leadership is a value-laden activity (Brown & Treviño, 2009; Shamir et al., 1993), it could be hypothesized that self-affirmation is very likely to lead to teachers' leadership enactment. For instance, in his model of teacher-led school improvement, Frost (2011) engages teachers in finding their visions and values, which guides them towards leadership behaviors. By investigating the relationship between self-affirmation and teacher leadership beliefs, this research emphasizes the potential of self-affirmation exercises in fostering teacher leadership in educational settings.

Conceptual Framework

Teacher Leadership

Teacher leadership has been attracting more attention recently in the academic world (Lowery-Moore et al., 2016; Martínez & Tadeu, 2018) because it is now viewed as a key factor in determining the quality of schools (Wang & Ho, 2020). Recent studies have also demonstrated that teacher leadership impacts student learning (Hallinger & Heck, 2010; Ingersoll et al., 2018; Shen et al., 2020). However, the definition of teacher leadership lacks consensus within the field (Wenner & Campbell, 2017). Nguyen et al. (2020) found seventeen different definitions in their review. However, when examining all these definitions, it becomes apparent that Wenner and Campbell's (2017) succinct definition of teacher leadership resonates with other definitions. They argue that teacher leadership is about teachers assuming leadership roles beyond their classrooms while simultaneously fulfilling their classroom responsibilities. This definition reflects the essence of teacher leadership.

These leadership roles include a diverse array of leadership activities, such as leading change, communicating with colleagues (Katzenmeyer & Moller, 2009), leading professional development, participating in school-wide decisions (Wang & Xia, 2022), supporting professional learning (Wenner & Campbell, 2017), conducting one-on-one coaching sessions with colleagues (Margolis & Huggins, 2012), co-teaching (Margolis,

2012), assisting other teachers in classrooms, engaging their colleagues in classroom-based inquiry (Valli et al., 2006), involvement in educational policy (Can, 2009; Carpenter & Sherretz, 2012) or parent involvement (York-Barr & Duke, 2004).

These teacher leadership roles could be performed both formally and informally (Hunzicker, 2013; Meirink et al., 2020). In formal leadership roles, teachers are assigned specific positions and are expected to exercise leadership within those roles. These positions may include department head, team leader, curriculum developer, mentor, coach, and others (Neumerski, 2012; York-Barr & Duke, 2004). Within this formal conception of teacher leadership, teachers carry out the principal's role in a quasi-administrative role (Smylie et al., 2002). Early teacher leadership initiatives often reflected this formal conception of teacher leadership.

The current understanding of teacher leadership is shifting from formal positions to a more informal, integrated approach (Carrion & García-Carrión, 2015; Frost, 2012; Hunzicker, 2017; Poekert, 2012). In this current understanding, leadership does not equate with position, authority, roles, structure, or people at the top of the organization. Leadership is more about teachers' agency and their decision to initiate change (Frost & Durrant, 2002). Leadership emerges through interaction with other people, tools, and the environment (Spillane, 2006; Gronn, 2002). In this informal view of teacher leadership, which could be called non-positional teacher leadership (Frost, 2019), the challenge is not to identify and select teacher leaders, but to create a context where all teachers can exercise leadership (Frost, 2006; Lambert, 2003). This view, however, raises important challenges: How can we enable every teacher to exercise leadership? What antecedents facilitate the emergence of teacher leadership? How can we foster these antecedents to promote informal teacher leadership?

Recent review studies have focused on the antecedent of teacher leadership (Ding & Thien, 2022; Nguyen et al., 2020; Wenner & Campbell, 2017). Schott et al. (2020) identified antecedents at three levels: teacher, school level, and supra-school level. Teacher antecedents refer to the teacher as an actor and his/her personal characteristics, such as knowledge, skills, motivation, dispositions, age, and experience (Hunzicker, 2017). Two important antecedents at the teacher level are self-esteem and values (Hunzicker, 2017; Smulyan, 2016). In the context of transformational school leadership, Sun et al. (2017) found that leaders' self-efficacy and values were important predictors of transformational school leadership practices. Therefore, promoting teachers' self-esteem and cultivating their values can be an effective strategy to empower teachers to exercise leadership. One promising yet surprisingly unexplored approach to achieving this goal is through self-affirmation exercises. By engaging teachers in self-affirmation exercises, school leaders can potentially enhance teachers' self-esteem and help them reinforce their core values, supporting their leadership endeavors.

Self-Affirmation

Self-affirmation theory, originally proposed by Steele (1988), is based on the idea that people are motivated to maintain self-integrity, worth of the self, and an image of themselves as moral, capable, and adaptive (Aronson et al., 1999; Cohen & Sherman, 2014; Steele, 1988). When self-integrity is threatened, as in the case of setbacks and disappointment in life, people immediately try to restore their self-integrity (Sherman & Cohen, 2006) and maintain their conception of themselves as good, virtuous, and

efficacious (Cohen et al., 2007). People adopt various strategies to manage the threat to their self-integrity. They might be engaged in defensive adaptations (Taylor & Brown, 1988), downward social comparisons (Taylor & Lobel, 1989), or gossiping negatively about others (Wert & Salovey, 2004). These strategies may help reduce the threat, but they all come with a cost. All these defensive behaviors threaten the integrity of the relationship with others (Cohen et al., 2007). Therefore, one healthy and effective way to restore self-integrity is through affirming the self, such as reflecting on positive aspects of the self, recalling past experiences when one has lived up to personal ideals, or reminding oneself of important values (Sherman & Cohen, 2006). In fact, consciously or unconsciously, we all engage in self-affirmation acts in our daily lives to demonstrate our adequacy (Cohen & Sherman, 2014). For instance, if someone is rejected or fails, they may remind themselves of their positive social ties or past successes and feel better about themselves.

Researchers utilize different exercises in their research to induce self-affirmation in people (see Gümüş, 2022; McQueen & Klein, 2006 for a review). In some studies, participants are presented with a list of values, are instructed to rank them, and then choose the most important one (e.g., Steele & Liu, 1983). In one study, participants were instructed to describe past occasions on which they exhibited kindness to others (e.g., Reed & Aspinwall, 1998). In others, participants were given positive personality feedback (e.g., Cohen et al., 2000). However, the most widely utilized and extensively researched experimental manipulation involves asking individuals to write about their core personal values (McQueen & Klein, 2006). This practice of writing about core values serves as a means of self-affirmation, contributing to enhanced self-perception.

Self-affirmation has demonstrated effectiveness in multiple studies. For example, when participants were affirmed, they were less defensiveness towards evidence linking smoking to health issues (Harris et al., 2007; Sherman et al., 2000). A recent meta-analysis has shown that self-affirmation reduces defensiveness towards threatening health information (Sweeney & Moyer, 2015). Affirmed participants were also more inclined to acknowledge the misdeeds of their own groups (Čehajić-Clancy, 2011), show less stereotypical behaviors towards outgroup members (Fein & Spencer, 1997), exhibit reduced bias against other teams (Sherman & Kim, 2005), waste less food and vegetables even after one week (Graham-Rowe et al., 2019), consume less alcohol even after the experiment (Armitage et al., 2011; Ehret & Sherman, 2018), and be more accepting of the effects of alcohol on breast cancer and anti-smoking information (Harris & Napper, 2005). Moreover, affirmed individuals tend to take more responsibility for their teams' defeats (Sherman & Kim, 2005) and exhibit greater openness towards counter-attitudinal arguments (Cohen et al., 2007). In addition, self-affirmation boosts self-control and persistence (Schmeichel & Vohs, 2009) and reduces stress (Creswell et al., 2005). Although self-affirmation has been explored in limited school settings, recent meta-analyses have shown that it positively impacts students' grades, particularly for minority students (Liu et al., 2020; Wu et al., 2018).

Self-affirmation is effective in maintaining and restoring self-integrity for several reasons. Firstly, self-affirmation broadens people's perspectives, and they view threatening information and events from a larger standpoint (Sherman, 2013; Sherman & Hartson, 2011). This broadened perspective helps diminish the perceived magnitude of the threat. Secondly, when affirmed, individuals usually shift their focus from the "threatening" aspect of the event to its "informational" value, which enables them to

move beyond ego protection (Sherman & Cohen, 2006). Thirdly, when people are affirmed, they are reminded of their broader self-worth beyond the threat (Sherman, 2013). This reminder leads to an uncoupling of the self and threat, ultimately reducing threat's impact on the self (Sherman & Hartson, 2011; Sherman, 2013). They are reminded that life is balanced despite adversity (Cohen & Sherman 2014). Fourthly and most importantly, self-affirmation creates a sense of connection to something larger than one's ego, enabling individuals to transcend their narrow self-interests and broaden their perspective beyond the immediate self (Burson et al., 2012; Crocker et al., 2008; Sherman, 2013). This last point directly suggests that self-affirmation could be an effective tool that can enable teachers to exercise leadership since leadership transcends narrow self-interest and ego protection while actively contributing to a broader vision beyond oneself. In the school context, teachers need to go beyond their classrooms and focus on the development of the whole school rather than just focusing on their students. In short, self-affirmation, as a well-established concept in psychological science, has the immense potential to be used as an effective tool to enable teachers to adopt leadership beliefs.

Conceptual and Methodological Significance of the Study

The current study aims to test the impact of self-affirmation on teacher leadership beliefs, using an experimental design. The study has unique potential to contribute to the existing literature for several reasons. Firstly, it is significant due to its experimental design. A while ago Colquitt (2008) and recently Podsakoff & Podsakoff (2019) have called for increased utilization of experiments in leadership research. However, the percentage of published research papers employing experimental designs was low. The most recent publication on the use of experimental design indicated that only 11.5% of published studies in leadership literature during 2015–2018 employed experimental design (Podsakoff & Podsakoff, 2019). Experiments can provide evidence of causality (Antonakis et al., 2010), and this study aims to contribute to the literature by employing an experimental design. Secondly, most studies on self-affirmation have been conducted in the field of psychology, to the best of my knowledge, this study is the first to investigate the effect of self-affirmation in the context of (educational) leadership literature. Thirdly, in the last three decades, psychological researchers have tested the effect of self-affirmation in the context of self-threatening events and information (Sherman, 2013). It is surprising that this phenomenon has never been tested in the context of leadership. While self-affirmation has been employed to help people go from negative functioning to normal functioning, limited research has examined its impact on transitioning individuals from normal functioning to positive functioning (e.g., leadership). The aim of the present research is to investigate the impact of self-affirmation on leadership in general, with a specific focus on teacher leadership. To the best of my knowledge, this study represents the first attempt to examine the effect of self-affirmation on leadership not only in the field of (educational) leadership literature but also within the field of psychology.

Methodology

An experimental design was adopted for this study since it is only possible to provide causality between two constructs through an experimental design (Campbell & Stanley, 2015). The sample of the study consisted of 221 teachers who work at different

levels at various state and private schools across different regions in Turkey. A link was shared on social media accounts, and data were collected through that online link. A convivence sampling strategy was adopted since it was practical and participants were easy to reach (Taherdoost, 2016). Participants were informed about the study, and participation was voluntary. After excluding 33 participants due to incorrect responses to the control question, excessive missing data, or completion time under one minute, the final sample size was 221. The sample size for the study was determined a priori using G*Power (Faul et al., 2009) to achieve a power of 0.80 and an alpha error probability of .05, with a target medium-sized effect size of 0.3. Based on a power analysis, a minimum sample size of 111 (37 in each group) participants was required. The actual sample size (n=221) used in the study exceeded this minimum requirement.

200 participants (91.7%) were female, while 18 participants (8.3%) were male (3 participants did not provide demographic information). In terms of teaching level, 33 participants (15.1%) were from preschool, 64 participants (29.4%) were from primary school, 52 participants (28.4%) were from middle school, and 59 participants (27.1%) were from high school. The average age of the participants was 36.8 years (range=22–62, SD = 6.81), and they had an average of 12.9 years of teaching experience (range=1–42, SD = 7.39).

Procedures and Measures

Prior to the experiment, participants completed a one-item self-esteem scale adapted from Robins et al. (2001). The scale assessed participants' self-esteem with the question, "I have high self-esteem," using a 7-point Likert scale ranging from 1 (definitely does not describe me) to 7 (definitely describes me). This single-item measure has demonstrated validity and reliability in previous research (Robins et al., 2001). The self-esteem scale was utilized to assess randomization checks because previous research has shown that self-esteem affects affirmational processes (Steele et al., 1993). Those with high self-esteem already have affirmational resources (Sherman & Cohen, 2006). They are more able to counter threats than those who do not have high self-esteem (Schimel et al., 2004). In other words, they already live their lives more affirmed (Jordan et al., 2003). Since self-esteem has the potential to affect the results of the experiment, it was crucial to ensure that groups were equal in terms of their level of self-esteem.

After the completion of the self-esteem scale, participants were randomly assigned to one of three groups: the self-transcendent value-affirmation condition (STVA; n = 87), the self-enhancement value-affirmation condition (SEVA; n = 67), or the control group (n = 67). In the STVA group, participants were presented with a list of 21 self-transcendent values, including values such as empathy, trust, and humility, adapted from Burson et al. (2012) and The Values in Action (VIA) Strengths Scale by Peterson and Seligman (2004). They were asked to select the most important one and write a short essay explaining why that value is significant to them. These two manipulations are standard procedures commonly employed in self-affirmation studies (McQueen & Klein, 2006).

The SEVA group received a list of 7 self-enhancement values (e.g., prestige, success, wealth). These value-affirmation manipulations were also adapted from Burson et al. (2012) and have shown efficacy in previous research. Two types of self-affirmation were tested, following Burson et al. (2012) since they argue that self-

transcendent value-affirmation provides a better buffer than self-enhancement value-affirmation. This distinction is based on Schwartz's (1994) conceptualization. Values that emphasize harmonious connections with others are categorized as 'self-transcendent.' In contrast, values that refer to enhancing one's status in a social hierarchy for recognition and acknowledgment are categorized as 'self-enhancement' (Schwartz, 1994). Participants in the control group wrote about the food and drinks they consumed in the last two weeks, following a task adapted from Cohen et al. (2000).

After the manipulations, participants completed a one-item self-esteem scale again. Finally, participants completed the six-item subscale of the Teacher Leadership Belief Scale (Bolat & Antalyalı, 2023). This subscale, with a high level of validity and reliability (Cronbach's alpha = 0.92), assessed teachers' belief about teacher leadership-the extent to which teachers see six leadership behaviors as part of their professional identity. Sample items included "I engage in pedagogical conversations with my colleagues to contribute to their development" and "I offer advice and suggestions to my colleagues." Responses were provided on a 5-point Likert scale, ranging from 1 (definitely disagree) to 5 (definitely agree). Their responses on this scale served as the dependent variable.

Ethical Procedures

For this study, ethical approval was obtained from International Final University with a reference no of 100/50/REK.001 on the date of 19th of June, 2023.

Results

A one-item self-esteem scale was utilized to assess the randomization check. An ANOVA test was employed to examine the self-esteem scores across the three groups. The findings revealed no statistically significant difference in mean self-esteem scores among the groups, F (2, 139) = 0.793, *p*= 0.454, indicating successful random assignment (Table 1).

Table 1

One-way ANOVA

	F	*df1*	*df2*	*p*
Self Esteem	0.793	2	139	0.454

Group Descriptives

	Group	*N*	Mean	*SD*	*SE*
Self Esteem	Control	67	5.13	1.25	0.153
	STVA	87	5.37	1.21	0.130
	SEVA	67	5.18	1.28	0.156

A one-item self-esteem scale was used again after the experiment for manipulation check. An ANOVA test was conducted to compare the self-esteem scores across the three groups. The results showed no significant difference in self-esteem scores between the groups, F (2, 137) = 1.11, *p* = 0.331. The means for experimental group 1 (STVA) and the control group were 5.40 and 5.18, respectively. Although the difference was not significant, it approached a significant level (see discussion below) (Table 2).

Table 2

One-way ANOVA

	F	*df1*	*df2*	*p*
Self Esteem	1.11	2	137	0.331

Group Descriptives

	Group	*N*	Mean	*SD*	*SE*
Self Esteem	Control	67	5.13	1.25	0.153
	STVA	87	5.40	1.16	0.124
	SEVA	66	5.18	1.26	0.156

ANOVA was conducted to compare the mean teacher leadership beliefs (TLB) scores across the three groups. The results of the ANOVA indicated a statistically significant difference in the mean scores of TLB among the three groups, F (2,135) = 4.17, p = 0.017. The mean score for the control group was 3.34 (SD = 0.76); for the STVA group, it was 3.68 (SD = 0.69); and for the SEVA group, it was 3.48 (SD = 0.87). Post-hoc comparisons employing the Tukey HSD test revealed that the mean score for the STVA group (M = 3.68, SD = 0.69) significantly differed from that of the control group (M = 3.34, SD = 0.76, p < .05). However, no significant differences were observed between the control group and the SEVA group, or between the SEVA group and the STVA group (Table 3).

