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ORIGINAL ARTICLE

Academic Resilience Scale for Adolescents in Turkey: Relationship with School Burnout and School Attachment

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Abstract

Academic resilience is the capacity of students who encounter various risk factors to show positive adaptation despite these difficulties. The aim of this study is to develop a multidimensional scale, based on Ecological Systems Theory, to determine adolescent students' levels of academic resilience and the resources of academic resilience they have. For this purpose, a scale study was carried out with a sample group consisting of 695 students who continue their secondary and high school education. Exploratory factor analysis was conducted to find out the factor structure of the developed scale. A scale consisting of 27 items and four sub-dimensions was formed. Confirmatory Factor Analysis revealed that the scale's factor structure showed good fit. Secondary factor analysis also confirmed that the sub-dimensions meaningfully converged under the superstructure of academic resilience. The findings show that all sub-dimensions made a meaningful contribution to the superstructure. Furthermore, negative relationships were found between academic resilience and school burnout, while positive relationships were found with school attachment.

Keywords Academic resilience · Adolescent and youth · Scale · School burnout · School attachment

Key Findings A valid and a reliable 27-item Academic Resilience Scale for Adolescents with four sub-dimensions was developed to measure adolescents' academic resilience levels and their resources, based on the ecological systems theory and cultural context. The analyses revealed a significant negative correlation between academic resilience and school burnout ($r = -.48$), and a significant positive correlation between academic resilience and school attachment ($r = .58$).

Public Relevance Statement This study developed a valid and reliable Academic Resilience Scale for Turkish adolescents, based on the cultural context and ecological systems theory. It further investigated the relationship between academic resilience, school burnout, and school attachment using this scale. These findings hold significant practical importance for educators, school counselors, and parents. Understanding adolescents' ability to cope with academic challenges will greatly contribute to developing targeted intervention programs and support policies aimed at enhancing their resilience, ultimately fostering more supportive educational environments.

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Introduction

Throughout their lives, people may encounter unexpected challenges, crises, and traumatic events. Such adverse life experiences can negatively affect many people's physical, cognitive, and emotional development, potentially disrupting their overall adaptation to life. Nevertheless, in studies conducted, it has been noticed that some individuals can adapt to life again, continue their development, show positive results even in high-risk environments, and quickly recover from the negative effects of trauma despite risk situations that may disrupt their life harmony (Campbell et al., 2016; Masten, 2001; Werner & Smith, 1982). Over the years, this situation has attracted researchers' attention; the importance of the factors that eliminate or reduce the effects of the difficulties created by negative experiences has been noticed, and research has focused on what these factors are (Masten, 1994; Seban & Perdeci, 2016). These studies were carried out under the framework of "Resilience" in the literature. When the literature is examined, the concept of resilience is defined in different ways by researchers. For instance, Connor and Davidson (2003) describe resilience as a personal trait. Johnson (2008) defines it as the ability to overcome difficulties or to recover oneself after encountering negative

experiences, difficult situations, and hardships. However, in general, resilience is defined as a dynamic process that enables individuals to maintain their normal development or to show positive adaptation as a result of the use of protective factors against risk situations (negative life experiences) that may harm their development or adaptation (Luthar et al., 2000; Masten, 2001; Masten et al., 1990).

When the definitions are examined, resilience is mostly explained within the framework of risk, protective factors, and positive adaptation (Karaırmak, 2006; Sarkar and Fletcher, 2013). When the resilience literature is examined, risk is generally considered as a "risk" for the individual, family, and environmental effects that may threaten the adaptation and development of individuals, increase the likelihood of a negative situation, or cause the continuation of a possible problem (Kirby and Fraser, 1997; Wright et al., 2013). Examples of situations that may pose a risk for individuals are chronic diseases, the death of parents, psychopathology in parents, poverty, and disasters (Gizir, 2007). Individual, family, and environment-based factors (optimism, hope, self-efficacy; warm family ties, good parenting characteristics; friend support, positive relationships with a supportive adult in the social circle) that mitigate or prevent the negative and destructive effects of risk factors and facilitate readjustment are known as protective factors (Gizir, 2007; Karaırmak, 2006; Luthar and Cicchetti, 2000). Positive adjustment, on the other hand, is expressed as the individual's more functional or healthy adaptation than expected or the successful performance of the individual's developmental tasks despite being exposed to stressful and risky situations (Luthar et al., 2015; Masten & Coastworth, 1998). In resilience studies, the difficulties and risks faced by individuals and the methods of coping and re-adaptation show some similarities. However, resilience is a complex and comprehensive concept. For this reason, it is necessary to examine the concept separately as "family resilience" (Patterson, 2002; Walsh, 1996), "psychological resilience" (Luthar and Cicchetti, 2000; Masten, 2001), and "academic resilience" (Martin, 2002) in a context-specific manner. The context of this study is academic resilience, which is the successful adaptation process that students show despite negative life experiences (risk situations) that may disrupt their school adaptation.

Academic Resilience

Academic resilience is defined as students' high motivation and academic success despite the risks that may cause them to fail in their courses and drop out of school due to stressful life experiences and situations (Alva, 1991; Frisby et al., 2020; Wang et al., 1994; Ye et al., 2021). Some researchers define academic resilience as a dynamic and multidimensional adaptation process between a student and the resources around him/her against the risks that may disrupt the student's school adaptation (Calhoun et al., 2018; Downey, 2008). When we look at the definition, it is striking that three features are emphasized while defining academic resilience, as is the case with general resilience. The first includes risk factors such as low income (Gizir & Aydın, 2009; Kong, 2020), being a refugee (Anagnostaki et al., 2016; Demir & Aliyev, 2019), and different ethnic status (Gonzalez & Padilla, 1997), which can negatively influence students' academic development, motivation, and success. The second one consists of individual and/or environmental protective factors such as self-efficacy, planning (Martin & Marsh, 2006), self-regulation, social competence, optimism (Kim, 2011), school climate, and parental expectations (Gafoor & Kottalil, 2011), which make it easier to reduce or eliminate the effect of risk factors that may impair school-related functionality. The third point involves positive school-related adaptation factors such as academic achievement (Erberer et al., 2015; OECD, 2017), enjoying school and attending class (Martin & Marsh, 2006), and self-efficacy belief (OECD, 2018).

In the relevant literature, it is seen that there are positive relationships between academic resilience and many academic, social, emotional, and psychological structures such as school belonging and subjective well-being (Avcı & Çakır, 2021), goal orientation and language achievement (Najafzadeh et al., 2018), student participation, mathematics self-efficacy, self-esteem, and attitude toward school (Borman & Overman, 2004), self-efficacy and life satisfaction (Turan, 2021), and school attachment (de la Fuente et al., 2021; Martin et al., 2015). However, it is argued that academic resilience has negative relationships with undesirable student behaviors such as test anxiety (Hayat et al., 2021) and school burnout (Oyoo et al., 2018; Ríos-Risquez et al., 2016). Therefore, it is obvious that academic resilience, which is associated with many positive and negative school-related variables, is a significant matter, which means that it should be carefully understood in improving the academic outcomes of adolescent students with negative experiences and in minimizing the effects of demographic characteristics that have impacts on school outcomes, that is, in creating equality of opportunity (Ye et al., 2021). Actually, studies on an international scale are also carried out on how academic resilience develops and can be improved (Agasisti et al., 2018; Fenwick et al., 2022; Özcan & Bulus, 2022). However, it is noticed that there is no standard approach to how academic resilience is measured in studies carried out to understand, examine, develop, and support the concept (Rudd et al., 2021).