Table 3

One-way ANOVA

	F	*df1*	*df2*	*p*
Teacher Leadership Belief Score	4.17	2	135	0.017

Note. * p < .05, ** p < .01, *** p < .001

Group Descriptives

	Group	*N*	Mean	*SD*	*SE*
Teacher Leadership Belief Score	Control	67	3.34	0.756	0.0923
	STVA	87	3.68	0.694	0.0744
	SEVA	66	3.48	0.871	0.1073

Tukey Post-Hoc Test – TLB MEAN

		0	1	2
0	Mean difference	-	-0.337*	-0.139
	p-value	-	0.021	0.551
1	Mean difference		-	0.198
	p-value		-	0.257
2	Mean difference			-
	p-value			-

Note. * p < .05, ** p < .01, *** p < .001

Consistent with predictions, self-transcendent self-affirmation (STVA) exerted an influence on teachers' beliefs in leadership (M=3.68). In conclusion, the self-transcendent self-affirmation, not self-enhancement value-affirmation (M=3.48), intervention yielded a significant effect on participants' beliefs in teacher leadership, with those in the STVA group reporting higher levels of teacher leadership belief compared to those in the SEVA and control groups (M=3.34).

Discussion and Conclusion

The present study examined the impact of two types of self-affirmation exercises on teachers' leadership beliefs- the extent to which teachers view leadership behaviors as part of their professional identity. The results provide experimental evidence that self-transcendent value affirmation can significantly enhance teachers' leadership beliefs. When affirmed, teachers are more likely to see leadership as part of their professional identity and endorse more leadership beliefs. This could be the first step to enabling teachers to exercise leadership in schools. It should be noted that this study is about helping teachers adopt leadership beliefs rather than actions. However, it could be the first step to effective teacher leadership development since becoming a leader is about developing a leadership stance (Smulyan, 2016) and acquiring "a leadership identity (Lieberman & Friedrich, 2010). Teachers must first view themselves as leaders in order to lead (Carver, 2016). Therefore, developing leadership beliefs is crucial for teachers to exercise leadership since beliefs and actions are often linked. Beliefs are the driving forces behind teachers' (pedagogical) decisions (Richardson et al., 1991). Teachers' beliefs matter and influence their practices (Fives & Buehl, 2012). Beliefs are also important because teachers adopt new practices when they are aligned with their beliefs (Bingham & Hall-Kenyon, 2013). This suggests that even if organizational structure and culture are supportive, teachers will choose not to exercise leadership when leading is aligned with their beliefs. Similarly, Schwartz (2017) has pointed out that a value influences behaviors when this value is activated. Therefore, activating teachers' self-transcendent values will likely lead to teacher leadership behaviors.

The study employed both self-transcendent and self-enhancement value affirmation. Self-enhancement value affirmation did not affect teachers' leadership beliefs. This result suggests that affirming self-enhancement values, which emphasize enhancing one's status in a social hierarchy (Schwartz, 2017), may not be as effective in fostering teacher leadership belief. This finding is consistent with Burson et al.'s (2012) finding that self-transcendent value-affirmation provides a better buffer than self-enhancement value-affirmation. Furthermore, there is no consensus in the literature about the relationship between these two kinds of values. While some studies find them conflicting (Spain et al., 2014), others find it compatible (Cohen & Liu, 2011). Wang et al. (2021) found that both values are compatible and contribute to teacher commitment and lower quitting intentions, although the magnitude of the effect was higher for self-transcendent values. The current study provided evidence that while self-transcendent values led to enhanced leadership beliefs, self-enhancement values did not. This finding suggests that these two types of values do not have the same effect on leadership as other teacher outcomes, such as teacher commitment and lower quitting intentions, even if they could be compatible.

The current study showed that self-transcendent value-affirmation enhanced leadership belief because leadership is, after all, about self-transcendent values. Sarros

and Santora (2001) and Singh and Krishnan (2014) found a positive relationship between self-transcendence values and transformational leadership. Similarly, Dent et al. (2005) found a relationship between self-transcendence and servant leader behavior. Self-transcendence refers to an increased connection with others and the environment (Yaden et al., 2017). Self-transcendence values focus on concern and care for others (Schwartz, 2012). Individuals who hold self-transcendence values help others more, value collective interests, and transcend narrow self-interest (Wang et al., 2021). They favor group unity and member equality (Schwartz, 2012). These are exactly the qualities that define a leader. Burns (1978), a pioneer in the leadership field, views transforming leadership as moral leadership whereby the leader goes beyond satisfying the needs and desires of followers toward end-values such as justice and equality, which are self-transcendence values. In that sense, as Carey (1992) argues, self-transcendence is intrinsic to leadership. In the school context, research shows that teachers who hold more prosocial values (i.e., self-transcendence values) are more motivated to build relationships with others and also act more friendly towards others (Wang & Hall, 2019). Furthermore, when people have self-transcendence values, they are more attentive and understanding and perform a higher moral dimension (Sagiv & Schwartz, 2007). This is directly related to leadership. In short, exercising leadership is about holding self-transcendence values, and the current study demonstrated that teachers' leadership beliefs can be developed through a self-transcendence value exercise.

This finding also highlights the importance of focusing on values that foster connections with others in the context of leadership. This finding also suggests it might be incorrect to automatically assume that teachers in formal leadership positions will exercise leadership. As Heifetz (1994) suggested, individuals in formal positions can struggle to exercise leadership since their position necessitates maintaining order, while leadership requires chaos at a tolerable rate. What matters could be teachers' values and their motivation to influence others to communicate these values.

Implications

This study carries significant implications for theoretical frameworks. While the majority of studies have assessed the impact of self-affirmation in response to threats, this research investigates the unique potential of the self-affirmation exercise for teacher leadership. That is, self-affirmation not only helps people cope with threats, but also enhances their self-transcendent tendencies within their day-to-day lives. When individuals are affirmed for their normal functioning, they are more likely to exercise leadership and positively influence others' lives. This study used an experimental design and provided a causal link between affirmed values and leadership beliefs. This could also be a modest call for the increased application of experimental designs within the field of educational leadership literature.

The present study, to the best of my knowledge, is the first study that explored the impact of self-affirmation on leadership beliefs not only in the educational leadership literature, but also in psychological science. The results of this study hold important implications for school leaders. Self-affirmation exercises could be used in educational settings as an effective tool to foster teacher's leadership beliefs. School leaders can integrate self-affirmation exercises into professional development and leadership training programmes. Such interventions could create, in Sergiovanni's

(1987) term, "leadership density" in schools where all teachers are empowered to exercise leadership.

The present study has some limitations. While this study provides evidence of the immediate impact of self-affirmation on teacher leadership belief, it is unclear whether these effects persist over time. However, it should be noted that previous studies have shown that the effects of self-affirmation interventions can last for an extended period of time. For instance, Harackiewicz et al. (2014), Logel and Cohen (2012), and Miyake et al. (2010) have demonstrated that the effect of self-affirmation on academic grades and health outcomes have endured months and years after the intervention. Binning et al. (2019) found that affirmed middle school students experienced a 69% decrease in disciplinary incidents compared to students in the control condition, and affirmation was linked to higher school trust over time. Similarly, Goyer et al. (2017) found that affirmed minority students went to more selective colleges two years later. These findings suggest that brief but timely interventions could have long-term benefits when supported by institutional processes (Goyer et al., 2017). In short, self-affirmation could lead to long-term effects on teacher leadership. However, this assumption needs to be tested with longitudinal studies.

Another limitation of the study pertains to the manipulation check. Following the intervention, participants in the experimental groups experienced an increase in self-esteem levels, and the difference approached a significant level. However, it did not reach significance at the 0.5 level. There could be various reasons for this lack of significance. One possible reason could be the relatively small sample size, which affects the statistical power of the analysis. Future experiments should be conducted with a larger sample size to address this limitation. The participants might have attended closely to the manipulation but not the manipulation check (see Hauser et al., 2018 for discussion). Also, collectivist and individualistic cultures differ in terms of the valuation of the self. The self is structured differently in collectivist cultures (Sherman & Cohen, 2006). As a result, self-affirmation might have worked without affecting the self-esteem. Schmeichel and Martens (2005) have claimed that affirmation has no effects on self-esteem or positive moods. Future studies should explore alternative forms of manipulations in collectivist cultures.

In conclusion, this study contributes to the literature by demonstrating the potential of self-affirmation, specifically self-transcendent value-affirmation, to enhance teachers' leadership beliefs. School leaders could foster teacher leadership and improve school outcomes by using self-affirmation exercises.

Conflicts of Interest

The authors declare that they have no conflict of interest.

Author Bio:

Dr. Ozgur Bolat received his B.A. from Bogazici University School of Education, Turkey. He later received the Fulbright and TEV scholarship to study for a Master's degree at Harvard University Graduate School of Education. Upon completion, he returned to Turkey and taught at Bogazici University for two years. Bolat received his PhD at the School of Education University of Cambridge in the UK. During his PhD studies, Bolat spent one year at Massachusetts Institute of Technology (MIT) Sloan

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The Relation Between Cognitive Processes and Problem-Solving Performances of Preschoolers

Okul Öncesi Dönem Çocukların Bilişsel İşlem Düzeyleri ve Problem Çözme Performansları Arasındaki İlişki

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ABSTRACT: The aim of this study is to examine the relationship between the cognitive processing levels of preschool children and their problem-solving skills. The Cognitive Assessment System (CAS), developed by Naglieri and Das (1997) and adapted into Turkish by Ergin (2003), was used to determine the cognitive processing levels of children. A puzzle completion task was given to determine the problem-solving strategies of the participant children. The age range of 21 children in the study group was between 5 and 6, with an average age of 5.61. According to the coding of the researcher, 11 positive and 4 negative puzzle completion strategies that children used were determined. A canonical correlation analysis was conducted using positive and negative strategies as predictors of problem-solving skills to evaluate the multivariate shared relationship between cognitive processes and problem-solving. The results indicated that the explanatory percentage of the Planning dimension of cognitive processes on positive strategies was higher than the Attention, Simultaneous, and Successive dimensions.

Keywords: Cognitive processes, problem-solving, puzzle completion task, canonical analysis.

ÖZ: Bu çalışmanın amacı, okul öncesi dönem çocuklarının bilişsel işlem düzeyleri ile problem çözme becerileri arasındaki ilişkiyi incelemektir. Çocukların bilişsel işlem düzeylerini belirlemek için Naglieri ve Das (1997) tarafından geliştirilen ve Ergin (2003) tarafından Türkçe'ye uyarlanan Bilişsel Değerlendirme Sistemi (CAS) kullanılmıştır. Katılımcı çocukların problem çözme stratejilerini belirlemek için yapboz tamamlama görevi verilmiştir. Çalışma grubundaki 21 çocuğun yaş aralığı 5 ile 6 arasında olup ortalama yaşları 5.61'dır. Araştırmacının kodlamasına göre çocukların kullandıkları 11 olumlu ve 4 olumsuz yapboz tamamlama stratejisi belirlenmiştir. Bilişsel işlem ve problem çözme arasındaki çok değişkenli paylaşılan ilişkiyi değerlendirmek için problem çözme becerilerinin yordayıcıları olarak pozitif ve negatif stratejiler kullanılarak kanonik korelasyon analizi yapılmıştır. Sonuçlar, bilişsel süreçlerin Planlama boyutunun olumlu stratejiler üzerindeki açıklama yüzdesinin Dikkat, Eşzamanlı ve Ardıl Bilişsel İşlemler boyutlardan daha yüksek olduğunu göstermiştir.

Anahtar kelimeler: Bilişsel işlem, problem çözme, yapboz tamamlama görevi, kanonik analiz.

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Problem-solving is considered a skill that requires high-level cognitive competencies. The problem-solving process includes steps such as revealing the problem, analyzing the elements of the problem, producing solutions, deciding on the most appropriate solution, testing the solution, and evaluating the result (Bingham, 2016/1958). This research aims to evaluate the relationship between problem-solving and cognitive competencies of preschool children based on the accepted modern approaches to explain cognitive competencies.

Cognitive Processes

Compared to traditional intelligence tests, intelligence theories based on cognitive processes explain intelligence better (Fagan, 2000; Sternberg, 1988). Traditional intelligence tests appear to measure similar information as achievement tests (Naglieri & Bornstein, 2003). PASS theory, a neurocognitive intelligence theory that defines intelligence through four cognitive processes, reconceptualizes intelligence as cognitive processes (Das et al., 1994). This study evaluated cognitive functions using the Cognitive Assessment System (CAS), a measurement tool based on PASS theory. PASS Theory was created by Das et al. (1994), considering current theoretical and applied psychology studies of intelligence. It got this name by combining the first letters of the English spellings of the cognitive function areas defined as Planning, Attention, Simultaneous, and Successive. Das (2002) and Naglieri (1999) describe these components in detail. Accordingly, planning refers to the strategies and decisions that an individual uses while solving problems or achieving a goal (Das, 2002). Attention, on the other hand, is defined as a cognitive process that prevents an individual from focusing selectively or responding to attention-grabbing stimuli. In other words, the ability of the individual to focus on the elements that need to be focused and ignore the others is called attention (Das, 2002). The individual's combining separate stimuli into a group or associating each element within a conceptual whole is defined as simultaneous operations (Naglieri, 1999). Simultaneous cognitive processing refers to the individual's ability to relate parts of the stimulus in a comprehensible whole. Successive cognitive processes are defined as processes that put stimuli in a chain-like and special sequence (Naglieri, 1999).

According to the results of some studies in which the cognitive processing levels of preschool children were evaluated using the CAS scale, children's cognitive processes are found to be related to children's weight status and physical activity (Davis et al., 2015), early literacy skills (Enerem, 2018), behavioral problems (Aslan, 2009). Additionally, visual reading training programs (Ergin, 2015) and fine motor skill activities (Stewart et al., 2007) are effective in increasing preschoolers' cognitive processes.

Problem-Solving in Preschoolers

Educators and researchers have seen problem-solving skills as critical skills that should be developed throughout life. There are different opinions about the content of problem-solving skills. Cicerone et al. (2000) conceptualized problem-solving skills as complex cognitive processes, including "executive function, reasoning, decision making, and the capacity for insight and awareness" (as cited in Chan & Fong, 2011, p.2024). On the other hand, problem-solving has also been defined as a complex

cognitive process that includes problem identification, information processing, and planning (Argelagos & Pifarre, 2012; Chan & Fong, 2011; Fessakis et al., 2013; Kalyuga & Hanham, 2011). Individuals can plan to apply a solution to a particular problem after the information processing process. This planning process can happen once or several times. If individuals choose a suitable method, the problem can be solved instantly. However, if they cannot solve the problem, they can restructure their planning strategies or use trial-and-error methods until they solve the problem (Fessakis et al., 2013). Top-level self-regulation processes used to plan the solution of a problem include deciding which strategy should be used during problem-solving and monitoring the success of problem-solving (Sternberg, 1981).

Researchers have mostly focused on understanding the facilitating or destructive aspects of child-related individual variables (e.g., Berhenke et al., 2011) or parenting behaviors (e.g., Sun & Rao, 2012) that affect success in challenging problem-solving tasks. Since this article focuses on the characteristics of children, the relationship between different variables about children and problem-solving is discussed below. For example, the child's attention is related to the child's task persistence and effortful control (e.g., Gaiter et al., 1982; Kochanska et al., 2000). In addition, emotions play an important role in the problem-solving process. The positive effect of emotions can support attention and memory problem-solving (Carver & Scheier, 2000). The negative affectivity, on the other hand, increases cognitive load, impairs working memory, and is related to less deep strategy use (Turner et al., 1998). Campos et al. (1989) found that affectivity affects attention, self-regulation, problem-solving, and optimal functioning processes. Children who become excessively or emotionally disorganized may not fully engage with the task (Cole et al., 1994).

The literature discusses the importance of solitary play and single-use toys for competent problem-solving skills. For example, Rubin (1982) claims that nonsocial play is related to problem-solving skills. The relevant research indicates that children were more competent in problem-solving when they engaged in a task after playing with objects (Dansky & Silverman, 1973; Sylva et al., 1976). Toys that elicit individual play were often used in intellectually beneficial ways (Trawick-Smith et al., 2011). One of the intellectually beneficial toys is puzzles. Puzzles have been found to lead to problem-solving behaviors (Fleer, 1990; Kirova & Bhargava, 2002; Lloyd & Howe, 2003). Puzzles are named 'cognitively oriented' or 'closed-ended' materials. According to Lloyd and Howe (2003), single-use toys may help children develop problem-solving skills; however, the role of play materials alone in facilitating children's problem-solving skills needs to be investigated further.

The Current Study

This study aims to examine the relationship between the cognitive processing levels of preschool children and their problem-solving performance. Puzzles are among the favorite toys of children. However, limited research has been done on the cognitive processes used in the puzzle completion process (Doherty et al., 2021). This research primarily determines preschool children's strategies during the puzzle completion task. It also provides an example of how the puzzle completion task is a procedure that can be used to evaluate children's problem-solving skills and how performance on this task can be evaluated. It is thought that this research will contribute to the relevant literature by

revealing the relationship between the strategies used by children during the puzzle completion task and children's cognitive processes.

Cognitive processes to be used during the puzzle completion task can be exemplified based on the PASS Theory. The planning process defines mental processes such as the child's determination of puzzle completion solutions, choosing among solutions, applying the chosen solution, and checking the effectiveness of the method he/she applies. Behaviors of controlling the urge to use strategy and act without careful thought while completing puzzles are components of the cognitive process called Planning. Planning processes include Attention, Simultaneous and Successive processes. Focusing on the puzzle task, resisting distraction, and maintaining focus indicate that the attention process is taking place. Simultaneous cognitive operations, on the other hand, is a mental process of bringing together separate stimuli as a whole. Simultaneous cognitive processes such as remembering the puzzle picture and visualizing the puzzle shapes are required in the puzzle completion task. The fourth cognitive operation of the PASS theory is the Successive Cognitive Process. This process, which defines the serial organization of speech sounds and the synthesis of separate vocal and motor stimuli in the form of successive sequences, is not a processing structure that children will need as much as other processes in the puzzle completion task.