Measuring Academic Resilience

Although there is a significant consensus on the definition of academic resilience in the literature, it is striking that there are differences between researchers regarding how it can be measured, as well as defining the concept. Studies reveal that multiple approaches are used to measure academic resilience (Rudd et al., 2021; Tudor & Spray, 2018). This situation makes it difficult to compare the findings obtained from academic resilience studies (Rudd et al., 2023), to evaluate the effectiveness of intervention programs for the development of academic resilience (Tudor & Spray, 2018), and to comprehend the concept.

Rudd et al. (2021) argue that there are three approaches to the measurement of academic resilience (definition-driven, process-driven, and latent construct approaches) in the literature. The definition-driven approach, which constitutes one-third of the studies conducted, is the approach that is based on predetermined criteria for risk and positive adaptation without the use of an academic resilience scale. In studies based on this approach, the following method is often used to identify a student that develops academic resilience: being in the lowest 25% socio-economic level (risk factor) and having the highest level of achievement or above average (adaptation indicator). Although this method has brought a certain standard for the determination of resilience in studies carried out on an international scale, the fact that only those included in certain percentages are considered to be resilient creates a limitation in terms of inclusivity (Rudd et al., 2021). However, setting threshold values for risk and adaptation causes the academic resilience rate to be higher or lower than it really is in some countries (Ye et al., 2021). As a result of this measurement approach, it causes the resilience rates to differ along with the preferred threshold values.

Another approach is the process-driven approach. In this approach, it is investigated to which factors the students who are in risk groups but who have shown high success owe this (Rudd et al., 2021). This approach is similar to the variable-focused approach, which is one of the approaches (person-focused and variable-focused approaches) proposed by Tudor and Spray (2018) on how academic resilience is measured. Tudor and Spray (2018) state that academic resilience is evaluated by examining the mediation or moderation effects of protective factors in the relationship between risk and positive adaptation in variable-focused studies. Process-driven approaches examine the dynamism in the relationship between risks and protective factors and positive adaptation together, which renders the resilience process understandable (Rudd et al., 2021; Tudor & Spray, 2018). Although it provides significant convenience to understand the process, it is rather difficult to fulfill the requirements of this approach because researchers need to have good methodological knowledge to investigate the relationship between these three dimensions and to have remarkable knowledge about how the findings obtained in the context of relationships can contribute to the understanding of academic resilience (Rudd et al., 2021).

The last approach to evaluate academic resilience is the latent construct approach. Measurements made through this approach are based on factors thought to be effective in developing academic resilience and are calculated using students' responses to the items reflecting these factors (Rudd et al., 2021). Measurement tools based on this approach can be examined in two groups. While the first group of measurement tools calculates the academic resilience capacity in one dimension (Martin, 2013; Martin & Marsh, 2006), the second group calculates the resilience level through multidimensional measurement tools (Arastaman, 2011; Cassidy, 2016; Samuels & Woo, 2009; Zulfikar et al., 2020). Researchers have expressed that the use of a validated scale for the measurement of academic resilience can enable the comparison of research findings and standardization for the measurement of academic resilience (Tudor & Spray, 2018). However, it has been argued that the use of the scales based on this approach in research without determining the risk status in general only helps to identify the factors associated with resilience (such as grit, self-efficacy), and the inclusion of people who do not have risks or negative experiences in the research sample in these studies makes it difficult to understand the concept correctly (Rudd et al., 2021).

Present Study

Within the scope of this research, a new measurement tool based on the latent structure approach was developed. This measurement tool was constructed by integrating findings from previous studies on academic resilience (Rudd et al., 2021; Tudor & Spray, 2018; Ye et al., 2021) with expert evaluations and theoretical considerations to ensure that the construct was measured in the most valid and comprehensive way.

In this context, when the literature is examined, in most studies, it is seen that measurement tools associated with psychological resilience, such as The Connor-Davidson Resilience Scale (Connor & Davidson, 2003), The Resilience and Youth Development Module (WestEd, 2001), and The Brief Resilience Scale (Smith et al., 2008), etc., are utilized instead of using an appropriate measurement tool for the context. It is thought that the data obtained through these measurement tools in relevant studies can give an idea about psychological resilience rather than the resilience process

in the context of school and education. Consequently, a new comprehensive measurement tool (including individual, family, school, and environmental factors) has been developed to determine students' levels of resilience in accordance with the context of education and school life.

Academic resilience is described by researchers as the capacity of students to perform well at school despite situations that may put their school life at risk (Alva, 1991; Morales & Trotman, 2004; Wang et al., 1994). When the measurement tools evaluating academic resilience are examined, it is noticed that some of the tools measure academic resilience without using any risk indicator (Ramdani et al., 2021; Sarwar et al., 2010). Some of them make evaluations on the negative experiences that students can always encounter in their school life (Martin & Marsh, 2006). Additionally, it is seen that some try to measure academic resilience through scenarios that may render the student's school life difficult (Cassidy, 2016) and negative school experiences forms (Martin, 2013). However, the absence of risk indicators or the inclusion of daily negative school experiences in current measurement tools may make it difficult to understand academic resilience. It is also known that it can be risky to draw conclusions about academic resilience based on the data of the same measurement tools given to students who face risks that negatively affect school adaptation and to students who have not been exposed to any risk (Rudd et al., 2021). In addition to these, it is seen that many studies are carried out based on only certain risks (such as low socio-economic level, being a refugee or migrant student) (Anagnostaki et al., 2016; Gizir & Aydın, 2009; Gonzalez & Padilla, 1997; Joseph et al., 2015; Kong, 2020). However, it has been stated that students face other risk factors apart from these risks and that these factors negatively affect students' school adaptation. Hence, it will be beneficial to have a checklist including such factors in the developed measurement tools (Tudor & Spray, 2018).

Based on this, a list of individual and environmental (related to family, friends and society) risk factors that may adversely influence students' school life has been added to the developed measurement tool taking into account the experiences of the authors who are experts in the field of academic resilience and school counseling. In addition, a sample situation scenario which can negatively affect school life is given for students who do not have any risk. Thus, the academic resilience levels of individuals who have been exposed to a real risk and those who have not been exposed to any risk but who are assumed to be exposed to a risk situation through the case scenario will be measured.