Method

Model of the Research

This research was designed in a descriptive survey model, which aims to examine the relationship between the cognitive processing levels of 5- and 6-year-old children and the strategies they use in the puzzle completion task. Descriptive survey studies attempt to describe an event, individual, or object under their conditions and analyze data across a sample population at a certain point of time (Cohen et al., 2007).

Study Group

The research was carried out in a city located in the northwest of Turkey. First of all, two preschools were determined according to the principle of accessibility. Afterward, an information note containing the purpose and procedures of the research was prepared to share with the families, and this information note was delivered to the parents in the two selected preschools by the school administration and teachers. Phone calls were made with the families who volunteered to participate in the research, and an application calendar was created with the children of the parents who filled out the parental consent form. The participant group of the study consisted of 21 children (13 boys, 8 girls) with typical development. The age range of the participating children is between 5 and 6, with an average age of 5.61 (SD=.49).

Data Collection Tools

The Cognitive Assessment System (CAS), developed by Naglieri and Das (1997) and adapted into Turkish by Ergin (2003), was used to determine the cognitive processing levels of children. A puzzle completion task was given to determine the problem-solving strategies of the participant children.

Puzzle Completion Task

The method used by Fagot and Gauvain (1997) was adapted within the scope of this research. A commercial cardboard jigsaw puzzle, having 36 pieces of different shapes that must be fitted together, is used in the study. The chosen jigsaw puzzle is 20 x 22 cm in size and is suitable for children 5-6 years old. The puzzle is an underwater picture with various fish and undersea creatures. Before being used within the scope of this research, it was applied by the researcher with three children who were not included in the sample. The direction given by the researcher is: "There is a puzzle here. I wonder how you will complete it. While you work on it, I will watch you and record your moves. I expect you to do it as fast as you can". While the children were trying to complete the puzzle, the researcher recorded all the children's moves. The researcher gave no directions while the children were playing with the puzzle. Asking the children for tips, s/he said, "I'm very curious how you complete it. That's why I'm just watching you." After the application, the researcher coded these moves and determined the strategies used by the children. All notes and codes have been checked repeatedly and the list of strategies has been finalized.

Cognitive Assessment System (CAS)

It is a battery developed by Naglieri and Das in 1997, designed to evaluate the cognitive processing performance of children aged 5-17 years. It is based on the PASS Theory, defined by four cognitive processes: planning, simultaneous, attention, and successive. It was adapted into Turkish by Ergin (2003). The CAS scale consists of two forms: Standard Battery and Basic Battery. Each of the four scales in the standard battery, planning, simultaneous, attention, and successive, consists of three subtests. Each of these four scales in the basic battery consists of two subtests. Within the scope of this research, the 5-7 age form of the standard battery was used. There are three subtests for each cognitive domain in the standard battery; the total number of subtests is 12 (Naglieri & Das, 2014).

Planning Scale: Planning refers to children's mental processes about the solutions they create against the problems and how they apply and evaluate them. It consists of 3 subtests: Matching Numbers, Planned Codes, and Planned Connections. After implementing the planning subtests, the child is asked what kind of strategy s/he uses during the process. Simultaneous Scale consists of Nonverbal Matrices, Verbal Spatial Relations, and Figure Memory subtests. Simultaneous cognitive processes help the individual to associate the individual elements as a conceptual whole in his mind and to associate the stimulus parts understandably. Attention Scale: Attention is a mental process that focuses the individual against stimuli and provides selective cognitive activity. The Attention Scale consists of three subtests: Expressive Attention, Number Detection, and Perceptual Attention. The three subtests of the Successive Scale are Word Series, Sentence Repetition, and Speech Rate (5-7). Successive cognitive processes are mental processes to understand the serial organization of events and make sense of stimuli in a specially ordered chain (Naglieri & Das, 2014). This test was administered and scored by a practitioner with a CAS practice certificate within the scope of this research.

Data Collection

The researcher participated in the certification program for the CAS test. After obtaining the CAS implementation certificate, an application was made to obtain the necessary ethical documents to run the research. Afterwards, an informative text about the research was prepared, and families with preschool children were reached. A phone call was made with the families who volunteered to participate in the research, information was given about the details of the research, a consent form was sent to the families, and the implementation schedule was determined. The applications were carried out in a room designed for children. The children were informed in terms of the research scope, and consent was obtained from the children. Two of the children did not want to participate in the study. Then, the study was conducted with the 21 children who volunteered to participate in the research. The practices within the scope of the research were carried out one-on-one with the participant children. First, the CAS test was applied, and the puzzle completion task was started when the application of the test was finished. The CAS scores of the children were calculated within a few days after each application, and the CAS test family report was prepared and conveyed to the families. The application of CAS took approximately 75-90 minutes, and the puzzle completion task lasted an average of 35 minutes. While 13 children who participated in the research completed the Puzzle, eight children stated that they wanted to leave it unfinished after a certain period.

Ethical Procedures

Ethics committee approval has been given by the Social and Human Sciences Ethics Committee before the application. Within the scope of the research, an information form, a parent consent form, and a child consent form were prepared and distributed. The children were the ones who voluntarily participated. The collected data has been stored under the principle of confidentiality. Family reports were created about the results of the CAS test. Family interviews were conducted within a few weeks following the implementation, and these reports were delivered to the families.

Data Analysis

While evaluating the normality assumptions, ±2 criteria for skewness and ±7 criteria for kurtosis were used (Curran et al., 1996). Accordingly, it was concluded that the data showed a normal distribution. According to the results, it was determined that the data showed normal distribution (Table 1).

Table 1

Normality Distribution

	Skewness	Kurtosis	Mean	SD
Planning	.319	-.375	95.85	16.36
Simultaneous	.338	.225	102.42	13.85
Attention	.305	.443	104.19	11.46
Successive	-.103	-.757	97.09	12.78

Table 2

Intercorrelations and Descriptive Statistics of Study Variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Planning	1																	
2	Simultaneous	.45*	1																
3	Attention	.64**	.36	1															
4	Successive	.46*	.45*	.36	1														
5	P.S.1	.03	-.30	-.18	-.08	1													
6	P.S.2	-.02	.23	.31	-.08	.12	1												
7	P.S.3	-.06	-.02	-.01	-.19	.24	.44*	1											
8	P.S.4	-.02	-.23	.04	.02	.35	-.03*	.53*	1										
9	P.S.5	-.09	-.28	-.44	-.28	.14	-.19	.21	-.12	1									
10	P.S.6	.41	.24	.09	.57**	.06	-.28	-.62**	-.43*	-.17	1								
11	P.S.7	.06	-.56**	-.12	-.10	.51*	-.37	-.30	.18	.07	.25	1							
12	P.S. 8	-.02	-.48*	-.53*	-.09	.23	-.56**	-.46*	-.29	.10	.38	.66**	1						
13	P.S. 9	-.09	-.04	.12	-.32	-.30	.41	.44*	-.25	.25	-.48	-.37	-.31	1					
14	P.S.10	.19	-.24	.23	.43	.23	-.31	-.22	.27	-.46*	.38	.66**	.38	-.31	1				
15	N.S.1	.44*	.53*	.00	.25	-.18	-.13	-.14	-.58**	.21	.35	-.30	.02	.05	-.22	1			
16	N.S.2	.37	.64**	.19	.32	-.24	-.05	-.42	-.53*	.21	.62**	-.34	-.02	-.24	-.26	.52	1		
17	N.S.3	.36	.11	-.10	.44**	.12	-.36	-.52*	-.48*	.25	.90**	.28	.42	-.36	.17	.44	.52*	1	
18	N.S.4	.01	.02	-.12	.25	-.18	-.33	-.90**	-.36	-.23	.55**	.34	.26	-.33	.26	.04	.33	.44*	1

Descriptive statistics are displayed in Table 2. The positive and negative strategies used by the children during the puzzle completion task were observed and noted by the researcher. Accordingly, 11 positive strategies and 4 negative strategies were listed. As one of the positive strategies, strategy number 11, "combined two pieces," was used by all children, and it was excluded from the analysis. The list of positive and negative strategies and the distribution of how many children use this strategy are presented in Table 3.

Figure 1

Negative Strategy Example

Figure 2

Positive Strategy Example

Table 3

List of Positive and Negative Puzzle Completion Strategies

		Used		Not Used	
		f	%	*f*	%
P.S. 1	Checked the picture from the puzzle box before starting	6	28.6	15	71.4
P.S. 2	Checked the picture from the puzzle box after a while	12	57.1	9	42.9
P.S. 3	Spread out all the pieces in the box on the table and turning the pieces over	10	47.6	11	52.4
P.S. 4	Sorted by color	16	76.2	5	23.8
P.S. 5	Combined the patterns	20	95.2	1	4.8
P.S. 6	Tried to combine taps and blanks	13	61.9	8	38.1
P.S. 7	Started from above or below	2	9.5	19	90.5
P.S. 8	Spoke to himself/herself	4	19.0	17	81.0
P.S. 9	Asked the researcher about clues	12	57.1	9	42.9
P.S. 10	Found the corner pieces at first	4	19.0	17	81.0
P.S. 11	Combined two pieces	21	100	0	0
N.S. 1	Locate the middlers on the edge or corner pieces in the middle	10	47.6	11	52.4
N.S. 2	S/he combined the wrong pieces even if colors and shapes do not fit	11	52.4	10	47.6
N.S. 3	Tried to combine 2 pieces of unmatching color	12	57.1	9	42.9
N.S. 4	Researched the pieces out of the box one by one	10	47.6	11	52.4

Note: P.S.=positive strategy, N.S.=negative strategy

Results

Preliminary Results

Results from bivariate correlations (Pearson) showed that Planning was positively related to Simultaneous (r =.45., p<0.05), Attention (r =.64, p<0.01), Successive (r =.46, p<0.05), and Negative Strategy 1 (r =.44, p<0.05). Although Simultaneous was positively correlated to Successive (r =.45, p<0.05) and Negative Strategy 2 (r =.64, p<0.01), it was negatively correlated with Positive Strategy 7 (r =-.56, p<0.01) and Positive Strategy 8 (r =-.48, p<0.05). Attention was negatively correlated with Positive Strategy 8 (r =-.53, p<0.05). Successive was positively related to Positive Strategy 6 (r =-.57, p<0.01) and Negative Strategy 3 (r =-.44, p<0.01).

Also, a t-test analysis was conducted to test whether the cognitive processes skills differ between the children who completed the puzzle and the ones who would like to stop working on it before it is completed. Planning t (19) =.23, p=.81; simultaneous t (19) =1.63, p=.11; attention t (19) =.71, p=.48; and successive t (19) =.75, p=.45 scores do not differentiate in terms of puzzle completion status.

Canonical Correlations Analyses

A canonical correlation analysis was applied using positive and negative strategies as predictors of problem-solving skills to evaluate the multivariate shared relationship between two variable sets (i.e., strategies and cognitive abilities). It was running separate models for positive and negative puzzle completion strategies to examine their unique contributions to display.

First, a canonical correlation analysis was conducted using ten positive strategies as predictors of problem-solving skills to evaluate the multivariate shared relationship between two variable sets (positive strategies and cognitive abilities). The results are indicated in Table 4. The analysis yielded four functions with squared canonical correlations (R_c^2) of .955, .797, .527, and .278 for each successive function. The full model across all functions was statically significant by considering Wilks's λ = .003 criterion, F (40, 28.40) = 2.55, p = .005. Wilks' λ represents the variance not explained by the model. Thus, 1-λ describes the full model effect size of an r2 metric. In this study, the r2 type effect size was found to be .99 for the four canonical function sets. This result indicates that the full model explains approximately 99% of the variance shared between the variable sets. The dimension reduction analysis allows the researcher to test the hierarchical arrangement of functions for statistical significance (Sherry & Henson, 2005). As noted, the full model (functions 1 to 4) was not statistically significant; however, the explained variance (R_c^2) for each function was above 20%, implying the practical significance of each function. The standardized canonical function coefficients and structure coefficients for Functions 1 to 4 are presented in Table 4. The squared structure coefficients and the communalities (h2) across the four functions for each variable are also given.

Table 4

Canonical Solution for Positive Strategies and Children's Cognitive Processes Skills

	Function 1			*Function 2*			*Function 3*			*Function 4*			
Variable	*Coefficient*	r_s	r_s^2(%)	*Coefficient*	r_s	r_s^2(%)	*Coefficient*	r_s	r_s^2(%)	*Coefficient*	r_s	r_s^2(%)	h^2(%)
Positive S1	-.18	-.11	1.21%	-.27	.40	16.00%	-.28	-.03	0.09%	.67	.32	10.24%	27.54%
Positive S2	-.98	.10	1.00%	.20	-.55	30.25%	.71	.18	3.24%	-1.26	.01	0.01%	34.50%
Positive S3	1.57	-.09	0.81%	.20	-.15	2.25%	-1.11	-.03	0.09%	.97	.23	5.29%	8.44%
Positive S4	-1.88	-.04	0.16%	.31	.17	2.89%	1.17	.32	10.24%	-2.01	.07	0.49%	13.78%
Positive S5	-.78	-.30	9.00%	.78	.35	12.25%	.14	-.40	16.00%	-.53	.46	21.16%	58.41%
Positive S6	.28	.45	20.25%	.41	.45	20.25%	-.01	-.19	3.61%	-1.01	-.45	20.25%	64.36%
Positive S7	1.67	-.09	0.81%	.11	.75	56.25%	.01	.39	15.21%	1.65	.26	6.76%	79.03%
Positive S8	-2.05	-.41	16.81%	.35	.60	36.00%	.24	-.09	0.81%	-1.67	-.03	0.09%	53.71%
Positive S9	-.73	-.16	2.56%	-.30	-.45	20.25%	.86	.22	4.84%	-.29	.29	8.41%	36.06%
Positive S10	-.17	.26	6.76%	.53	.55	30.25%	.53	.58	33.64%	-.33	-.13	1.69%	72.34%
R_c^2			95.53			79.75			52.74			27.83	
Planning	-.52	-.91	82.81%	-.76	-.20	4.00%	.61	.11	1.21%	-.87	-.33	10.24%	98.91%
Simultaneous	-.21	-.66	43.56%	.82	.47	22.09%	.74	.47	22.09%	.33	.32	0.01%	97.98%
Attention	-.26	-.77	59.29%	.74	.33	10.89%	-1.05	-.50	25.00%	-.07	-.18	5.29%	98.42%
Successive	-.24	-.68	46.24%	-.61	-.33	10.89%	-.35	-.11	1.21%	.91	.63	0.49%	98.03%

Note. Structure coefficients (r_s) greater than |.45| are underlined. Communality coefficients (h^2) greater than 45% are underlined. Coefficient = standardized canonical function coefficient; r_s= structure coefficient r_s^2= squared structure coefficient; h^2= communality coefficient.

Another canonical correlation analysis was run using four negative strategies as predictors of problem-solving abilities to evaluate the multivariate shared relationship between two variable sets (negative strategies and cognitive abilities). The analysis yielded four functions with squared canonical correlations (R_c^2) of .639, .562, .087, and .003 for each successive function.

Table 5

Canonical Solution for Negative Strategies and Children's Cognitive Processes Skills

	Function 1			*Function 2*			
Variable	*Coefficient*	r_s	r_s^2*(%)*	*Coefficient*	r_s	r_s^2*(%)*	h^2*(%)*
NS1	-.46	-.63	39.69%	-.42	-.66	43.56%	83.25%
NS2	-.88	-.74	54.76%	.32	-.33	10.89%	65.65%
NS3	.66	.04	0.16%	-.96	-.89	79.21%	79.37%
NS4	.12	.09	0.81%	.19	-.13	1.69%	2.50%
R_c^2			63.99			56.24	
Planning	.05	.35	12.25%	1.04	.52	27.04%	39.29%
Simultaneous	1.09	.93	86.49%	-.12	.16	2.56%	89.05%
Attention	-.01	.28	7.84%	-1.02	-.24	5.76%	13.60%
Successive	.42	.09	0.81%	.43	.49	24.01%	24.82%

Note. Structure coefficients (r_s) greater than |.40| are underlined. Communality coefficients (h^2) greater than 40% are underlined. Coefficient = standardized canonical function coefficient; r_s= structure coefficient r_s^2= squared structure coefficient; h^2= communality coefficient.

Wilks's λ = .143 criterion, F (16, 40.35) = 2.24, p = .01 indicated that the full model across all functions was statistically significant. For the set of two canonical functions, the r^2 type effect size was .856, which indicates that the full model explained about 85% of the variance shared between the variable sets. The dimension reduction analysis allows the test of the hierarchical arrangement of functions for statistical significance (Sherry & Henson, 2005). As noted, the full model (functions 1 to 2) was not statistically significant; however, the explained variance (R_c^2) for functions 1 and 2 was above 20%, implying the practical significance of these two functions. The last two functions only explained 8% and .03% of the variance, indicating a lack of contribution to the shared variance. Table 5 indicates the standardized canonical function coefficients as well as the structure coefficients for Functions 1 and 2. The squared structure coefficients and the communalities (h^2) across the two functions for each variable are also given.

Discussion and Conclusion

The current study examined the relationship between the cognitive processing levels of preschool children and their problem-solving skills using a jigsaw puzzle completion task. The positive and negative strategies used by preschool children during the puzzle completion task were determined by the researcher's observation. Then, the relationship between these strategies and the cognitive processing levels of the children was examined by canonical correlation analysis. Puzzles are very popular toys among both girls and boys, regardless of gender. As the literature indicates, puzzles are referred to as toys that support the development of problem-solving skills. However, a very limited number of resources can be reached regarding the strategies children use while playing with puzzles. In this sense, this research is thought to contribute to the limited literature on puzzles.

Strategies that can facilitate the solution while completing the puzzle are called positive strategies. A total of 11 positive strategies were coded based on the

observations made by the researcher while the children were trying to solve the puzzle. One of the positive strategies, "Combined two pieces," was used by all the children participating in the study. "Combined the patterns" is a positive strategy used by 20 children. In addition to these, positive strategies such as "Sorted by color," "Tried to combine taps and blanks," "Checked the picture from puzzle box after a while," and "Asked the researcher about clues" are strategies used by more than 50% of children. When the strategies used by children were examined, it was seen that the strategies used by children were similar to those mentioned in the literature. For example, Fleer (1990) stated that children can develop common strategies through scaffolding in puzzle-solving tasks. Among the strategies suggested by Fleer (1990) and used by children in this research matched the following; "*Discussing the puzzle picture before it is dismantled," "Turning the pieces over so that the design of the picture is clearly presented," "Discussing the colour, patterning or shape of the border...", "…asking the child to look for a piece with that colouring or patterning", "Examining puzzle pieces already inserted and discussing the shape of the gaps…" and "Modelling to the child puzzle solving through verbalizing thinking and problem-solving strategies used "(*pp.76-77). Research done with preschool children indicated that each age group (3-, 4-, and 5-year-old children) completed the puzzle more quickly when a guide picture was present (Doherty et al., 2021). The same research results indicate that in the task of completing the puzzle, an enhanced understanding of meta-representation will contribute to the understanding that pictorial elements can come together to form an image and may provide additional strategies for putting the pieces together by trial and error.

Then, the relationship between positive strategies and children's cognitive processing scores was examined (Table 4). Accordingly, the explanatory power of Function 1 for Canonical Solution for Positive Strategies and Children's Cognitive Processes Skills is 95.53. Since Function 1 is the most explanatory function, examining the relationship between positive strategies in this set and children's cognitive processing scores deserve to be discussed. According to this result, there is only a relationship between Positive Strategy 6 (Tried to combine taps and blanks) and children's cognitive processing levels (Planning, Simultaneous, Successive, Attention). No relationship was found between Positive Strategy 1 (Checked the picture from the puzzle box before starting), Positive Strategy 3 (Spread out all the pieces in the box on the table and turning the pieces over), and Positive Strategy 4 (Sorted by color) and children's cognitive processing scores in any function. As expected, the explanatory percentage of planning on positive strategies was higher than the other three cognitive process subscales. Accordingly, the assumption that the Planning component is directly related to the puzzle completion task used as a problem-solving task and the strategies used during the puzzle completion task has been confirmed. The planning process defines mental processes such as the child's determination of puzzle completion solutions, choosing among solutions, applying the chosen solution, and checking the effectiveness of the method he/she applies.

The results of the canonical correlation analysis that was conducted using four negative strategies as predictors of problem-solving abilities to evaluate the multivariate shared relationship between negative strategies and cognitive abilities indicated that attention is not related to any of the negative strategies. Also, the results of the same

analysis indicated that “Negative strategy 4: Researched the pieces out of the box one by one” is not related to the cognitive processes scores of the participant children. Since there was no research examining the relationship between cognitive processes and the puzzle complete task, it was not possible to compare the results with the results obtained in different cultures and with different sample groups.

Limitations and Suggestions

The limitations of the present study one should consider when interpreting the results. The data was collected at one point in time. So, the results cannot determine causality. Second, the number of participants was limited to 21 children. Since the implementation of data collection tools in the research was long and the research had to be completed within the scope of a project, the number of participants was limited. In addition, the puzzle completion task was started immediately after the CAS application, with the children’s consent. However, the long duration of the applications may have affected the puzzle completion performance of the children. In addition, children’s puzzle completion strategies were recorded and coded by the researcher. Considering the study limitations, it can be stated that the generalizability of the results is not possible. It is recommended that future studies using similar designs on this subject be conducted with more participants, that children’s puzzle completion performances be evaluated at different times, and that different researchers code puzzle completion strategies.

Children’s puzzle completion strategies may be affected by variables other than cognitive processes. For example, jigsaw puzzle plays in young children relate to visual perception, eye-hand coordination, social development, and the development of specific mathematical concepts (Fleer, 1990), spatial abilities (Levine et al., 2012; Young et al., 2014) and general and pictorial metarepresentational development (Doherty et al., 2021). It is recommended that future studies examine the relationship between puzzle completion strategies and cognitive processes by controlling these variables.

Conflicts of Interest

The author declares that she has no conflict of interest.

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Prediction of Attitudes Towards the English Course by Social-Emotional Competence and Intercultural Awareness of Students*

Öğrencilerin Sosyal Duygusal Yeterlik ve Kültürlerarası Farkındalıklarının İngilizce Dersine Yönelik Tutumu Yordaması

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ABSTRACT: The objective of this study is to examine how secondary school students' beliefs about their social-emotional skills and intercultural understanding can forecast their attitudes towards the English course. This study was developed with a focus on the connection between language and culture, as well as the correlation between social-emotional competence and communication abilities. The research model employed in this study follows the relational survey approach, which falls within the realm of quantitative research methods. To gather data, the researchers utilized the Attitude towards English Language Teaching Scale, the Intercultural Awareness Scale, and the Delaware Social Emotional Competence Scale. The study involved students in the 6th, 7th, and 8th grades as participants. By employing the stratified sampling technique, data were gathered from a sample of 1864 students, with 639 from the 6th grade, 620 from the 7th grade, and 605 from the 8th grade. The collected data were analyzed using two statistical methods: "simple linear regression" and "multiple linear regression" analyses. The results indicated that when considering intercultural awareness and social-emotional competence variables together, they accounted for approximately 24% of the overall variation in students' attitudes towards the English course. The students' perspectives on intercultural awareness and social-emotional competence emerged as significant predictors of their attitude towards the English course.

Keywords: Attitude towards the English course, social-emotional competence, intercultural awareness.

ÖZ: Bu çalışmanın amacı, ortaokul öğrencilerinin İngilizce dersine yönelik tutumları üzerinde sosyal-duygusal yeterlik ve kültürlerarası farkındalık algılarının etkisinin ne ölçüde olduğunu belirlemektir. Bu araştırma, dil ve kültür arasındaki ilişki ve sosyal duygusal yeterliğin de iletişim becerisi ile ilişkisi düşünülerek tasarlanmıştır. Araştırmanın temel modeli, ilişkisel tarama modeli olarak belirlenmiştir, bu nedenle nicel araştırma yöntemleri kullanılmıştır. Araştırmada, veri toplamak amacıyla Kültürlerarası Farkındalık Ölçeği, İngilizce Dersine Yönelik Tutum Ölçeği ve Delaware Sosyal Duygusal Yeterlik Ölçeği kullanılmıştır. Tabakalı örnekleme yöntemi kullanılarak, bu araştırma 6, 7 ve 8. sınıf öğrencileriyle gerçekleştirilmiştir. Veri toplama sürecinde toplamda 1864 öğrenciden (639 öğrenci 6. sınıf, 620 öğrenci 7. sınıf ve 605 öğrenci 8. sınıf) veri elde edilmiştir. Basit doğrusal regresyon ve çoklu doğrusal regresyon analiz yöntemleri verilerin analizinde kullanılmıştır. Bulgular, kültürlerarası farkındalık ve sosyal duygusal yeterlik algılarının İngilizce dersine yönelik tutumu anlamlı bir şekilde yordadığını ve İngilizce dersine yönelik tutumun toplam varyansının yaklaşık %24'ünü açıkladığını göstermektedir.

Anahtar kelimeler: İngilizce dersine yönelik tutum, sosyal duygusal yeterlik, kültürlerarası farkındalık.

* This article is derived from first author's master thesis "Examining the Relationship of Attitude Towards English Lesson with Social Emotional Competence and Intercultural Awareness Perception", conducted under the supervision of the second author. This study was presented as an "oral presentation" at the IX. International Eurasian Educational Research Congress held in Turkey between 22-25 June 2022.

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In a globalizing world, foreign language learning and teaching have become more important. Along with English being a more globally accepted language in intercultural interaction than other languages, the importance of learning English is also increasing today. English can be viewed as an intercultural communication tool as well. (Özer & Korkmaz, 2016). It serves as a crucial intercultural communication tool, facilitating interactions across diverse cultures. The ubiquity of English extends across various domains, including science, social sciences, culture, and economics, where it is almost universally recognized as a common language. Consequently, it is typically taught in schools as a foreign language, highlighting its pivotal role in education and intercultural understanding. In the realm of foreign language acquisition, the significance of one's attitude toward the learning process cannot be overstated.

Taking into consideration the teaching-learning process as a whole is of utmost importance, particularly in the context of foreign language learning. It can be stated that students' attitudes, motivations, and affective factors towards learning a foreign language can have a significant impact on their academic success. Therefore, supporting students' affective development and assisting them in cultivating a positive attitude are crucial factors for a successful learning experience in foreign language education. According to Aydoğmuş and Kurnaz (2017), attitude towards language learning is considered one of the most crucial variables in studies investigating affective factors impacting foreign language learning. Hancı-Yanar (2008), underlined that knowing the level and direction of attitude towards learning English has an important place in the goal of language teaching. Although various factors contribute to English language learning in general, there are also numerous factors that influence an individual's attitude towards learning English. According to Csizer and Dörnyei (2005), to achieve the desired success in a target language, it is important to determine the direction of attitudes, reorganize the learning environment accordingly, and make changes. In addition, Savignon (1983) emphasized that attitudes are the predominant and crucial factor in language acquisition, and the learner's success in acquiring the target language is contingent upon their attitude. In the contemporary context, where English is widely recognized as a lingua franca, fostering a positive attitude towards the English language becomes crucial for successful language acquisition. Attitude towards a foreign language can facilitate or hinder language learning. In this manner, determining what influences attitude is important.

Feldman (1996) states that attitudes can be learned and change depending on experiences. The events, experiences, and beliefs of individuals play an important role in shaping attitudes. Attitude directs the relationship between the individual and the object. Attitudes are an affective tendency that does not change easily, and a certain time is required for the formation of attitudes. Attitude can change whether the information is temporary or permanent. For this change, beliefs and thoughts in the cognitive element should also change (Tavşancıl, 2010). Although cognitive, behavioral, and affective factors are effective in the formation of attitude, attitude is seen as a tendency that covers these three components (Karagül & Aşılıoğlu, 2018). Demirtaş-Madran (2012) points out that the affective dimension of attitude includes feelings towards the object, the behavioral dimension includes a behavioral tendency towards the object, and the cognitive dimension includes thoughts about the object.

Analysis of studies conducted in Turkey at the secondary school level on attitudes towards English lessons reveals that teaching methods, teaching activities, and strategies are experimentally investigated to determine their impact on attitudes. Additionally, these studies examine whether differences exist based on various variables or examine the relationships between these variables. Several research studies have explored the attitudes towards English language learning by investigating various factors, including the implementation of the drama method (Kadan, 2013), instruction based on learning styles (Baş & Beyhan, 2013), the active learning model (Güleç, 2014), English story reading (Şahin, 2016), learner autonomy-based teaching (Orakcı & Gelişli, 2019), and the puzzle-based learning approach (Derer & Berkant, 2020). In the studies using the relational survey model, the relationship between self-regulated learning strategies (Güneyli, 2016) lifelong learning tendencies (Aslıtürk & Ekşioğlu, 2020), English anxiety (Yalçın, 2020) variables, and attitude towards English course were examined. In all of these studies, a significant and positive correlation was discovered between the examined variables and attitudes towards English language learning. In a study conducted by Kafa (2016), it was found a relationship between attitude towards English as a common language and intercultural awareness at the undergraduate level. In a similar study by Sewbihon-Getie (2020) in Ethiopia, the social factors that positively affect attitudes towards learning English were found as communication with native speakers, peer groups, and students' parents.

Within the existing literature, no research has been identified that specifically investigates the correlation between "intercultural awareness" and "social-emotional competence" variables, as well as their collective impact on attitudes towards learning English as a second language. The present study was conducted to address this research gap by exploring the associations between language and culture, as well as the connections between social-emotional competence and intercultural awareness.

Social-emotional learning is an ongoing process that incorporates a set of competences essential to its implementation. These skills act as the essential building blocks of social-emotional learning. The widely recognized framework developed by the Collaborative for Academic, Social, and Emotional Learning (CASEL, 2021) is commonly employed to guide social-emotional learning practices. Within this framework, five core competences are identified: responsible decision-making, interpersonal skills, self-regulation, social consciousness, and self-awareness.

The various competences included within social-emotional learning play a pivotal role in shaping an individual's attitude towards learning English. Self-awareness is the foundation of effective language learning. It involves recognizing one's strengths, weaknesses, emotions, and motivations. When learners are self-aware, they can better understand their language learning process, leading to increased motivation and a positive attitude. Language learning often requires self-discipline and the ability to manage frustration or setbacks. Those who excel in self-regulation are more likely to persevere through challenges and maintain a positive attitude despite difficulties in the learning process. Social consciousness encompasses an awareness of others' perspectives, cultures, and emotions. In the context of learning English, this competence enables students to appreciate the language's global significance and connect with speakers of diverse backgrounds, fostering a more inclusive and positive outlook. Effective communication is a fundamental aspect of language learning. Proficiency in

interpersonal skills, such as active listening and empathy, enhances students' ability to engage with teachers and peers, leading to positive social interactions that can bolster their enthusiasm for English. Learning a language involves making choices about how to allocate time and effort. Those who excel in responsible decision-making are more likely to set achievable language learning goals, make constructive choices in their study methods, and maintain a sense of agency and control, contributing to a positive attitude.

These competences not only facilitate language learning but also affect overall motivation and school success, as highlighted by Dittrich (2022). A positive attitude towards learning English is closely linked to the development of these competences, as they empower students to approach language acquisition with confidence, resilience, and an appreciation for its cultural and global dimensions. To attain proficiency in a foreign language, it is necessary to cultivate a variety of cognitive, social, and emotional skills. In the language teaching process, taking the social-emotional learning approach as a basis and developing students' basic social-emotional competences will increase success, especially in second language learning. The implementation of the Content and Language Integrated Learning (CLIL) approach enables the exploration of cultural differences, including the examination of how emotions are expressed across diverse cultures. The implementation of programs that integrate content and language in a way to cover many skills, such as social-emotional competences will be useful in foreign language learning (Gay et al., 2022). By exploring cultural differences and expressions of emotions across diverse cultures, students not only enhance their language skills but also develop a heightened intercultural awareness, which in turn can positively influence their attitude toward learning English. According to De Boer (2008), social sensory competences should be assessed in the context of the situation/environment. Behavior that appears socially competent in one situation or culture may be considered "asocial" behavior in another situation or culture. Therefore, it can be said that intercultural awareness may also be related to social-emotional competences. Social-emotional competences are instrumental in fostering a positive attitude toward learning English. They empower learners to navigate the challenges of language acquisition with self-awareness, self-regulation, social consciousness, interpersonal skills, and responsible decision-making, ultimately contributing to their language proficiency and overall success. Moreover, the interconnectedness of these competences with intercultural awareness reinforces the idea that a holistic approach to language learning is key to developing a favorable attitude towards learning English.

It should not be forgotten that each language gains meaning within its own culture. In the field of language teaching, culture has become increasingly prominent in recent years, gaining significant recognition and attention. Linguistics acknowledges that the structure and usage of a language are indicative of the cultural values embraced by the respective society. Teaching a language without introducing the target culture will render the language meaningless (Cardona et al., 2015). Language is a means of understanding, and understanding is achieved through a common language. In order to understand, there is also a need for a certain degree of common communication standards in perception, belief, thinking, and behavior. The concepts of culture and intercultural communication have an important impact on linguistics (Knapp, 2010). In foreign language classes, learners encounter the values and understandings of other

cultures that can contribute to personality development as well as the use of communication skills. While learning a new language and the basic aspects of the target culture, learners inevitably encounter various cultural differences and understandings (Burwitz-Melzer, 2012). A growing number of foreign language instructors are recognizing the inherent connection between foreign language learning and the acquisition of foreign cultural knowledge. They understand that it is essential for teachers to foster students' intercultural awareness to cultivate their intercultural communication skills. Intercultural awareness involves comprehending and appreciating both one's own culture and a different culture. The first step to developing cultural awareness for an individual is to be conscious of their own culture. When an individual truly understands, embraces, and is well-acquainted with their own culture, they appear to notice differences and similarities as they become familiar with other cultures. They acquire a different perspective and gradually become aware of other cultures. Ultimately, this leads to intercultural awareness. "Intercultural awareness is the conscious understanding of the role of culturally-based forms, practices, and frameworks in intercultural communication and the ability to flexibly and contextually apply these concepts in real-time communication" (Baker, 2009, p. 88). According to Zhu (2011), when individuals from diverse cultures engage in communication, there is a potential for misunderstandings to occur due to variances in the interpretation and evaluation of events. Therefore, language learning and culture are closely related to each other.