When the measurement tools developed in accordance with the context of academic resilience and used in research are investigated, it is realized that academic resilience is tried to be measured based on individual factors (Cassidy, 2016; Martin, 2013; Martin & Marsh, 2006; Ramdani et al., 2021). As a matter of fact, Rudd et al. (2021) state that the measurement tools used to measure academic resilience employ more than thirty factors while determining resilience, and these factors are generally related to student characteristics (academic self-efficacy, internal locus of control, emotion regulation, etc.). This means that environmental factors are ignored when measuring academic resilience. However, the resilience process is also highly related to an individual's environment (Ungar, 2018). Literally, when the definitions of resilience and resilience in the context of education are examined, it is argued that resilience emerges as a result of the interaction between an individual and environmental factors in the face of negative life events (Olsson et al., 2003; Rutter, 2006; Silas Casillas, 2008; Ungar, 2012). Additionally, it is stated that students should have both personal, family, school, and environmental resources and these resources should be accessible so that they can adapt again in the face of the difficulties they encounter (Ungar, 2018). Therefore, the adaptation process of students who encounter various risks is explained not only by individual factors but also by external factors surrounding them. From this point of view, it can be said that academic resilience is not a concept that can be understood through the answers given within the framework of individual factors alone, and that it can be understood in a multidimensional way considering that other external factors that have an impact on an individual's development are also taken into account. Indeed, an examination of the measurement tools developed to assess psychological resilience, such as the Adolescent Psychological Resilience Scale (Bulut et al., 2013) and the Resilience and Youth Development Module (WestEd, 2001)—reveals that these instruments encompass not only individual characteristics but also factors related to family, school, and the broader environment. However, when the academic resilience scales that have been developed so far are investigated, it is seen that there is no measurement tool with structural features that can deal with the concept in a multidimensional way, as is the case with psychological resilience. In this respect, based on Bronfenbrenner's (1979) Ecological Systems Theory, the contributions of family, school, and environment (friends, relatives, etc.) units, which are effective on students' development, to the development of academic resilience were determined and a four-sub-dimension (individual, family, school, and environmental resources) academic resilience scale was developed.

In addition, widely used instruments in the academic resilience literature—such as the Academic Resilience Scale (Martin & Marsh, 2006), the Academic Resilience and Risk Scale (Martin, 2013), and the ARS-30 (Cassidy, 2016)—appear to have been developed within individualistic cultural contexts. Although these tools have been adapted and used by researchers in collectivist cultures such as Turkey (Aliyev et al., 2021; Kapıkıran, 2012; Seçer & Ulaş, 2020), it

is believed that culture-specific factors may also play a role in the development of academic resilience. In consequence, Ungar (2011) states that resilience has a cultural feature and the resources for achieving resilience may vary from culture to culture. In this respect, it is obvious that there is a need to develop new culturally sensitive measurement tools that can detect academic resilience in countries with different cultural characteristics.

From this perspective, the aim of the study is to develop a new culturally sensitive and comprehensive (individual, family, school, and environmental level) measurement tool (The Academic Resilience Scale for Adolescents (ACRESA), which can determine students' levels of academic resilience and the resources of academic resilience they have, and to examine its psychometric properties.

Materials and Methods

This scale has been developed in order to determine students' levels and resources of academic resilience in a multidimensional way based on Ecological Systems Theory. The present study was carried out in two phases and with different study groups.

Phase 1: Development of a Scale of Academic Resilience for Adolescents

Participants

The participants of this study consisted of students with a high level of academic resilience. Considering the "resilience approach," two conditions must be met for an individual to be defined as resilient (Richardson, 2002; Rutter, 1999). The first of these criteria is that the individual must have a risk factor that will affect their adaptation or development, and the second is that the individual should be able to maintain their normal development despite the risk factors or have a positive adaptation indicator.

Considering these conditions, the participants were selected using the criterion sampling method (Yıldırım & Şimşek, 2013). Accordingly, the presence of a risk condition in students was determined as the primary selection criterion. Another criterion is positive fit. The fact that the students attend any school, that the school success score is 85 and above, and that the student's interest in the school is evaluated as positive adjustment criteria. The high level of students' interest in the school was also observed and confirmed by the interviewed teachers and psychological counselors.

School counselors working in different regions of Turkey and in different school types were contacted, and students who could meet the criteria mentioned above were tried to be determined. In this context, semi-structured interviews were conducted with 15 academically resilient students (6 females, 9 males) between the ages of 12 and 18, from different genders, studying in different regions of Turkey and in different school types.

Instruments

Semi-structured Form

The data were collected using a semi-structured interview form developed by the researchers. During the development process, a review of the relevant literature was conducted and expert opinions were sought to draft the initial version of the form. This draft was then reviewed by a faculty member specialized in academic resilience and qualitative research, after which a pilot interview was conducted. The pilot study was carried out with two students and items that were unclear or problematic were identified. Subsequently, the form was revised based on feedback from two additional faculty members with expertise in resilience, resulting in the final version of the interview form. Sample questions included in the form are as follows: "What kinds of difficulties have your current situation/conditions created in your school life?" "Can you describe how you have coped with these difficulties?" and "Which of your characteristics or actions have contributed to your success in overcoming these challenges affecting your school experience?".

Process

Prior to conducting the interviews, school counselors and teachers working in various provinces across Turkey were contacted. Detailed information about the purpose and procedures of the study was provided, and the criteria for participant selection were shared. Information forms outlining the study were then distributed to the students who met the inclusion criteria and their families via school counselors and teachers. Informed consent forms were provided to the parents of the students who volunteered to participate in the study. Once the students and their parents agreed to participate and completed the informed consent forms, follow-up communication with the participants was established and the interview phase began. The interviews were conducted either face-to-face or online, depending on participants' availability. Each interview lasted approximately between 13 and 35 min. The study was conducted with the approval of the Ministry of National Education (MoNE) and the Ethics Committee of the local university.

Data Analysis

The semi-structured interviews in the first phase of the research were analyzed in four stages. These phases consist of (1) coding the data, (2) finding the themes, (3) organizing the codes and themes, and (4) defining and interpreting the findings (Creswell et al., 2007). Within this framework, audio recordings obtained from the interviews were first transcribed by the researcher and converted into written text in Word format. The transcribed texts were then sent to the participants for feedback regarding accuracy and clarity. Necessary corrections were made based on the participants' feedback to finalize the transcripts. Prior to commencing the analysis of the written texts, intercoder reliability was established between two researchers (both holding doctoral degrees and possessing experience in qualitative research). Data analysis proceeded only after ensuring sufficient coder agreement.

Based on "Ecological Systems Theory," the data were themed under four headings: individual, family, school, and environment. As a result of the interviews, the protective factors that contribute to students' adaptation to school despite various risks were grouped under four different themes (individual, family, school, and environment) and 15 categories (Individual: Optimism, grit, having a goal, self-regulation, self-efficacy; Family: Social support, academic interest, encouragement; School: Academic support and encouragement, guidance services, social support, social assistance services; Environmental: Social support, academic and economic support, social assistance services). Considering these factors that contribute to the development of academic resilience, a pool of 144 items was created.

The scale item pool was discussed in detail at the meeting held with two experts who have projects and studies on academic resilience. The dimensions of the items, their representativeness, and their compatibility with the resilience literature were examined, and as a result of various corrections, 63 items were agreed upon. An evaluation form was sent to six experts who have studies and projects on positive psychology, resilience, and academic resilience in Turkey and abroad in order to obtain new expert opinions on these items. An expert opinion form was sent to the experts in order to examine the suitability of the written items under the individual, family, school, and environment dimensions, reflecting Bronfenbrenner's (1979) ecological systems theory, the power of these items to represent the dimensions, and the suitability of the items to the academic resilience literature. Experts were asked to evaluate the suitability of each scale item with a score between 1 and 3 (1 point: not suitable, 2 points: appropriate, 3 points: to be revised). The degree of agreement among experts was tested using Kendall's W analysis, taking into account the scores given by each expert for the statements. When the responses of six experts were analyzed, it was determined that there was no statistical difference between the scale items and the opinions of the experts (Kendall's $W=0.54$; $p=0.489>0.05$).

Based on the evaluations received from experts, certain items were removed, revised, or added to the initial pool of 63 items. Consequently, a new item pool consisting of 64 items was developed. In order to evaluate the language use and intelligibility of the scale, an evaluation was requested from two teachers with postgraduate education, a Turkish teacher and a Turkish Language and Literature teacher, who teach in institutions affiliated with the Ministry of National Education. As a result of the feedback received, in order to evaluate whether the students understood the whole scale or not, face-to-face pilot interviews were conducted with six students studying in 7th, 8th, 10th, and 11th grades. Care was taken to ensure that the six selected students were equally distributed between boys and girls and represented different socio-economic regions. As a result of the interviews, some items were rearranged and the new form was re-evaluated with three students studying in 8th, 9th, and 10th grades, and it was seen that the whole scale was completely understood by the participants.

Exploratory factor analysis was conducted in order to find out the factor structure of the item pool, which was prepared based on the data obtained from the interviews. In order to test the items of the scale consisting of 64 items, a trial test was applied using the maximum variation sampling method. The sample group consisted of 440 students studying in the 7th–12th grade ranges, with different levels of success and economy (secondary schools and high schools in the low, medium, and high achievement and socio-economic levels group). However, responses from 320 students (162 Females, 158 Males) were included in the data set to perform the analysis due to reasons such as answers to control items, missing markings, and extreme values. In order to discover the factor structure of the scale, exploratory factor analysis was performed. While performing the factor analysis, considering the academic resilience literature and expert opinions, some dimensions were combined and the items under some dimensions were excluded on the grounds that they did not have sufficient factor loads. As a result, a 27-item structure with four sub-dimensions (individual, family, school, and environmental resources) was created and it was decided to make the main application. The structures that make up the sub-dimensions of the developed scale are shown in Table 1.

Phase 2: Performing the Structure, Criterion Validity and Reliability Analyses of the Scale

Sample

At this phase of the study, data were collected from a total of 702 students in order to analyze the construct validity and

Table 1 Structures constituting sub-dimensions

Sub-dimensions	Structures constituting sub-dimensions
Family resources	Social support
	Academic interest
	Encouragement
School resources	Academic support and encouragement
	Guidance services
	Social support
Environmental resources	Social support
	Academic support
Individual resources	Optimism
	Grit
	Have a goal
	Self-regulation
	Self-efficacy

reliability of the scale. The sample group was formed using the convenience sampling method. In this context, students who were studying in different school types (Science High School, Vocational and Technical Anatolian High School, Anatolian High School, etc.) between the 7th and 12th grades and reflecting different socio-economic levels (low, medium, and high) were included in the sampling group. Extreme values were excluded from the data analysis, and analyses were carried out on the data of different sample groups for exploratory ($N=343$) and confirmatory ($N=352$) factor analyses. Kline (2014) stated that the sample size should be 10 times the number of variables, and a sample of 200 people would be sufficient to extract reliable factors. Considering these criteria, the sample size was calculated. In order to test the criterion validity of the study, data were also collected from 715 students (389 female, 326 male) from 7th to 12th grades representing various school types.

Instruments

Academic Resilience Scale for Adolescents (ACRESA)

This measurement tool was developed in order to determine adolescent students' levels of academic resilience (7th and 12th grade students aged 12–18 years) and their resources of academic resilience in a multidimensional way. The scale consists of 27 items, four sub-dimensions (individual, family, school, and environmental resources), and a four-point Likert response format (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree). The measurement tool consists of two parts. In the first part, there is a list of life events that may negatively influence students' school adaptation and a case study. If students have a risk or risks that negatively affect their school adaptation in their current lives, they are asked to mark this from the list. In cases where there are no risks, they are asked to read the case study given to them (as if they have experienced this event themselves) and to mark the items given in the second part, considering the attitudes of themselves, their family, school, and environment.

The example case given to students is shown below:

> "Due to your illness (asthma, leukemia, cancer, kidney failure, etc.) you have to go to hospital at regular intervals and there are times when you stay at hospital for days. That's why you're often absent, lagging behind, and getting low grades in many classes."

Maximum 108 and minimum 27 points are taken from the scale, and there is no reverse-coded item in the scale. The scale can be calculated separately as both the total score and the sub-dimension score. The total score obtained from this scale denotes students' levels of academic resilience and the level of their academic resilience resources. The scores obtained from the sub-dimensions indicate the efficiency of individual, family, school, and environmental resources that students have in order to develop academic resilience in the face of risks that may negatively affect their school life.

The individual resources that constitute the first dimension of the scale consist of items that show the student's personal reactions to risks that may negatively affect school life. A high score in this sub-dimension indicates the efficiency of personal resources in developing academic resilience. The second dimension of the scale is family resources. This dimension consists of items that show the family's approach to the student in the face of risks that may negatively affect the student's school life. A high score obtained from this sub-dimension denotes that the student's family resources may be sufficient to develop academic resilience. The third dimension is school resources. School resources consist of items that show the school's approach to the student in the face of the risks that the student has faced or may encounter. A high score obtained in this dimension provides a clue that the student's school resources are sufficient to develop academic resilience in the face of difficulties encountered. The last dimension of the scale is environmental resources. This dimension consists of items that show the approach of the environment to the student in the face of risks that may/will make the student's school adaptation difficult. A high score in this section indicates the adequacy of environmental resources in developing academic resilience.

School Burnout Scale

Salmela-Aro et al. (2009) developed this measurement tool based on 9 items, three sub-dimensions (exhaustion at school; cynicism toward the meaning of school; sense of inadequacy at school) and a five-point scale to determine primary and secondary school students' levels of

school burnout. This scale was adapted to Turkish culture by Seçer et al. (2013). During the adaptation study of the scale, both exploratory and confirmatory factor analyses were performed. According to the exploratory factor analyses, the factor loads of the items ranged from.42 to.89. The total variance explanation rate of the three factors was 66.85%. First-level fit indices according to the confirmatory factor analyses were $\chi^2 = 1.50$, RMSEA = .042, RMR = .013, NFI = .98, NNFI = .98, CFI = .99, IFI = .99, RFI = .96, AGFI = .93, GFI = .97. Second-level fit indices were $\chi^2/df = 2.40$, RMSEA = .060, RMR = .042, NFI = .97, NNFI = .97, CFI = .98, IFI = .98, RFI = .95, AGFI = .92, GFI = .96. The internal consistency coefficient determined for the scale was.75.