According to Byram (1997), foreign language teaching should not only develop learners' language competence, but also their sociolinguistic, discourse competence, and intercultural competence. Intercultural communication competence can only improve if these areas are closely related. Furthermore, foreign language instruction should encompass sub-domains such as attitudes, knowledge, and interpretive abilities, along with associative and exploratory skills, and a discerning awareness of cultural nuances (Burwitz-Melzer, 2012). Self-reflection, which is necessary for intercultural communication, reflects not only individual motives and prejudices but also one's cultural patterns, including stereotypes and prejudices held in one's society or group. Intercultural communication requires awareness of one's cultural ties and foreign codes, values, and norms (Auernheimer, 2005). According to Chen (1997), in our contemporary era, intercultural communication has evolved into an almost indispensable component, incorporating elements such as intercultural awareness, intercultural sensitivity, and intercultural adaptability. Intercultural awareness can be considered the foundation of communication. It encompasses two essential qualities: awareness of one's culture and awareness of another's. In other words, it involves the ability to step back from our standpoint and not only be aware of our cultural values, beliefs, and perceptions but also to be aware of the cultures of others (Zhu, 2011). Intercultural awareness is rooted in the realization that foreign language learners cannot attain complete familiarity with all the intricate aspects of the culture in the society where the target language is used. Thus, the emphasis lies on the cultivation of awareness rather than comprehensive knowledge. According to Tomlinson (2001), intercultural awareness entails foreign language learners gaining insight into the presence and dynamics of a different culture. As acknowledged by Tomlinson, intercultural awareness is integral to foreign language acquisition, but how learners

approach and engage with the language is equally essential. In this regard, it becomes evident that developing a positive attitude towards English courses is not only beneficial but also fundamental to achieving success in English language acquisition. To facilitate this, it is imperative to delve into a deeper understanding of the various elements that influence and support attitudes towards learning the English language.

Intercultural awareness in the context of learning English means understanding the cultural nuances and context surrounding the language. When learners embrace intercultural awareness, they not only focus on language as a set of rules and vocabulary but also as a means to access and appreciate different cultures. This broader perspective on language learning can significantly impact learners' attitudes toward English lessons. When students recognize the cultural richness embedded within the English language, they are more likely to develop a positive attitude toward their English courses. They start to see language learning as a gateway to exploring diverse worldviews, traditions, and societies. This positive attitude, in turn, enhances their motivation, engagement, and commitment to mastering English. However, an isolated approach to language learning, neglecting cultural aspects, can lead to a less favorable attitude. Students may perceive English lessons as dry and disconnected from real-life experiences. Without intercultural awareness, they miss out on the depth and richness that the language and culture may offer, potentially leading to disinterest and a lack of motivation. In essence, intercultural awareness acts as a catalyst for fostering positive attitudes toward English lessons. It enriches language learning and broadens students' horizons, making them more receptive to the language and more eager to embrace the learning process. Therefore, cultivating intercultural awareness alongside language skills is pivotal for nurturing favorable attitudes and achieving success in English language acquisition.

Social-emotional learning and intercultural awareness can profoundly influence one's attitude toward learning English. While social-emotional learning equips students with skills like empathy, emotional control, and collaboration, intercultural awareness provides the ability to understand the values, norms, and perspectives of different cultures. These two concepts, when combined, can offer students a richer and more meaningful experience in the process of language learning. Social-emotional learning can help students develop a more sensitive approach to language acquisition, and intercultural awareness can instill in them the ability to better understand and respect these differences. The convergence of these two areas can contribute to students experiencing their English learning journey more positively, richly, and with cultural awareness, ultimately fostering a positive attitude.

The relationship between social-emotional competences and intercultural awareness interconnect in various ways. Social-emotional competences, which encompass skills like empathy and social awareness, facilitate the understanding of others' feelings and behaviors, thus promoting better comprehension of individuals from diverse cultural backgrounds, a crucial aspect of intercultural awareness. Successful communication skills, a subset of social-emotional competences, play a pivotal role in cross-cultural interactions, enabling individuals to establish meaningful connections and navigate cultural differences positively. These interconnected competences empower language learners to develop language proficiency and cultivate a deeper appreciation for intercultural experiences, fostering a more favorable attitude toward learning English or any other language. Intercultural awareness and social-

emotional learning can significantly enrich and transform one's attitude toward English language learning. Intercultural awareness supports students to understand the values, norms, and perspectives of different cultures, which can enhance their interest in learning English. Students may see English not only as a means of communication but also as a cultural window. In addition, social-emotional learning equips students with skills like empathy, emotional control, and collaboration. These skills facilitate more positive and effective communication with classmates and teachers. Moreover, increasing students' self-awareness empowers them to better understand their learning processes, potentially boosting confidence, and motivation in the language learning journey. In conclusion, intercultural awareness and social-emotional learning can turn English language lessons into a rich experience that offers more than mere language proficiency, fostering deeper cultural understanding, effective communication, and self-awareness, ultimately making the language learning process more positive, meaningful, and successful.

Developing a positive attitude towards English courses will increase success in learning English. For this reason, there is a need to know the elements that affect and support attitudes towards English language learning. Through an analysis of the literature, it becomes evident that there is a connection between social-emotional competence, cultural awareness, and the domain of language teaching and learning. The current study holds significant potential in providing valuable insights into the influence of social-emotional competence and intercultural awareness on attitudes towards English language teaching, thereby making a noteworthy contribution to the field. This investigation can aid in the development of more effective language teaching programs as a result. Moreover, the present study is expected to deepen our understanding of the importance of incorporating content into English language teaching programs as a means to promote the development of social-emotional competence and intercultural awareness.

In summary, the primary objective of the current study is to investigate the correlation between secondary school students' attitudes towards English courses and their perceptions of social-emotional competence and intercultural awareness. Additionally, the study aims to determine the predictive capacity of these perceptions on students' attitudes towards English courses. The study sought to examine and address the following sub-problem:

1. What is the relationship between students' perceptions of social-emotional competence, their perceptions of intercultural awareness, and their attitudes towards the English course?
2. Are students' intercultural awareness perception scores a significant predictor of their attitudes towards the English course?
3. Are students' social-emotional competence perception scores a significant predictor of their attitudes towards the English course?
4. What is the predictive power of students' social-emotional competence perception scores and intercultural awareness perception scores together with their attitude towards the English course?

Method

Research Model

The study employed the correlational survey model, which falls under the umbrella of quantitative research methods. Correlational research is an investigative approach that aims to explore the relationship between multiple variables without directly intervening or manipulating these variables (Büyüköztürk et al., 2020, p.191).

Population and Sample

The study population for this research consists of students in the 6th, 7th, and 8th grades attending public/state secondary schools located in the central area of Batman province. Within the central region of Batman Province, a population of 29,461 students is currently enrolled in secondary schools spanning grades 6th, 7th, and 8th. The study employed the technique of stratified sampling to ensure representative inclusion of participants. According to Büyüköztürk et al. (2020, p. 85), stratified sampling is a sampling approach that seeks to identify the subgroups within a population and guarantee their inclusion in the sample in proportion to their representation in the overall population. For this purpose, a total of 42 secondary schools in Batman City Centre were classified as socio-economic level in terms of parent profile according to the opinions of school administrators, eight secondary schools were classified as high, 12 secondary schools as middle, and 22 secondary schools as low socio-economic level. According to their perceptions of the population size, 19% of the secondary schools were high, 29% were medium, and 52% were low. The sample for this study was drawn from schools that were classified into two categories: high socio-economic level (two schools), medium socio-economic level (three schools), and low socio-economic level (eleven schools). Data were collected from students in the 6th, 7th, and 8th grades within these selected secondary schools, according to the predefined categorization. A total of 1917 students from 16 secondary schools, selected using the stratified sampling technique, participated in the data collection process, but those who did not fill in the scales applied by the purpose, those who filled in incomplete and incorrectly were removed and analyses were carried out on the scales filled in by 1864 students. Considering the impact of distance education during the pandemic, it was determined that the developmental stage of fifth-grade students was not deemed suitable for data collection purposes. As a result, the study did not include fifth-grade students due to the incompatibility of their developmental stage for data collection. Information about the sample group is presented in Table 1.

Table 1

Information on Sample Group

Grade	Female	%	Male	%	Total
Sixth	307	48,0	332	52,0	639
Seventh	304	49,0	316	51,0	620
Eighth	315	52,1	290	47.9	605
Total	926	49.7	938	50.3	1864

Data Collection Tools

Attitude Scale towards English Lesson: The internal consistency coefficient of the 'Attitude Towards English Lesson Scale' developed by Orakcı and Gelişli (2019) on 6th-grade secondary school students was found to be Cronbach's Alpha = 0.895. A two-dimensional and five-point Likert-type scale with a total of 16 items explaining 58% of the variance was obtained. It was found that items 1, 2, 4, 5, 7, 8, 10, 12, 13, and 14 of the scale formed the first sub-dimension, and the items in this dimension were related to the affective dimension of the attitude scale. It was determined that items 3, 6, 9, 11, 15, and 16 formed the second sub-dimension, and the items in this dimension were related to the behavioral dimension of the attitude scale. Items 1, 2, 5, 7, and 10 were reverse-coded. The internal consistency value of the first sub-dimension of the scale was 0.911, while the second sub-dimension was 0.887. In this study, the internal consistency coefficient Cronbach's Alpha value was found to be α=0.864. The internal consistency coefficient Cronbach's Alpha value for the first sub-dimension of the scale was found to be 0.83, and the second sub-dimension Cronbach's Alpha value was found to be 0.73.

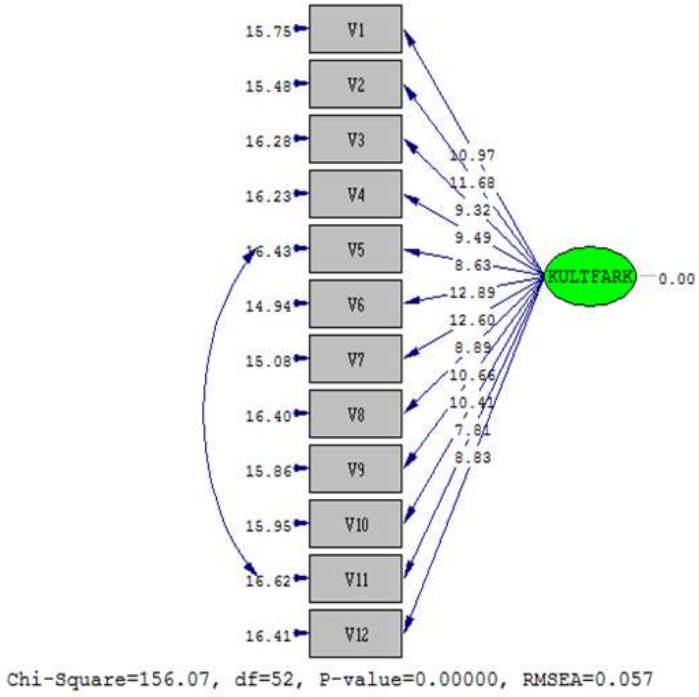
Intercultural Awareness Scale: The researchers conducted a scale development study to assess students' intercultural awareness. This study utilized the "Intercultural Awareness Questionnaire" developed by Zorba in 2019, which consists of 31 items. The research involved a sample of 794 students who were in the 7th and 8th grades of secondary school.

- Internal consistency of the 31 items was evaluated by item-total correlation. The items having the values under. 30 were excluded from the scale, which were the items 2, 6, 9, 10, 11, 14, 25, and 29.
- The 23 items were reanalyzed, and all the items had item total correlations higher than .30. The Cronbach Alpha was .92 for the scale.
- Keiser-Meyer-Olkin (KMO) coefficient (.928) and Bartlett's test of sphericity [X^2=3761.044; sd=66 (p<0.01)] were calculated. The results were acceptable for the factor analysis.
- "Principal Axis Factoring" method was used and unrotated factor solution was selected in exploratory factor analysis. Four factors having eigenvalues higher than one were found. These four factors explained 53,69% of the total variance. The contributions of the factors were 37,74% for the first factor, 6,22% for the second factor, 5,12% for the third factor, and 4,63% for the fourth factor, respectively.
- The items (1, 3, 8, 12, 13, 16, 18, 21, 28) having low factor loadings were excluded and the factor analysis repeated. Two factors, with the first factor contributing 39,90% and the second factor contributing 3,89%, were found. Items 5 and 7 with low factor loadings were removed and reanalyzed.
- As a result of the scale development study, a one-dimensional 12-item five-point Likert-type scale explaining 41.374% of the variance was obtained. The internal consistency coefficient Cronbach's Alpha value was found as α=.828. As a result of the exploratory factor analysis, the factor loading values of the remaining items in the scale were determined to be between 0,56 and 0,76.
- This one-dimensional scale was applied to a different sample group of 610 6th-grade students, and confirmatory factor analysis was performed on the data obtained. As a result of confirmatory factor analysis, it was seen that the structure revealed in the

EFA was confirmed (X^2=156.07 (sd=52, p<.01), (X^2/sd) =3.00, RMSEA=.0.057, Standardized RM*R*=0.049, GFI=.96 and AGFI=.94, NNFI=.93, NFI=.92, CFI=.95). Figure 1 shows the results of confirmatory factor analysis of intercultural awareness scale.

Figure 1

Intercultural Awareness Scale Confirmatory Factor Analysis



Delaware Social-Emotional Competence Scale: The Turkish adaptation of the "Delaware Social-Emotional Competence Scale" by Filiz and Durnalı (2019) was employed to assess the social-emotional competence of students. As a result of the validity and reliability analysis of the scale adapted to Turkish, Cronbach's Alpha internal consistency coefficient was found to be .70. The scale was formed as 10 items with two dimensions. Items 2, 3, 4, 5, 7, and 9 of the scale constitute the self-awareness dimension of the scale, while items 6, 8, 10, and 11 constitute the social awareness sub-dimension of the scale. There are no reverse-coded items in the scale. In this study, Cronbach's Alpha coefficient was found as 0.728. The Cronbach's Alpha value of the self-awareness dimension was 0.616, and the Cronbach's Alpha value of the social awareness dimension was 0.493.

Ethical Procedures

Before collecting the data for the research, Pamukkale University Ethics Committee Approval (including the Parent Consent Form) and the required permissions were obtained from Batman Provincial Directorate of National Education.

Data Collection Process and Data Analysis

The scales were administered to students in the 6th, 7th, and 8th grades within a classroom setting, with a duration of approximately 15-20 minutes for completion. The

statistical analyses for all data were conducted using the IBM SPSS Statistics 22 software package. The statistical significance level was taken as .05. To examine the relationship between the total scores obtained from the three scales and the scores obtained from the sub-dimensions, the Pearson product-moment correlation coefficient was computed. Both "simple linear regression" and "multiple linear regression" analyses were employed to address the sub-problems regarding prediction.

Results

Attitude Towards English Language Teaching, Intercultural Awareness, Social-Emotional Competence Variables

The results of the correlation analysis for the solution of the sub-problem expressed as "What is the relationship between students' perceptions of social-emotional competence, their perceptions of intercultural awareness and their attitudes towards English course?" are presented in Table 2.

Table 2

Correlation Analysis Results of Attitude Towards English Language Teaching, Intercultural Awareness, Social-Emotional Competence Variables

1. Attitude scale (TAS)				2. Culture. awareness scale	3. Social-emotional competence scale (SCS)		
Scales	TAS	- AD	- BD	(IAS)	SCS	- SA1	- SA2
1. Attitude scale (TAS)	1						
- Affective Dimension (AD)	0.940*	1					
- Behavioural Dimension (BD)	0.833*	0.594*	1				
2. Intercultural awareness scale (IAS)	0.476*	0.404*	0.466*	1			
3. Social-emotional competence scale (SCS)	0.302*	0.260*	0.290*	0.418*	1		
- Self Awareness (SA1)	0.280*	0.234*	0.280*	0.426*	0.923*	1	
- Social Awareness (SA2)	0.254*	0.229*	0.230*	0.300*	0.851*	0.584*	1

*p> .05

When the Pearson correlation coefficients shown in Table 2 were examined, a significant positive correlation was found between the Intercultural Awareness Scale and the affective sub- dimension (r=.404), behavioural sub-dimension (r=.466) and total scores (r=.476) of the Attitude Towards English Language Teaching Scale (p<.05). A significant positive correlation was found between Intercultural Awareness Scale and Social-Emotional Competence Scale's self-awareness sub-dimension (r=.426), social awareness sub-dimension (r=.300), and total scores (r=.418) (p<.05). There is a significant positive relationship between the affective sub-dimension of the Attitude Towards English Language Teaching Scale and the self-awareness sub-

dimension (r=.235) and social awareness sub-dimension (r=.229) of the Social-Emotional Competence Scale (p<.05). There is a significant positive relationship between the behavioural sub-dimension of the Attitude Towards English Lesson Scale and the self- awareness sub-dimension (r=.280) and social awareness sub-dimension (r=.230) of the Social-Emotional Competence Scale (p<.05). There was a significant positive correlation between Attitude Towards English Lesson Scale and Social-Emotional Competence Scale total scores (r=.302) (p<.05).