School Attachment Scale

This scale consisting of 15 items and three sub-dimensions (school attachment, friend attachment, and teacher attachment) was developed by Hill (2005) to evaluate children and adolescents' levels of school attachment. The scale, which was adapted into Turkish by Savi (2011) for 3rd–8th grade students, was found to give more valid and reliable results in 13 items according to the results of the exploratory and confirmatory factor analyses. Later, Çakar and Karataş (2017) decided to review the construct validity of this measurement tool in a study group consisting of high school students. According to the results of the confirmatory factor analyses conducted within the scope of the study, the construct validity of the scale was ensured in 14 items. The fit indices obtained in this study are as follows: $\chi^2/df = 2.98$, RMSEA = .08, NFI = .92, CFI = .94, and SRMR = .06. The reliability analysis of the scale was determined by the internal consistency test. According to the analysis, the internal consistency coefficient for the whole scale was found to be.91.

Process

In the second phase of the study, data were collected from students attending various types of schools in Gaziantep, Turkey. The researcher went to each school and made face-to-face interviews with the school principals, and after the necessary permissions (The research permission obtained from the Ministry of National Education and the Ethics Committee of the local university was shared with the authorities for the administration of the measurement tools to the students.) were obtained, the appropriate classes were visited (Researchers went to available classrooms in order to apply the scale, with the direction of the school principal, in a way that would not disrupt the students' lessons.).

The researcher introduced himself in each class, explained the purpose and importance of the research, gave information regarding the measurement tools, and stated that the data were collected on a voluntary basis. The measurement tools were distributed to the students who agreed to fill in the scale. The filling times of the measurement tools were approximately 20 min for the secondary school group and 15 min for the high school group.

Data Analysis

In the second phase of the study, exploratory and confirmatory factor analyses were conducted to test the construct validity of the scale. A simple correlation test was used to test the criterion validity, and Cronbach's alpha test for internal consistency was used for the reliability analysis. Before each analysis, missing data, extreme values, normality, and multicollinearity problems were examined. Extreme values, standard scores, and Mahalanobis in the data sets were analyzed using the distance method. The kurtosis/skewness coefficients and normality tests were used to examine normality. Before performing the exploratory and confirmatory factor analyses for the ACRESA scale, the rate of missing data was examined, and it was seen that it was below 5%, thus data losses showed MCAR characteristics. They stated that the use of the Listwise Deletion method is very effective if the missing data is of the MCAR type and the data deletion rate is low (Schafer & Graham, 2002). Based on this, 13 data points were deleted from the data set. In addition to all this, a filler item (tick I agree for this item) was added to the measurement tool in order to prevent the participants from marking the data randomly or filling in the measurement tools in a careless way. The data of the participants who did not respond appropriately to this item while the data were being processed by the researcher were not included in the data set.

Results

Construct Validity

Exploratory Factor Analysis

Exploratory factor analysis was carried out in order to find out the factor structure of the scale developed within the scope of the research. Kaiser–Meyer–Olkin (KMO) and Barlett's test results were examined to evaluate the suitability of the data collected at the beginning of the analysis in terms of factor analysis. Considering that the KMO value was.88, it was seen that the sample was sufficient for factor analysis (Kaiser, 1974). Also, Barlett's test ($\chi^2 = 5222.57$, $p < .01$) was found to be significant. Therefore, both the KMO and Barlett's sphericity test results denoted that the data were suitable for performing

factor analysis (Field, 2013). While performing the factor analysis, it was deemed appropriate that the load values of the items in the scale should be at least.50 in parallel with Güriş and Astar's recommendation (2015). Attention was paid to the factor extraction method being principal component analysis. Considering that the factors would be related, it was decided to use the Varimax technique as a rotation technique. While deciding on the number of factors, the eigenvalues and magnitude values, the scree plot, and experts' opinions working on academic resilience were taken into consideration. As a result of the analyses, a four-dimensional scale with 27 items, which constitutes 59.43% of the total variance, was created. The table (Table 2) and the scree plot (Fig. 1) of the eigenvalues and explained variance rates of this measurement tool, which consists of four dimensions with eigenvalues higher than 1, are given below. When the figure is examined, it is seen that the slope line starts to flatten after the fourth factor.

The rotated component matrix obtained from the exploratory factor analysis is given in Table 3. After the rotation analysis, the factor loading values of the items at the factor level are shown in Table 3. When the table is examined, the item factor loads of family resources in the first factor vary between.74 and.79 (items 8–15). Also, it is observed that the item factor loads of school resources in the second factor vary between.68 and.81 (items 16–22). Additionally, it is seen that the item factor loads of environmental resources in the third factor are between.72 and.87 (items 23–27), and the item factor loads of individual resources in the fourth factor differ between.53 and.74 (items 1–7).

Confirmatory Factor Analysis

Confirmatory factor analysis was performed in order to determine the model compatibility of the structure of the 4-sub-dimension scale with 27 items obtained as a result

Table 2 Eigenvalues of factors and ratios of variance explained

	Initial eigenvalues			Rotated sums of factor loads		
Factors	Sum	Variance %	Cumul. %	Sum	Variance %	Cumul. %
1	7814	28,940	28,940	5034	18,643	18,643
2	3482	12,896	41,836	4138	15,324	33,968
3	2647	9804	51,640	3498	12,957	46,924
4	2104	7792	59,432	3377	12,508	59,432

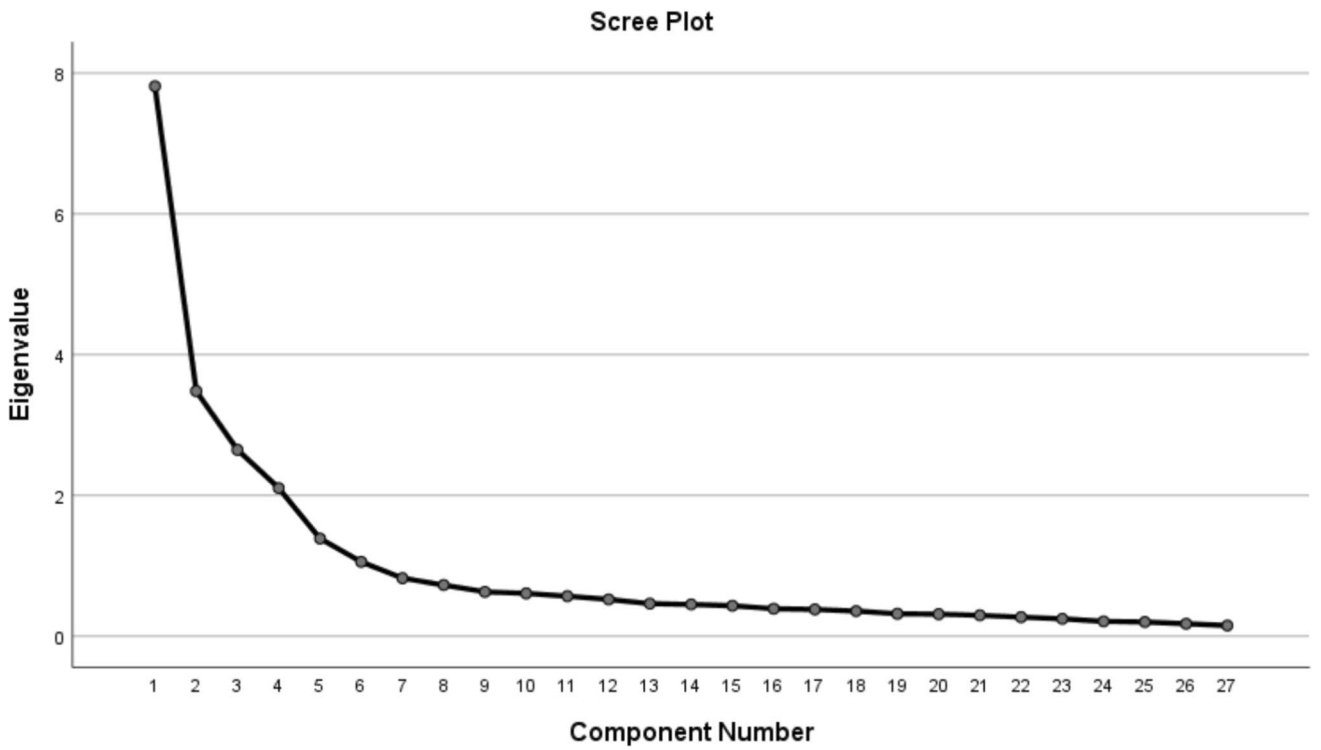

Fig. 1 Academic Resilience Scale for Adolescents (ACRESA) scree plot

Table 3 Rotated component matrix and substance factor loads

Items	Family sources	School sources	Environmental sources	Individual sources
8. My family supports me when I face difficulties	.74			
9. I know that my family will continue to trust me even if I experience failures	.75			
10. My family believes that I will overcome difficulties	.78			
11. My family is interested in my studies a lot	.74			
12. My family tries to provide a suitable environment for me to study	.74			
13. My family makes sacrifices to help me succeed	.76			
14. My family encourages me to study (They say you can do it, you can manage it, you do it)	.79			
15. My family believes that I will be successful	.79			
16. My teachers help me to overcome my deficiencies in my lessons		.68		
17. My teachers support me to be successful		.73		
18. My teachers motivate me to study		.70		
19. When I ask my school counselor for help (academic, psychological, etc.), s/he helps me		.75		
20. My school counselor helps me cope with situations that hinder my academic success		.80		
21. When my academic motivation drops, my school counselor supports me to motivate		.81		
22. My teachers try to support me in the face of difficulties		.73		
23. My friends try to support me in the face of difficulties			.77	
24. There are people around me (friends, relatives, neighbors and others) with whom I can talk about my troubles			.85	
25. There are people around me (friends, relatives, neighbors and others) who take a close interest in me in the face of difficulties			.87	
26. When I'm depressed, there are people (friends, cousins, other individuals) who make efforts to lift me up			.80	
27. I have friends who I can ask for help when I have difficulties with my lessons			.72	
1. Despite the difficulties I have experienced, I believe that good things will happen in the future				.63
2. I believe that I can overcome various difficulties				.67
3. I believe that if I try, I will be successful				.64
4. I continue to work until I reach my goals				.74
5. No matter how hard it is, I don't give up				.72
6. I have goals and dreams that keep me going				.53
7. I plan to achieve my goals				.56

of the exploratory factor analysis. The diagram of the analysis is given in Fig. 2. When the figure is examined, it is observed that the item factor loads are between.42 and.88. The fit indices for the model are $\chi^2/df = 3.07$, RMSEA = .07, CFI = .85, TLI = .83, and SRMR = .06. As a result of the analysis, four modifications between i16 and i17, i17 and i18, i19 and i20, and i16 and i18 were carried out to improve the model. The fit indices after the modification processes were found to be$\chi^2/df = 2.16$, RMSEA = .05, CFI = .91, TLI = .90, and SRMR = .06. Considering the fit indices in the literature (Çokluk et al., 2018; Hu & Bentler, 1999), it is seen that the scale shows a good level of fit.

Criterion Validity

Table 4 shows the relationships between the total score of the Academic Resilience Scale for Adolescents and factors, school burnout, and school attachment. When the relationships between the variables are investigated, there is a moderately significant negative correlation between the total score of academic resilience and school burnout ($r = -.48$, $p < .01$). However, it has a moderately significant positive correlation with school attachment ($r = .58$, $p < .01$). Therefore, it can be stated that the Academic Resilience Scale for Adolescents has psychometric properties suitable for use in studies in the field of education and psychology. In addition,

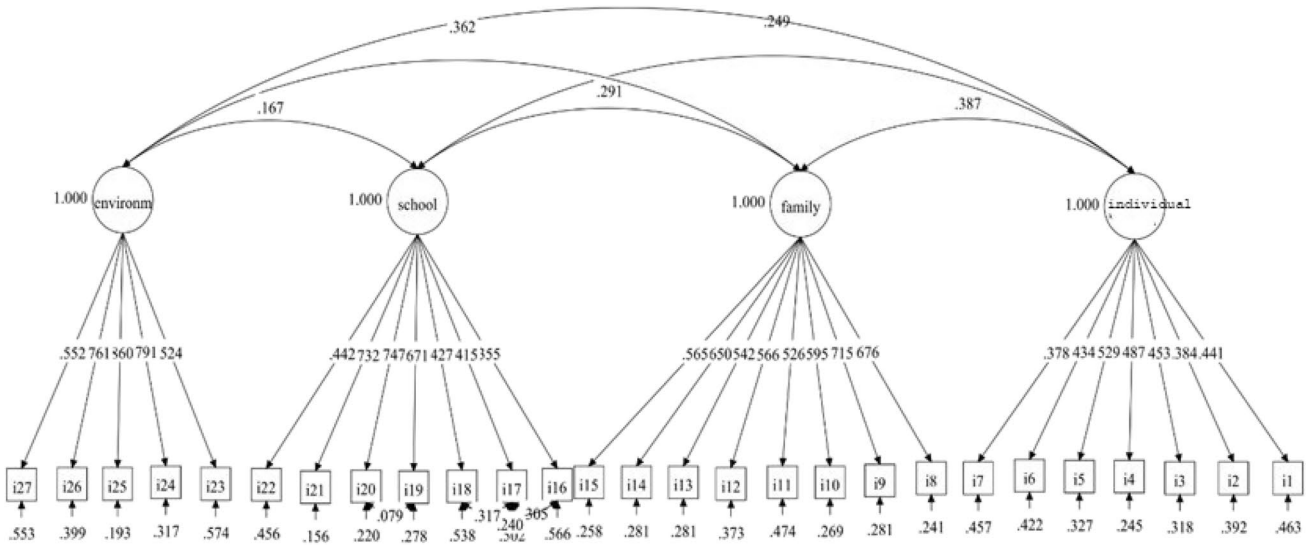

Fig. 2 Academic Resilience Scale for Adolescents confirmatory factor analysis diagram