Intercultural Awareness and Attitude on the Attitude toward the English Course

The findings obtained from the simple linear regression analysis for the second sub-problem of the study, "Are students' intercultural awareness perception scores a significant predictor of their attitudes towards the English course?" are presented in Table 3.

Table 3

Results of Simple Linear Regression Analysis for the Prediction of Attitude towards the English Course

Variable	B	Standard Error	β	t	p
Fixed	22.450	1.430	-	15.694	.000
Intercultural Awareness	0.719	0.031	0.476	23.326	.000
R = 0.476 R^2 = 0.226					
$F_{(1, 1862)}$ = 544.103 p = .000					

*p> .05

When Table 3 is analyzed, it is seen that intercultural awareness has a significant relationship with attitude towards the English course (R = 0.476, R^2 = 0.226, p<.05). Accordingly, intercultural awareness explains approximately 23% of the total variance in attitude towards the English course. When the standardized (β = 0.476) and t values are examined, it can be said that intercultural awareness is a significant predictor of attitude towards the English course.

Social-Emotional Competence on the Attitude toward the English Course

The third sub-problem of the study, "Are students' social-emotional competence scores a significant predictor of their attitudes towards the English course?" is presented in Table 4.

Table 4

Results of Simple Linear Regression Analysis for the Prediction of Attitude towards the English Course

Variable	B	Standard Error	β	t	p
Fixed	34.148	1.573	-	21.713	.000
Social-Emotional Competence	0.673	0.049	0.302	13.665	.000
$R = 0.302$ $R^2 = 0.091$					
$F_{(1, 1862)} = 186.721$ $p = .000$					

*p> .05

When Table 4 is analyzed, it is seen that Social-Emotional Competence has a significant relationship with attitude towards English course as a result of simple regression analysis ($R = 0.302$, $R^2 = 0.091$, $p<.05$). Accordingly, Social-Emotional Competence explains approximately 9% of the total variance in attitude towards English language teaching. When the standardized ($\beta = 0.302$) and t values are analyzed, it can be said that Social-Emotional competence is a significant predictor of attitude towards the English course.

Social-Emotional Competence and Intercultural Awareness on the Attitude toward the English Course

The findings for the fourth sub-problem of the study, "What is the predictive power of students' social-emotional competence perception scores and intercultural awareness perception scores together with their attitude towards the English course?" are presented in Table 5.

Table 5

Multiple Linear Regression Analysis Results Regarding the Prediction of Students' Intercultural Awareness and Social-Emotional Competence on Attitude Towards English Course

Variable	B	Standard Error	*β*	*t*	*p*	Binary r	Partial r	Tole-rance	VIF
Fixed	17.287	1.691	-	10.226	.000	-	-		
Intercultural Awareness	0.640	0.034	0.423	19.019	.000	0.476	0.403	0.825	1.211
Social-Emotional Competence	0.279	0.054	0.125	5.618	.000	0.302	0.129	0.825	1.211
$R = 0.489$ $C.R^2 = 0.238$									
$F_{(2, 1861)} = 292.298$ $p = .000$									
CR^2=Corrected R^2									

*p> .05

When Table 5 is analyzed, it is seen that intercultural awareness and social-emotional competence variables together show a moderate and significant relationship

with attitude towards the English course (R = 0.489, D.R^2 = 0.238, p<.05). Together, intercultural awareness and social-emotional competence variables explain approximately 24% of the total variance in attitude towards English course. According to the standardized regression coefficient (β), it is seen that the relative importance of the predictor variables on the attitude towards English language teaching is intercultural awareness (β = 0.423) and social-emotional competence (β = 0.125). These results show that the attitudes towards the English course of the students participating in the study were significantly predicted by intercultural awareness scores at the highest level and social-emotional competence scores at the lowest level.

Discussion and Conclusion

Results showed a positive and moderately significant relationship between the intercultural awareness of the students and the affective sub-dimension, behavioral sub-dimension, and total attitude scores of the attitude scale towards the English course. The study concluded that an increase in students' intercultural awareness leads to a corresponding increase in their attitudes towards the English course, or conversely, an increase in attitudes results in an enhancement of their intercultural awareness. In support of this research result, in a study conducted by Kafa (2016), it was found that a correlation exists between the attitudes of university students towards learning English as a foreign language and their level of intercultural awareness. The results indicated a positive correlation between these two variables. It is expected that intercultural awareness will increase or positive attitudes towards English will develop as intercultural awareness increases. Misunderstandings or intercultural problems are caused not only by the lack of language skills but also by cultural reasons, and having intercultural competence in overcoming this problem is very important for English speakers (Kramsch, 1998).

Another result of the current study points out a significant positive relationship between the intercultural awareness scale and the self-awareness sub-dimension, social awareness sub-dimension, and total scores of the social-emotional competence scale. No other study analyzing the relationship between the two variables was found in related literature. Findings revealed a positive and moderate relationship between students' intercultural awareness and social-emotional competence, so an increase in intercultural awareness would lead to an increase in social-emotional competence or an increase in social-emotional competence would lead to an increase in intercultural awareness. An individual with high intercultural awareness has the competence to easily recognize and solve the problem he/she experiences during communication. An individual with self-awareness and social awareness, which are included in social-emotional competences, will not have problems adapting to social life. Social-emotional skills are essential for life among the 21st-century skills (Organisation for Economic Co-operation and Development [OECD], 2015). Increasing one's self-awareness can also lead to greater awareness in the social sphere. An individual who knows their strengths and weaknesses becomes proactive in pursuing their goals, generates creative solutions to problems, and manage their emotions in social settings without experiencing anxiety or worry (Turkish Industry and Business Association [TÜSİAD], 2019).

The study also found a positive significant relationship between the affective sub-dimension of the attitude towards the English course scale and the self-awareness

sub-dimension and social awareness sub-dimension of the social-emotional competence scale. Moreover, there was a significant positive relationship between the behavioral sub-dimension of the attitude towards the English course scale and the self-awareness sub-dimension and social awareness sub-dimension of the social-emotional competence scale. At the same time, a positive significant relationship was found between the total scores of the attitude towards the English course scale and the social-emotional competence scale. Based on the findings, a positive but low-level relationship exists between attitude towards the English course and social-emotional competence. Sevimbay (2016) concluded that 29% of the total variance of attitude depends on the sub-dimensions of self-efficacy belief (reading, writing, listening, speaking). Furthermore, Goleman (2021) stated that with the development of social-emotional competences, self-confidence increases, emotions and impulses are taken under control, as well as being beneficial for academic success.

In the study, when the predictive power of students' intercultural awareness on their attitudes towards the English course was analyzed, intercultural awareness had a positive and highly significant relationship with attitude towards the English course. According to the results, intercultural awareness explains approximately 23% of the total variance in attitude towards the English course. This result shows that intercultural awareness is a significant predictor of secondary school students' attitudes towards the English course. According to Cardona et al. (2015), culture teaching has gained importance by adopting a communicative approach in language teaching. Sensitivity to culture-based behaviors in communication is defined as cultural awareness. Cultural awareness plays an important role in language teaching, perceptions, and attitudes towards culture. Başbay et al. (2018) stated that the participants in the qualitative study conducted stated that it is necessary to include both the target culture and different cultures in foreign language lessons. Increasing students' intercultural awareness by including elements of different cultures in the educational process in English language teaching is important in terms of improving the attitude towards the course positively. While numerous factors influence English language learning, it is equally emphasized that there are several factors contributing to the formation of attitudes toward English. Çakıcı (2007) highlights the need to examine the key factors that impact successful language learning, emphasizing that research in foreign language acquisition should uncover these factors. This conclusion underscores the significance of intercultural awareness as a crucial factor in explaining middle school students' attitudes toward English lessons.

When the predictive power of students' social-emotional competence on their attitudes towards the English course was analyzed, results showed that social-emotional competence had a positive and low-level significant relationship with attitude towards the English course. According to the analyses, social-emotional competence explains approximately 9% of the total variance in attitude towards the English course. In this manner, social-emotional competence is a significant predictor of attitude towards the English course. Ertanir et al. (2021) found that social-emotional competence and language proficiency are positively correlated with each other and that students with high second language proficiency also have higher social-emotional competence. In other words, students who can understand and communicate are more cooperative, exhibit fewer problematic behaviors, and have emotion regulation skills. In their study,

Slot et al. (2020) also found that language skills were a stronger predictor of boys' socioemotional development compared to girls. In a longitudinal study conducted by Gut et al. (2012), it was concluded that high social-emotional competences can compensate for significant deficiencies in cognitive and language competences. What's more, Fahim and Pishghadam (2007) and Pishghadam (2009) found that English language learning achievement is strongly related to various dimensions of emotional intelligence. As students' social-emotional competence levels increase, their attitudes towards English language teaching can also increase positively. Therefore, it is important to consider students' social-emotional competence in English language teaching. Most of our students encounter English for the first time at school. Students may experience panic, anxiety, and feelings of failure in this situation. Such feelings may be effective in the formation of negative attitudes towards that course. In this case, social-emotional competences will play an important role in coping with students' negative emotions.

The results indicate that the combined intercultural awareness and social-emotional competence scores accounted for approximately 24% of the total variance in attitude towards English language teaching. The relative order of importance of the predictor variables on attitude towards English language teaching was found to be intercultural awareness and social-emotional competence. On this basis, intercultural awareness and social-emotional competence together have a significant effect on attitude towards English language teaching. Language learning is a social activity. Second language learning appears as "Sociocultural theory" as a social practice that takes place in cooperation with different people in sociocultural contexts (Melani et al., 2020). Family, peer groups, schools, and social activities that constitute social environments affect the attitude towards English. Social-emotional learning increases social interaction and facilitates language learning with the combination of both cognitive and affective factors by positively affecting students' attitudes towards language learning in the sociocultural environment. On the other hand, Young and Sachdev (2011) suggested that an English classroom is the best place to develop intercultural competence. With the increase in intercultural communication due to globalization, individuals may often reject or misunderstand the existence of different cultures based on their own culture. In order for intercultural communication to be healthy, foreign language learners should have intercultural awareness. In this way, they can both act with an awareness of different cultures and develop a sense of curiosity towards different cultures. Organizing activities aimed at increasing students' intercultural awareness and developing their social-emotional competences in English lessons can positively affect students' attitudes towards English lessons.

Along with all the results of the current study, there are some limitations that should be mentioned. The study is limited in its scope to data collected exclusively from students in the 6th, 7th, and 8th grades who attend secondary schools situated in the central districts of Batman province, which is located in the eastern region of Turkey. Furthermore, it is important to acknowledge that the dimensions of the data collection instruments utilized in the study have certain limitations. As a consequence of the distance education provided during the pandemic, fifth-grade students were excluded from the sample due to their unsuitability for data collection at that particular level. Secondly, it is known that attitude towards the English course is also related to the

social environment. For this reason, it should be considered that the socio-cultural-economic structure of the students living in Batman province may also affect the results of the research and this should be considered as another limitation of the research.

Recommendations

According to the results of this study, English language teaching programs aiming to increase intercultural awareness, which was found to be a significant predictor of attitude towards English language teaching, should be developed. In order to enhance or increase students' intercultural awareness in English lessons, instructional designs can be developed to present different cultural elements in comparison with students' own cultures and at the same time integrate them with language skills.

Considering the effect of social-emotional competence on attitudes towards the English course, activities such as group discussions, role-playing scenarios, journaling, cross-cultural projects, peer support groups, community engagement, mindfulness exercises, conflict resolution workshops, guest speakers, and self-assessment and goal-setting into the curriculum can be designed to develop social-emotional competence along with students' language skills in English course curricula. An experimental study can be conducted to examine the effect of social-emotional competence and intercultural awareness development activities, which will be integrated with the English curriculum, on attitudes towards the English course.

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Statement of Responsibility

All stages of this research, such as conceptualization, methodology, data collection and analysis, data organization, references, and writing-original draft, were carried out by Fatma Sarıkayış under the supervision of Assoc. Prof. Dr. İbrahim Tuncel.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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The Effect of Socioeconomic Level on Academic Achievement: Evidence from PISA*

Sosyoekonomik Düzeyin Akademik Başarı Üzerindeki Etkisi: PISA'dan Kanıtlar

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ABSTRACT: This research aims to examine the predictive relationship between the economic, social, and cultural status index (ESCS) and academic achievement in the context of PISA 2018 Turkey sample. The research used secondary data analysis, a quantitative research method. In this regard, advanced analyses were carried out in line with the new and different research questions on the data set obtained for the Turkish sample within the scope of PISA 2018. The research sample consists of 186 schools representing 12 regions and 6890 students representing these schools, which were selected in two stages by random stratified sampling from students in the 15-year-old age group continuing formal education in 2018. The findings revealed that the ESCS index is a significant predictor of students' reading, mathematics, and science literacy scores in terms of both public and private schools. According to the findings, ESCS index explains greater variance in terms of academic achievement within the sample of private schools. The research also showed that the ICT resources index has emerged as a more effective predictor of academic success than the other ESCS variables, such as the educational resources index, parent education level, and parent-professional level.

Keywords: Educational inequalities, ESCS and academic achievement, home resources, PISA 2018.

ÖZ: Bu araştırmanın amacı PISA 2018 Türkiye örnekleminde ekonomik, sosyal ve kültürel düzey indeksi (ESCS) ile akademik başarı arasındaki yordayıcılık ilişkisini incelemektir. Araştırma nicel araştırma yöntemlerinden ikincil veri analizi yöntemiyle gerçekleştirilmiştir. Bu doğrultuda PISA 2018 uygulaması kapsamında Türkiye örneklemine ilişkin elde edilmiş veri seti üzerinden yeni ve farklı araştırma soruları bağlamında ileri analizler yürütülmüştür. Araştırmanın örneklemini Türkiye'de 2018 yılında 15 yaş grubu içerisinde yer alan ve örgün eğitime devam eden öğrencilerden seçkisiz tabakalı örnekleme yoluyla iki aşamalı olarak seçilen, 12 bölgeyi temsil eden 186 okul ve bu okulları temsil eden 6890 öğrenci oluşturmaktadır. Araştırmadan elde edilen bulgularda ESCS indeksinin hem devlet okul hem de özel okullar bağlamında öğrencilerin okuma, matematik ve fen okuryazarlığı puanlarının istatistiksel olarak anlamlı bir yordayıcısı olduğu tespit edilmiştir. Elde edilen bulgulara göre ESCS indeksi özel okullar bağlamında devlet okullarına göre akademik başarının daha etkili bir yordayıcısıdır. ESCS değişkenleri açısından bilişim kaynakları indeksinin üç puan türünde de akademik başarının anlamlı bir yordayıcısı olduğu görülmüştür. Bilişim kaynakları indeksinin diğer ESCS değişkenleri olan eğitim kaynakları indeksi, ebeveyn eğitim düzeyi ve ebeveyn mesleki düzeyine kıyasla akademik başarının açılanmasında daha etkili bir yordayıcı olarak ortaya çıkması araştırmadan elde edilen önemli bulgular arasındadır.

Anahtar kelimeler: Eğitim eşitsizlikleri, ESCS ve akademik başarı, ev kaynakları, PISA 2018.

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Educational inequalities caused by social, cultural, economic, geographic, and anthropological factors are still a point of controversy in education systems. Although countries have been attempting to eliminate educational inequalities resulting from these structural characteristics and promote equal education opportunities by incorporating technological advancements into education systems, progress remains limited. Equality of opportunity is a liberal principle that allows all people to compete within their abilities and skills regardless of their economic, social, or political circumstances. Educational equality means that the results of education are independent of socioeconomic conditions, rather than the equalization of educational goods, results, resources, or opportunities (Ferreria & Gignoux, 2010; TEDMEM, 2021). According to Roemer (1998), in order to ensure equal opportunity in a society, conditions should not be divisive in the process of accessing advantages. Roemer, who coined the term "advantage" to characterize the product or outcomes obtained after a process, referred to the determinants of advantage based on an individual's will as "efforts" and those that are independent of the individual as "conditions."

Coleman (1967) revealed that one of the main factors causing inequalities in academic achievement in the context of the United States was the family environment and socioeconomic status. According to Coleman (1967), even if all inputs and processes are equalized based on school facilities, teacher qualifications, and educational programs, the additional resources, and activities that middle and upper-socioeconomic-class families provide to their children might lead to serious inequalities in the products of education (Coleman, 1967). In the same way, Rawls (1971) addressed the problem using the concept of a social lottery, meaning that the child's economic, social, and cultural background plays a distinctive role in the development of knowledge and skills.

Bourdieu (1986) explains these inequalities based on three types of capital: economic, cultural, and social. Economic capital refers to wealth and assets, while cultural capital refers to knowledge and skills. Social capital involves individuals' networks and relationships, which can provide opportunities, resources, emotional support, and validation. Bourdieu (1974) asserted that existing social and cultural inequalities are reproduced through schools and that 'cultural capital' and 'habitus,' which are transferred from family and environment to students, play a significant role in this process. Cultural capital can take on three forms: first, as a person's internalized habits and behaviors; second, as tangible cultural objects such as books and machines that reflect cultural knowledge; and third, as established cultural practices within institutions (Bourdieu, 1986). He argued that individuals enter the classroom with varying levels of cultural capital and habitus as a result of the formal or informal experiences with their families and social environments, and the benefit they receive from education is strongly attributable to their cultural capital.