Table 4 Correlation coefficients between academic resilience and school burnout and school attachment

Variables	1	2	3	4	5	6	7
1 School burnout	1						
2 School attachment	−.57*	1					
3 Academic resilience (global score)	−.48*	.58*	1				
4 Family sources (factor 1)	−.37*	.31*	.75*	1			
5 School Sources (factor 2)	−.36*	.52*	.70*	.29*	1		
6 Environmental sources (factor 3)	−.25*	.40*	.65*	.35*	.28*	1	
7 Individual sources (factor 4)	−.37*	.41*	.71*	.40*	.40*	.28*	1

there are strong parallel relationships between the factors. This indicates that there is a shared psychological structure among the factors and that the total score of academic resilience can be formed from the factor scores. As a matter of fact, to test whether the four factors that make up the scale are combined in the superstructure of academic resilience, second-level CFA was performed, and the results are shown in Fig. 3. The fit indices obtained from the analysis results (χ^2/df = 2.15, RMSEA = .05, CFI = .91, TLI = .91, and SRMR = .06) reveal that the four factors fit well under the superstructure of academic resilience.

Reliability Analysis

In order to test the reliability values of the developed measurement tool, the internal consistency coefficients were calculated. The findings (Cronbach Alfa for Family Sources:.91, School Sources:.88, Environmental Sources:.88, Individual Sources:.80, and All Scale:.90) show that each of the reliability coefficients meets the acceptable internal consistency coefficient.

In order to demonstrate the reliability of the items that make up the scale and the scale as a whole, item statistics and item-total test correlations are given in Table 5. When the item-total correlation coefficients are examined, it is seen that the coefficients are between.38 and.62. Considering the criterion that items with a coefficient of.30 and above can distinguish the measured features well (Çokluk et al., 2018), it can be said that these items can distinguish the measured features well.

Discussion

The aim of this study is to develop a new measurement tool "The Academic Resilience Scale for Adolescents," which is based on "Ecological Systems Theory," and which can determine students' levels and resources of academic resilience in a culturally sensitive and comprehensive (individual, family, school and environmental level) way.

This scale, unlike the academic resilience scales that have been developed so far, enables evaluation and understanding of students' academic resilience holistically. This is proven

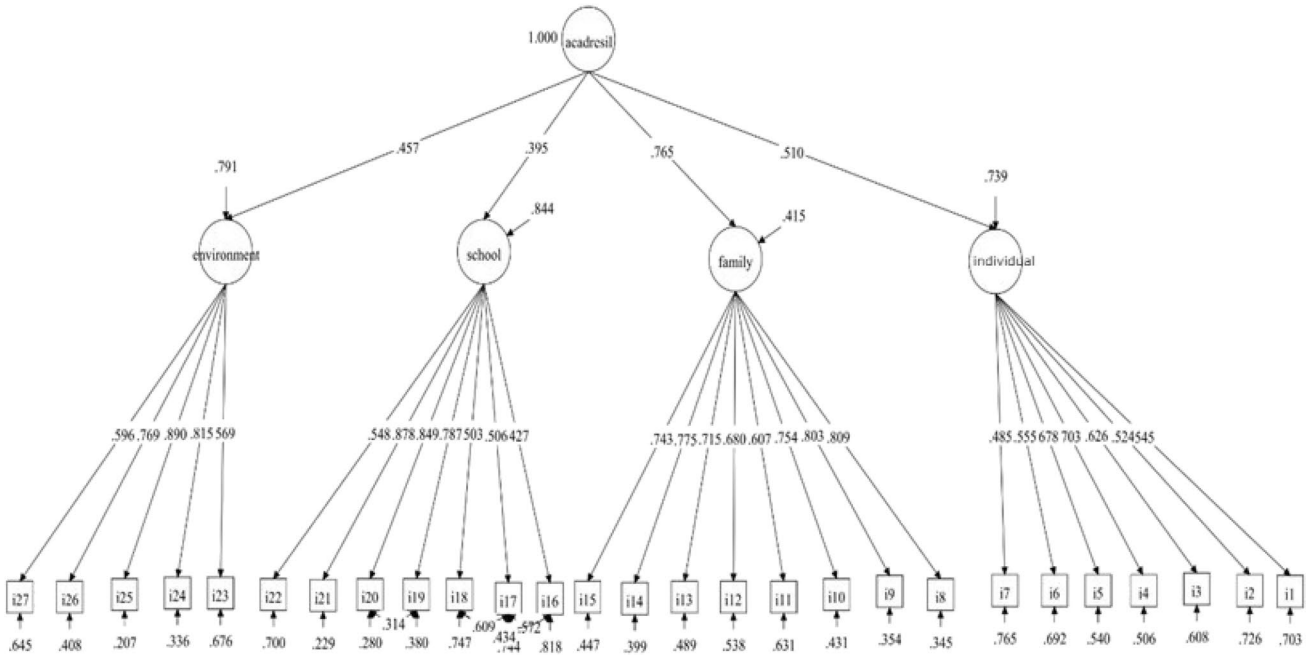

Fig. 3 Academic Resilience Scale for Adolescents level Two CFA diagram

by the findings obtained from exploratory and confirmatory factor analyses. When the exploratory factor analysis findings of the Academic Resilience Scale for Adolescents are examined, it is seen that the scale has a structure consisting of 27 items with 4 factors, and this structure explains 59.43% of the total variance. Additionally, the item factor loads of the scale, which were examined, range from.53 to.87. Family resources, which constitute the first factor of the scale, clarify 18.64% of the total variance. It is seen that the factor loads of the items that make up the factor vary between.74 and.79. This factor consists of items showing the social support, academic interest, and encouragement approaches offered by the family to the student in the face of risks that may negatively affect the student's school life. In a study examining the internal and external protective factors that predict academic resilience, it is argued that the variable that explains academic resilience best among external factors is the family's high expectations (Gizir & Aydın, 2009). Similarly, in another study examining the external protective factors associated with academic resilience, it is stated that family support explains academic resilience significantly (Arastaman & Balcı, 2013). In the academic resilience literature, it has been noted that academic success, which is one of the positive adaptation indicators, boosts as the social support provided by their families to students with various difficulties and disadvantages increases (Malecki & Demaray, 2006). In addition, when the factor structure of the psychological resilience scale developed for adolescent students in Turkey by Bulut et al. (2013) is examined, it is seen that the most contributing factor to the total variance is family support. In other developed scales, factors related to the family are included as sub-dimensions (von Soest et al., 2010). It is observed that the family resources that explain the general structure of the developed academic resilience scale at the highest rate are also similar to the factor structures of the scales mentioned above. Therefore, the factor in question has a structure that measures academic resilience in a valid way.