Taking the argument further, Bowles and Gintis (2002) stated that the advantage of social position is one of the most important determinants of academic success. They emphasized in their study that inequalities are reinforced through the unequal education system and that the socioeconomic structure precedes the education system in terms of developing cognitive skills. While the ideology of the dominant, or upper, culture is prominent in schools, students from lower socioeconomic classes deliberately or instinctively demonstrate resistance to the system, increasing their risk of failure

(Apple, 2004). Moreover, economically higher-class parents actively cultivate their children's social and cognitive abilities through a process known as "concerted cultivation". In contrast, lower-class parents engage in a set of activities called the "accomplishment of natural growth," which promotes children's spontaneous rather than planned growth (Lareau, 2002, p. 747). Thus, individuals with socioeconomic advantages become more skilled in knowledge and skills through school.

Taken together, although it may appear impossible to speak of absolute equality of opportunity, eliminating socioeconomic inequalities that arise in the process of gaining social status and roles for individuals, as well as minimizing academic achievement inequalities arising from these conditions, might be expressed as the major goals of equality of opportunity in education. Consequently, the purpose of this research is to address the educational disparities associated with the family's socioeconomic position by using the PISA 2018 results within the context of Turkey.

Current Issues Related to Economic, Social, and Cultural Status (ESCS) in Turkey

The Economic, Social, and Cultural Status (ESCS) index is employed in the Programme for International Student Assessment (PISA) to measure students' economic and social status. Socioeconomic status (SES) is commonly used in scholarly literature to refer to this notion, and ESCS is closely related to SES. Both terms refer to a measure of student access to financial, social, cultural, and human capital (Avvisati, 2020). While the family's economic, social, and cultural status are some of the primary factors leading to educational inequalities (Dronkers & Robert, 2008; Figlio & Stone, 2012), they also contribute to the emergence of advantageous and disadvantageous student groups in the educational system. As reported by the Social Justice Index Report (2019), Turkey is ranked the second lowest of the 41 countries in the EU and OECD countries' social justice index. According to the same report, Turkey is ranked second from the bottom in the income equality ranking and last in the education equality ranking (Hellman et al., 2019). Moreover, according to the OECD (2018) report, 25% of children aged 0-17 in Turkey live in disadvantaged families, which is higher than the OECD average (13.6%). Furthermore, there are significant differences between the regions of Turkey. For example, while the poverty rate is 14% in the Western Anatolia Region, it is 42% in the Southeastern Anatolia Region (Gursel et al., 2013). According to The United Nations Children's Fund (UNICEF) reports, extra efforts should be made in Turkey to promote equal opportunities for children from disadvantaged groups where geographical and socioeconomic disparities impede educational equality (UNICEF, 2018; UNICEF, 2019).

Education expenditures and indicators also reflect Turkey's worrisome income inequality and poverty rates. Turkey is one of the OECD countries with the highest share of private resources in education expenditures, where the ratio of education expenditures to total income is 0.9% in the lowest 20% of income groups, while it rises to 4.4% in the highest 20% (Korlu, 2019; TUIK, 2019). According to the OECD "Child Well Being" indicators, overall, 24.4% of the students do not have access to basic educational needs, such as a "table to study" and a "quiet environment" (OECD, 2021). This rate increases to 47% for low-income families but drops dramatically to 9% for high-income families (OECD, 2021).

A similar problem of inequality exists between public and private school learning environments and educational expenditures. 20% of schools in Turkey are private schools, and 8% of the total student population attends private schools, making Turkey one of the countries where the difference between public and private school enrollment rates is quite considerable (OECD, 2017a). Class sizes and teacher-student ratios in public schools are twice that of private schools (OECD, 2017a). The average class size is 35 in public schools and 22 in private schools, compared to an average of 23 in public schools and 22 in private schools in the OECD average (OECD, 2017a). Above all, while public schools have 16 students and private schools have eight students per teacher, the expenditure per student in private schools in Turkey is four times that of public schools (Korlu, 2019). It is possible to predict that inequality in income and education expenditures might have a domino effect on many school outputs.

The Effects of School Type on Academic Achievement

Studies conducted in different contexts have shown that private schools commonly outperform public schools regarding academic achievement. Dronkers and Robert (2008) compared the variations in 19 OECD nations and discovered that private government-dependent schools exceed public schools in terms of mathematics achievement. Similarly, Figlio and Stone's study (2012) revealed that students enrolled in private schools consistently achieve superior performance on standardized tests and exhibit a higher likelihood of graduating from high school and pursuing higher education when compared to their peers attending public schools. Moreover, a study conducted in India found that private school students have substantially superior learning outcomes in mathematics and reading (Kumar & Choudhury, 2021). According to a study examining the degree to which the curriculum objectives of Turkish, Mathematics, Science and Technology, and Social Studies were met within the Turkish context, the level of achievement of private school students in all four basic areas was approximately one to two standard deviations higher than that of public-school students (İş Güzel et al.,2009). However, utilizing two large-scale databases, Lubienski and Lubienski (2013) revealed that academic achievement in public schools is at least comparable to and often higher than their private school counterparts after controlling the demographics and concluded that the privileged background of the private school students provides enhanced educational support.

Commonly, the superior performance of private schools is attributed to greater financial resources, smaller class sizes, the selection of more intelligent students, or characteristics of private school students and their families that provide them an advantage over students in public schools (Buckingham, 2000). Ünsal and Çetin (2019) found that teachers in private schools were more committed to the curriculum and utilized more student-centered techniques and methods. However, according to Benviste et al. (2002), the disparity may be attributed to the greater degree of autonomy and flexibility private schools have in their operational procedures, in contrast to public schools that often adhere to a centralized bureaucratic structure and standardized curriculum. Given the situation, the notable disparities in academic achievement and structural variations among these schools prompt inquiry into the influence of socio-economic determinants on these two school types and the comparative resilience of each type in relation to family-related disparities.

Literature Review

The relationship between socioeconomic status (SES) and academic achievement has been a topic of research interest for many years. Many studies have explored the association between SES and academic achievement in different contexts, the extent of this relationship, and the factors that mediate it. Furthermore, multiple research endeavors reveal how families' economic, cultural, and social capital are transmitted through education with significant implications for academic success (Barone, 2006; Lareau, 2002; Yang, 2003).

Research has consistently shown that SES is associated with academic achievement, but the extent of this relationship and the factors that mediate it vary across different contexts. In a meta-analysis study by Sirin (2005) in the U.S.A. context, a moderate relationship was found between SES and academic achievement (r = 0.299). The study revealed that parental education, parental occupation, and income of the family have a moderate relation with academic achievement. Among the SES components, home resources have the highest effect size compared to others. Regarding subject matter, the relation was the highest between SES and mathematics achievement. The study also emphasized that the relationship is stronger for students in suburban schools than rural or urban schools. With similar results to Sirin's research, Liu et al. (2020) found a moderate relationship between SES and academic achievement in a meta-analysis study conducted in the Chinese context (r = 0.243). According to the study, parental education, parental occupation, family income, and family resources are all significantly correlated with academic achievement, respectively, in terms of the SES variable. Contrary to Sirin's study, the study also showed that SES has a stronger correlation with language performance than science and math performance. Moreover, Harwell et al.'s (2017) meta-analysis study found a modest relationship between SES and academic achievement (r = 0.22). It showed that school location, student's grade, and school types are significant moderators of SES-achievement relationships. According to the study, the SES-achievement relationship is higher in urban area schools and public schools compared to suburban and private schools. This SES-achievement relationship decreases as the grade level of students increases.

Several studies have investigated the impact of socioeconomic status and cultural resources on students' academic achievement and socio-emotional development, highlighting the role of factors such as parenting stress, human capital investments, and parental education and occupation levels. In a study on early learning, Crosnoe and Cooper (2010) discovered that the family's economic disadvantage affected math and reading test results. The study emphasized that socioemotional issues, parenting stress, and parents' human capital investments all play a role in mediating the discrepancies. Tramonte and Willms (2010) investigated the cultural capital on students' academic and affective outcomes controlling the socioeconomic factors. They found that cultural capital has significant effects on reading literacy, a sense of belonging at school, and occupational aspirations. The study also showed that parental education level is statistically significant for only reading literacy while parental occupation level is significant for all three outcomes. In his study, Yang (2003) investigated the effect of socioeconomic status on mathematics and science achievement in 17 countries and found that cultural resources had the greatest impact on achievement in most countries. Barone (2006) investigated the effects of cultural resources

comparatively on 25 countries and concluded that a student's social class background may influence their social skills, language use, and attitudes towards teachers and the school curriculum.

Numerous research studies conducted in the national context obtained results that are comparable to those found in the international literature (Aslanargun et al., 2016; Bindak, 2018; Erdem & Kaya, 2021; Karaagac, 2019; Ozkan, 2020; Yolsal, 2016). For example, Aslanargun et al. (2016) showed that parental education level and family income status have a significant effect on academic achievement. Erdem and Kaya's study revealed that SES is the most important predictive variable of academic achievement among the factors such as age, gender, and students' well-being. In another study, Bindak (2018) found that academic success is strongly related to the number of books in the home, parental education level, and the family's wealth. Similarly, Karaagac (2019) revealed that socioeconomic factors account for 38% of the variance in academic achievement. Furthermore, research based on the PISA 2012 and 2018 datasets has found that a student's economic, social, and cultural status is a strong predictor of their reading, math, and science performance (see Erdem & Kaya, 2021; Ozkan, 2020; Yolsal, 2016).

As well as how academic achievement is correlated with SES and what factors moderate this relationship, the studies have shown how parents' socioeconomic status is transferred to their children through education. Children from low socioeconomic status households have significantly less developmental capital, such as a lack of a healthy home educational environment, and thus have relatively less access to educational resources, experiences, and social capital necessary for children's academic growth to succeed (Early et al., 2020; Miller et al., 2015; Yeung et al., 2002). Lower levels of socioeconomic status have also been associated with lower learning motivation (Akram & Ghani, 2013), lower self-efficacy (Artelt et al., 2003), school absence (Mooney et al., 2023) and consequently lower academic achievement (Sirin, 2005)

On the other hand, children who grow up in families with a wide social environment and cultural resources are more interested in reading, make more effort, and are more successful (Chiu & Chow, 2010), while families in a high socioeconomic class allocate more budget to educational resources and create richer learning environments (Chiu, 2010). Students with a high family income can afford learning activities after school, build important social networks (Lareau, 2002), and have easier access to information resources associated with cognitive development and academic success (Aslanargun et al., 2016; Daoud et al., 2020; Johnson, 2010; Kolikant, 2009; Lie & Zhou, 2012; Pagani et al., 2016). Studies highlight that, despite the educational reforms to provide equal educational opportunities, educational outcomes have been overshadowed by the family's socioeconomic status.

Current Study

The relationship between socioeconomic factors and academic achievement has been addressed in various ways in both international and national studies. Despite the interest in ESCS and academic achievement, previous studies have failed to address how the ESCS index works in the context of public and private schools in PISA exams and which variables construct the ESCS index as more effective in academic achievement. This paper, therefore, is expected to provide new insights into the

relationship between economic, social, and cultural resources and academic achievement across school types (public and private) and the ESCS variables and contribute to the body of knowledge in the existing literature. This research aims to examine the predictive relationship between economic, social, and cultural resources and academic achievement across the Turkey PISA 2018 sample. In accordance with this goal, the research attempts to answer the following research questions:

1) What is the predictive relationship between the economic, social, and cultural level index [ESCS] and students' reading, mathematics, and science literacy scores?

2) Is the predictive relationship between ESCS and students' reading, mathematics, and science literacy scores influenced by school type?

3) What is the predictive relationship between information resources, educational resources, parents' highest professional and highest education levels, and the students' reading, mathematics, and science literacy scores?

Method

Research Model

This study is a secondary data analysis that investigates the predictive role of ESCS and its components academic achievement across the Turkey sample using the dataset available in the PISA 2018 database. Secondary data analysis refers to the analysis of a dataset that has already been collected for other purposes in order to seek answers to new questions in different research (Devine, 2003; Johnston, 2014). This quantitative correlational study focused on simple and multiple regression analyses on the PISA 2018 Turkey data set to examine the relationship between ESCS, ESCS variables, and students' academic achievement within the context of secondary data analysis. One advantage of secondary data analysis is that it allows for the expansion of original research findings or the examination of questions not addressed in the original research on the same dataset (Hakim, 1982, as cited in Johnston, 2014). The current study conducted secondary data analysis in four phases: developing the research questions, defining the dataset, performing the analysis, and reporting the results (Johnston, 2014).

Sampling

The OECD team conducted the population and sample selection processes for this study independently of the authors of this paper. The PISA 2018 study population consists of 15-year-old students enrolled in formal education in the 2018 academic year. The sample from Turkey was determined in two stages (OECD, 2019). The first stage involved determining which schools would be included in the study using a random stratified sampling method. Four distinct variables were used to stratify the schools: school type, Turkey Statistical Regional Units Classification, administrative style of the schools, and gender. Following this, students were randomly picked from each school participating in the study. As a result, 186 schools and 6890 students representing 12 regions in Turkey took part in the PISA 2018 study (Table 1).

Table 1

PISA 2018 Turkey Sample Stratification Variables and Student Distributions (Ministry of National Education [MoNE], 2019)

Stratification Variables	Stratifications	Student Distribution Rates (%)
School Type	Anatolian High School	43.7
	Vocational and Technical High School	31.1
	Anatolian Imam Hatip High School	13.7
	Science High School	4.2
	Multi-Program Anatolian High School	4
	Social Sciences High School	2.4
	Anatolian Fine Arts High School	0.6
	Middle School	0.3
Statistical Regional Units Classification	İstanbul	20.2
	West Anatolia	13.3
	Aegean	12.5
	Mediterranean	12.4
	Southeastern Anatolia	10.4
	East Marmara	8.1
	West Black Sea	5.2
	Middle Anatolia	5.1
	Middle East Anatolia	5.1
	East Black Sea	3.8
	Northeast Anatolia	2.3
	West Marmara	1.6
School Administration Type	State School	87
	Private School	13
Gender	Female	50.4
	Male	49.6

Data Collection Tools

The data for this study was gathered through reading, mathematics, and science tests, as well as questionnaires administered to students and school administrators as part of PISA 2018. The achievement scores related to reading, mathematics, and science in the study were collected through computer-based achievement tests that lasted two hours (OECD, 2019). Questions on the tests were constructed by evaluating cognitive processes relevant to each field to assess student performance in reading, mathematics, and science (OECD, 2019).

The data relating to the ESCS, which is the independent variable in this study, were collected through questionnaires that include questions related to the educational level and occupational status of parents, information and communication technologies (ICT) resources, educational resources, and cultural resources available (OECD, 2019). The International Standard Classification of Education (ISCED) was used to classify parental education levels, and each parent's education period was coded numerically on a yearly basis with the highest value standardized. In a similar way, occupations were coded according to their prestige scores using the International Standard Classification of Occupations (ISCO-2008), and an occupational status socioeconomic index (ISEI) was obtained for each parent. The highest of these scores for the student's family was standardized and included in the computation of ESCS. The information about the existence or number of the home possessions was collected through several questions; "Which of the following are in your home?", "How many of these are there at your home?", and "How many books are there in your home?" (OECD, 2020). Students were given the following options for answering the first question: "a desk to study at, a room of your own, a quiet place to study, a computer you can use for school work, educational software, a link to the internet, classic literature, books of poetry, works of art, books to help with your school work, technical reference books, a dictionary, books on art, music, or design, a heating-cooling system, a TV subscription, and at least a one week vacation per year" (OECD, 2020, p.11). In response to the second question, students were provided with the options: "televisions, cars, rooms with a bath or shower, cell phones with internet access, computers, tablet computers, electronic book readers, musical instruments" (OECD, 2020, p.12). Finally, six options were presented in response to the last question: "0-10, 11-25, 26-100, 101-200, 201-500, and more than 500" (OECD, 2020, p.13). The educational resources index used as a predictor variable in the study was based on home possessions, such as a desk to study at, a quiet place to study, a computer you can use for schoolwork, educational software, books to help with your schoolwork, technical reference books, and dictionary. On the other hand, the computation of the ICT resources index includes educational software, internet connection, cell phone with internet access, computers, tablet computers, and e-book readers (OECD, 2017b).

Analysis of Data

To address the first question of the study, a simple linear regression analysis was conducted to explore the predictive relationship between the economic, social, and cultural level index (ESCS) and the students' reading, mathematics, and science literacy scores, as well as how this relationship varies by school type. The study utilized Plausible Value 1 in regard to students' achievement scores to perform regression analyses. The PISA Data Analysis Manual states that using a single plausible data in a sample as large as 6400 does not reveal a significant difference in mean and standard error calculations (OECD, 2009). Since the sample size in this analysis was 6890, the analyses were conducted using a single plausible value. The analyses were performed using SPSS version 24.0. To this end, the authors checked whether the data met the assumptions required for simple linear regression analysis. In this regard, the authors examined scatter plots to check the linearity between the predictor and predicted variables and examined scatter plots for residuals to check whether the differences between the predicted values and the observed values were normally distributed. After

confirming that the data met the assumptions, a simple linear regression analysis was performed to examine the link between the ESCS index and performance scores. The analysis was carried out in all schools and separately in the samples of public and private schools.

To address the second question of the study, a multiple linear regression analysis was conducted using Plausible Value 1 to reveal the predictive relationship between information resources [ICTRES], educational resources [HEDRES], parents' highest professional level [HISEI], parents' highest education level [PAREDINT], and the students' reading, mathematics, and science literacy scores. Before the analysis, the authors checked whether the data met the assumptions required for multiple linear regression analysis. At this point, the authors examined a scatter plot of standardized values (Z-predicted) and standardized residuals (Z-residuals) and whether the residual values are normally distributed. In addition, Durbin-Watson values were checked to test whether the error terms were independent, and the Mahalanobis distance for each observation was calculated based on predictive variables. After calculating the Mahalanobis values, the Mahalanobis values of a predictor variable that deviated significantly from the mean of the variables ($p < .001$) were excluded from the analysis by using the CDF.CHISQ(quant, df) function in SPSS (Tabachnick & Fidell, 2014). Based on the analyses performed, the data met the assumptions required for multiple regression analysis. In the analysis, ICT and educational resource indexes were used as continuous variables in the study, while the variables of the parent's highest education level and highest professional level were used as dummy variables. In this regard, while the highest education level of the parents was recoded as to whether or not they graduated from higher education, their professional prestige score was recoded based on whether they were above the average or not.

Results

The Relationship Between the ESCS Index and Students' Achievement Scores

Related to the first research question of the study, on the data obtained from the PISA 2018 database, a simple regression analysis was conducted in order to reveal the predictive relationship between the ESCS index and students' reading, mathematics, and science literacy scores using the SPSS program. As presented in Table 2, there was a moderate correlation between the ESCS index and students' reading, mathematics, and science literacy scores with a correlation of .33,.32, and .31, respectively.

Table 2

Predictive Relationship Between ESCS Index and Reading, Mathematics, and Science Literacy Scores (All Schools)

	R	R^2	F	p	*B*
Reading	.33	.10	829.273	.001	24.379
Mathematics	.32	.10	802.945	.001	23.753
Science	.31	.09	745.662	.001	21.975

Table 2 shows that the ESCS index is a significant predictor of reading, mathematics, and science literacy scores (p<.01) and explains 10% of the variance in reading and mathematics scores and 9% in science scores. When the non-standardized regression coefficient is considered, an increase in the ESCS index of one unit is expected to increase the reading score by 24.379, the math score by 23.753, and the science score by 21.975. In other words, the findings assert that as the parental educational status, professional prestige scores, and the number of educational, ICT, or cultural resources increase, students may get higher scores and be more successful in reading, mathematics, and science tests offered in the PISA exams. As a result, it is noteworthy that the increase in the performance score depending on the ESCS level is significant.

The Effect of School Type on the Relationship Between ESCS and Students' Achievement Scores

In order to reveal how the predictive relationship between the economic, social, and cultural level index and the students' reading, mathematics, and science literacy scores changes according to the private or public school environment, the data set was filtered by school type and simple regression analyses were performed separately on the public school and private school samples (Table 3).

Table 3

Predictive Relationship Between ESCS Index and Reading, Mathematics, and Science Literacy Scores

		R	R^2	F	p	*B*
Public Schools	Reading	.32	.10	726.138	.001	24.939
	Mathematics	.31	.10	680.122	.001	23.956
	Science	.31	.09	667.674	.001	22.628
Private Schools	Reading	.48	.23	221.670	.001	39.03
	Mathematics	.49	.24	231.885	.001	39.03
	Science	.48	.23	213.073	.001	37.195

Table 3 shows that there is a moderate correlation between the ESCS index and reading, mathematics, and science literacy scores in the public school sample (r >.30). While the ESCS index explains 10% of the variation in the fields of reading and mathematics in public schools, it explains 9% of the variance in science scores. Accordingly, a one-unit increase in the ESCS index in public schools is expected to boost the reading score by 24.939 points, the math score by 23.956 points, and the science score by 22.628 points. It is clear from the findings that the relationships between the ESCS index and the scores in each of the three competency areas are statistically significant. Considering this, an increase of approximately three units in the ESCS index in the context of public schools is expected to move the student to a higher level of proficiency in all three competence areas. This finding reveals that the ESCS index is an important factor in explaining student achievement in public schools.

In the sample of private schools, the correlations between the ESCS index and the reading, mathematics, and science score types were moderate and higher than in the public school sample. Regarding private schools, while the ESCS index explains .23 of the variances in reading and science literacy scores, it explains .24 in mathematics scores. If the ESCS index rises by one unit in the private school sample, the reading and mathematics scores are expected to increase by 39.03 points, while the science score is expected to rise by 37.195 points. As the findings assert, the anticipated score increases in private schools based on the ESCS index are at least 15 points higher than in public schools. Regarding PISA proficiency levels, an increase of approximately two units in the ESCS index is estimated, which moves students to a higher level in all three proficiency areas. Based on the findings, it is clear that the ESCS index is a more distinguishing factor in terms of academic achievement in the setting of private schools when compared to public schools.

The Relationship Between Variables of the ESCS Index and Students' Achievement Scores

To answer the second research question of the study, a multiple linear regression analysis was performed to examine the predictive relationships between ICT resources, educational resources, the occupational status and education level of the parents, and students' reading, mathematics, and science literacy scores. According to the findings, ICT resources, educational resources, parents' occupational status, and parents' educational level together are statistically significant predictor of reading, mathematics, and science literacy scores (p<.01). As Table 4 demonstrates, these four predictor variables together have a moderate relationship with reading, mathematics, and science literacy scores (r >.30). The total variance explained by the model as a whole was 12% for reading and science literacy scores, 11% for mathematics scores. Based on the standardized regression coefficients (ß), the relative order of importance of the predictor variables on the reading score is ICT resources (ß=.226), occupational level of the parents (ß=.194), educational resources (ß=.017) and educational level of the parents (ß=.004). The t-test results for the significance of the regression coefficients show that ICT resources and parental occupational status are significant predictors of reading scores (p<.001). Standardized regression coefficients show that the order of relative importance of predictor variables on mathematics and science literacy scores, respectively, were occupational status ($ß_{[Math]}$=.197, $ß_{[Science]}$=.190), ICT resources ($ß_{[Math]}$=.151, $ß_{[Science]}$=.186), educational resources ($ß_{[Math]}$=.067, $ß_{[Science]}$=.065) and educational level ($ß_{[Math]}$=.023, $ß_{[Science]}$=-.007). According to t-test results related to significance of regression coefficients, ICT resources, educational resources, and parental occupational status are significant predictors of academic achievement in mathematics and science (p<.001).

Table 4

Results for Multiple Regression Analysis

Score	Variable	*B*	SE	ß	t	p	Bivariate	Partial
Reading Score	Constant	477.328	2.134		223.645	.001		
	ICT Resources	21.392	1.501	.226	14.249	.001	.30	.17
	Educational Resources	1.447	1.334	.017	1.085	.278	.22	.01
	Parents' Occup. Pres. Score (Above the average)	35.839	2.413	.194	14.852	.001	.27	.17
	Graduated From Higher Education (Yes)	.803	2.353	.004	.341	.733	.16	.004
	R = .35	R^2 = .12						
	F = 246.208	p = .001						
Mathematics Score	Constant	457.613	2.102		217.671	.001		
	ICT Resources	13.875	1.454	.151	9.544	.001	.27	.11
	Educational Resources	5.574	1.281	.067	4.353	.001	.22	.05
	Parents' Occup. Pres. Score (Above the average)	36.315	2.417	.197	15.026	.001	.27	.17
	Graduated From Higher Education (Yes)	4.809	2.353	.023	1.738	.082	.17	.02
	R = .33	R^2 = .11						
	F = 219.601	p = .001						
Science Score	Constant	477.258	2.000		238.603	.001		
	ICT Resources	16.332	1.383	.186	11.809	.001	.29	.14
	Educational Resources	5.142	1.218	.065	4.221	.001	.23	.05
	Parents' Occup. Pres. Score (Above the average)	33.303	2.299	.190	14.483	.001	.26	.17
	Graduated From Higher Education (Yes)	-1.147	2.239	-.007	-.512	.608	.15	-.006
	R = .34	R^2 = .12						
	F = 230.633	p = .001						

According to Table 4, a one-unit increase in the ICT resources index results in an increase of 21,392 in the reading score, 13,875 in the mathematics score, and 16,332 in the science score. The findings show that increasing the availability of ICT resources,

such as internet access, computers, and tablets, and their use has a positive and significant impact on performance scores in all three proficiency areas. However, it is also evident from the findings that the increase in educational resources, such as sourcebooks, technical books, and dictionaries, does not affect the performance scores as much as the information resources.

The findings also show that if the parental occupational prestige score is above the average, it is expected to increase 35,839 in the reading score, 36,315 in the mathematics score, and 33,303 in the science score. On the other hand, parents who have graduated from higher education are estimated to increase the reading score by only .803 points and the mathematics score by 4.809 points, while it does not affect the science score at all. Accordingly, it is possible to say that if either parent works in jobs above a certain income level and with a relatively higher occupational reputation, it has a positive effect on the success scores of the students. However, as the findings indicate whether the parents completed higher education does not affect achievement scores.

Discussion and Conclusion

The ESCS Status is Key to Understanding Students' Academic Achievement

According to the study's findings, the ESCS index level is a significant predictor of students' reading, mathematics, and science literacy scores. This finding implies that the ESCS index plays a significant role in explaining academic achievement. It can be inferred from this that the curricula implemented in Turkish schools are insufficient to eliminate the effects of home and family disparities. To put it another way, the current educational system is unable to address inequalities resulting from society's socioeconomic structure properly. Although the effect of the ESCS level on academic achievement has diminished in Turkey since 2003, it is concerning that the ESCS-driven differences still negatively affect equality in the education system. From this perspective, the findings of this study also support conflict theories of education, which claim education systems reinforce class inequalities and contribute to the reproduction of social inequalities by transforming socioeconomic inequalities into academic inequalities. Similar to the findings of the current study, family-based factors (economic, social, and human capital) play a crucial role in explaining educational achievement, as revealed in many research articles focused on educational inequalities in Turkey (see Aslanargun et al., 2016; Bindak, 2018; Karaagac, 2019; Ozkan, 2020; Yolsal, 2016).; These inequalities due to socioeconomic conditions have gained even greater importance with the emergence of distance education, which was a compulsory implementation in response to the COVID-19 pandemic. During the pandemic, when schools were closed, the time students spent with their families at home increased, and the internet infrastructure, ICT resources, educational resources, and educational support from parents became even more important. Studies showed that socioeconomically disadvantaged students experienced more problems and distress than their peers during this period (Engzell et al., 2021; Maldonado & De Witte, 2020). For example, research in the Netherlands discovered that socioeconomically disadvantaged students lost up to 55% more learning than their peers (Engzell et al., 2021), while

another study in Belgium found that these students lost more reading and math skills (Maldonado & De Witte, 2020).

The ESCS Status is More Effective Predictor in Private Schools

Another key finding of this study is that the ESCS index is a better predictor of reading, math, and science literacy scores in private schools than in public schools. It is believed that the family's socioeconomic status, the structure of the curricula, education expenditures, parent involvement in education, and the academic resilience factors of students all contribute to the explanation of this result. First and foremost, compared to private schools, the education-teaching processes in public schools are less distinctive in terms of economic, social, and cultural resources, and so the disparities based on the ESCS index have less of an impact on public schools in terms of academic achievement. As a result of this finding, the impact of teacher credentials, student characteristics, learning environments, and the implemented curricula on coping with socioeconomic differences should be investigated in both public and private schools. In addition, education expenditures might be one of the reasons why the ESCS index is more effective in the context of private schools. According to the report published by the Education Reform Initiative (2019), Turkey is one of the countries with the highest private resource expenditures in education (Korlu, 2019). Research by the Turkish Statistical Institute (TUIK, 2019) shows that the amount allocated to education expenditures increases as the family's income level increases. In Turkey, while households in the lowest 20% of income distribution spend 0.9% of their total budget on education, this proportion rises to 4.4% in the highest 20% (TUIK, 2019). Given that students at private schools have higher socioeconomic levels than students in public schools, it is possible to infer that socioeconomic factors influence those differences in academic achievement more in private schools.

In addition to education expenditures, another factor that may be effective in the emergence of such a difference between private and public schools is the level of parental participation in education. Studies regarding Turkey show that as parents' socioeconomic levels increase, the education participation rate also increases (see Kocabas, 2016; Tabak, 2020). For example, in the study by Tabak (2020), a significant difference was found in favor of those with high-income levels in terms of communication with the school and the teacher, supporting the child's homework and studies, and socio-cultural development. According to another study, parents of students in private schools gave greater support to learning activities at home and communicated more effectively with the teacher (Kuru Cetin & Taskın, 2016). Furthermore, studies have shown that parents with relatively high education levels can communicate better with students about educational practices and support them better in school-related studies, implying that there is a strong relationship between parental education level and academic success (Akinsaya et al., 2011; Chiu & Chow, 2015; Davis-Kean, 2005; Fantuzzo et al., 2000; Trusty, 1999). In the PISA 2018 data set, the rate of parents who had received undergraduate and graduate education is 34% in the public school sample, while this rate is 62% in the private school sample. Given this fact, ICT, educational, and cultural resources might be used more effectively in educational activities in the context of private schools depending on the parent's education level.

Academic resilience might be another factor explaining why ESCS is more effective in private schools regarding academic achievement. According to OECD studies, students with high academic resilience, which is the ability to achieve good grades despite adversity, are more successful despite their socioeconomic disadvantages (Agasisti et al., 2018; Agasisti & Longobardi, 2017). One report states that students who are successful despite adverse conditions have strong personality traits, such as confidence in academic abilities, determination, disciplined work, high motivation, passion, and ambition (Agasisti et al., 2018). Given the fact that the average academic resilience scores of socioeconomically disadvantaged and advantaged students are expected to be close in the public school sample, the difference is expected to be greater in the private school sample. Nevertheless, according to the PISA 2018 data set, the average academic resilience scores of the two groups were closer in the public school sample than in the private school sample; the difference was two points in the public school sample but four points in the sample of private schools. The fact that this difference is greater in the private school sample could also explain why the ESCS index is more distinctive in the private school sample.

ICT Resources Have a Significant Impact on Students' Performance

A further key finding of this study is that ICT resources are a better predictor of academic achievement than educational resources. Considering that digital transformation has started to spread to every area of our lives today, the result is not surprising. Research on information technology and academic success shows that having access to and using information and communication technologies has a favorable impact on academic achievement (Daoud et al., 2020; Erdogdu & Erdogdu, 2015; Lie & Zhou, 2012; Pagani et al., 2016). For example, in a systematic review study by Daoud et al. (2020), a positive correlation was found between having an internet connection at home or school and academic success in 87% of the studies. Several other studies show that having internet access improves children's high-level thinking skills, such as critical thinking and problem-solving (Cabiness et al., 2013; Furlang & Davies, 2012; Lei & Zhou, 2012). Furthermore, Kolikant (2009) reveals that students with computer and internet access are more autonomous learners and have better study routines than their peers who do not. Moreover, Johnson (2010) discovered a positive correlation between cognitive development and internet availability.

To conclude, this paper shows that the ESCS index is an important predictor of academic success and that the ESCS index has a greater impact on academic success in private schools than in public education institutions. Furthermore, regarding ESCS variables, the study reveals that parental occupational status and ICT resources are important variables in predicting academic achievement. The findings of the study are confined to the data collected during the PISA 2018 exam and the analyses conducted within the study. Considering the findings for the first research question, it is believed that taking economic, social, and cultural factors into account in the development and evaluation of curricula, as well as organizing extra programs for socioeconomically disadvantaged students, are priority measures that should be implemented on a school-by-school basis. Furthermore, among the school-based measures that can be implemented is the identification of the socioeconomic profiles of students enrolled in schools, as well as the learning opportunities at home, and determining the advantaged

and disadvantaged groups. In order to overcome education inequities caused by students' socioeconomic circumstances, policymakers should design education policies that prioritize opportunity above equality and allocate educational resources accordingly. Above all, limiting the share of private resources in education spending and boosting the resources available to public institutions are among the topics that should be prioritized in the battle against educational inequities caused by socioeconomic conditions (Korlu, 2019).

In light of research findings, both in this current paper and other studies, it is critical to identify and resolve issues with internet and information technology access in students' homes to reduce the digital divide and, consequently, inequalities. Furthermore, the students' and parents' capability to use information and communication technologies should be determined, and supportive and mass education activities should be carried out for disadvantaged groups where necessary. Finally, in future research, it is recommended that the impact of ESCS on academic outcomes be examined while taking into account such factors as family involvement in education and academic resilience. In addition, qualitative research methods can be applied to investigate how ICT and educational resources are integrated into education in the context of home resources and how learning environments are created at home.

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Statement of Responsibility

The first author is responsible for conceptualization, formal analysis, writing the original draft and visualization in composing the article. The second author is responsible for methodology, validation, writing-review&editing and supervision in composing the article.

Conflicts of Interest

The authors report there are no conflicts of interest to declare.

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