The second factor of the scale is school resources. School resources explain 15.32% of the total variance. The item factor loads of the factor range from.68 to.81. This factor consists of items showing the academic support, encouragement, guidance services, and social support approaches provided by the school (teacher, psychological counselor, and other people) to the student in the face of risks that may negatively affect the student's school life. Studies show that factors such as teacher encouragement and appreciative efforts are among the factors that make students who are at risk resilient (Brooks, 1994). When the academic resilience scales that have been developed so far are examined, it is viewed that there are no school-related factors in any of the scales. On the other hand, when the factor structures of the scales developed for psychological resilience are examined, it is seen that factors such as teachers' and other employees' support, interest, and high expectations in in-school relations, as well as participation in in-school activities are included in the scales (Bulut et al., 2013; Gizir & Aydın, 2009). Therefore, it shows that school resources are

Table 5 Item statistics on the Academic Resilience Scale for Adolescents

Items	Item total correlation coefficient	Cronbach alpha coefficient to be obtained if the item is deleted
1	.441	.899
2	.463	.898
3	.428	.899
4	.384	.900
5	.399	.900
6	.481	.898
7	.380	.900
8	.617	.895
9	.603	.895
10	.630	.895
11	.504	.897
12	.547	.897
13	.525	.897
14	.545	.897
15	.622	.895
16	.487	.898
17	.446	.899
18	.422	.899
19	.438	.899
20	.449	.899
21	.495	.898
22	.467	.898
23	.386	.900
24	.420	.900
25	.387	.900
26	.454	.899
27	.510	.897

an important factor in understanding academic resilience as well as in the structure of psychological resilience.

The third factor of the scale is environmental resources. Environmental resources explain 12.95% of the total variance. It is seen that the item factor loads of the factor differ between.72 and.87. This factor consists of items that show the approach offered to the student in terms of academic and social support provided by the student environment for risks that may negatively affect the student's school life. Studies have shown that there is a positive relationship between adolescents' perceived peer support and resilience (Finkenauer & Righetti, 2011; Graber et al., 2016) and that social support is a construct that predicts academic resilience. Considering the resilience scale designed by von Soest et al. (2010) for adolescents, it is obvious that social resources are an important factor. Taking into consideration that the structures that make up social resources are encouragement, aid, support, and appreciation, it can be said that environmental resources are similar to the factor structure. It is seen that environmental resources, which stand out as a factor in the measurement of academic resilience, are related to psychological and academic resilience, which is consistent with other research findings.

Individual resources, which constitute the last factor of the scale, explain 12.50% of the total variance. The item factor loads of the factor range from.53 to.74. This factor consists of items reflecting the student's personal approach (optimism, grit, having a goal, self-regulation, and self-efficacy) in the face of risks that may negatively affect school life. It is seen that the factor structures of academic and psychological resilience scales developed so far are compatible with such individual resources as optimism (Kim, 2011; Samuels & Woo, 2009), perseverance (Cassidy, 2016; Martin & Marsh, 2006), having a goal (Gizir & Aydın, 2009), self-regulation (Kim, 2011; Zulfikar et al., 2020), and self-efficacy (Arastaman, 2011; Kim, 2011; Zulfikar et al., 2020).

Each of the four factors has clear similarities to the findings of studies on psychological and academic resilience and the factor structures of the scales developed. Therefore, considering the consistency of the factor structure of the developed measurement tool with the literature on psychological and academic resilience, it supports that the Academic Resilience Scale for Adolescents is a valid assessment tool for determining academic resilience and its resources in students. Literally, the results of confirmatory factor analysis conducted to examine the model fit of the factor structure of the scale developed within the scope of the research also support this finding.

Research findings reveal that there is a significant negative relationship between school burnout and academic resilience and sources of academic resilience. These findings are parallel to the results of previous research. Research indicates that academic resilience has a negative relationship with school burnout (de la Fuente et al., 2021; Ríos-Risquez et al., 2016) and negatively predicts burnout (Oyoo et al., 2018). The results of this study and the literature review (Fiorilli et al., 2017) point out that academic resilience is an important protective factor that can prevent adolescent burnout.

In addition, the relationship between academic resilience, academic resilience resources, and school attachment was examined. The findings reveal that academic resilience and academic resilience resources have a moderate positive relationship with school attachment. These results are consistent with previous research findings (de la Fuente et al., 2021; Martin et al., 2015). Bethell et al. (2014) state that resilience can improve the harmful effects of negative childhood experiences. They also argue that resilient students with negative childhood experiences show higher school attachment compared to their peers who do not have the same experiences. In addition, Kim et al. (2021) concluded in their longitudinal research that academic resilience had a significant

role in predicting students' school attachment. Besides, they revealed that earlier academic resilience affected later school attachment. These findings clearly show that the measurement results obtained through this scale, which was developed to evaluate academic resilience, are remarkably consistent with the findings of other research in the literature.

The results of the analysis performed to test the internal consistency values of the measurement tool show that the Cronbach Alpha values calculated for the factors and the total scale have values (individual resources.80; family resources.91; school resources.88; environmental resources.88, and total scale.90) higher than the internal consistency values that a measurement tool should provide (Cronbach, 1990). When the item-total correlation coefficients are examined, it is seen that the coefficients are between.38 and.62. It is argued that items with a factor correlation of.30 and above can distinguish individuals well in terms of the measured feature (Büyüköztürk, 2016). Therefore, these results point out that the items in the scale are consistent with each other, and the scale has a stable structure.

To conclude, the Academic Resilience Scale for Adolescents is a valid and reliable measurement tool that helps to determine adolescent students' levels of academic resilience and the resources of academic resilience they have in a comprehensive and multidimensional way.

Limitations

Although the factor structure of the developed scale is similar to the factor structures of the scales developed in the psychological and academic resilience literature, the sample group in which the study was conducted consists of students studying in Turkey. Therefore, the developed scale is limited to the context of Turkish culture.

Suggestions

By using this developed scale, school counselors can determine students' levels of academic resilience and the adequacy of the resources they have (individual, family, school, and environment). Thus, they can provide development, preventive, and protective guidance services for students with low resilience or insufficient resources. In this way, positive adaptation indicators (course success, school attachment, satisfaction, well-being, etc.) associated with academic resilience can be contributed. Besides, it can assist the students in risk groups in coping with the risk situation, and negative adaptation behaviors (dropping out, school absenteeism, course failure, etc.) can be prevented. Also, schools, within the framework of the comprehensive developmental guidance program, can identify resources of academic resilience so that their students can continue their lives more effectively at school and outside of school, and if there are resources that need to be developed in the context of students, schools, and families, studies can be included in the guidance programs. Finally, the factor structure of the developed scale shows significant similarities to the factor structures of other psychological and academic resilience scales developed for adolescents in both individual and collectivist cultures. Therefore, this scale can be adapted and used in research by researchers in other countries.

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Author Contribution Mehmet ŞAM and Ramin ALIYEV contributed to the study's conception and design. Literature review and material preparation were performed by both authors. Data collection and analysis were performed by Mehmet ŞAM. The first draft of the manuscript was written by Mehmet ŞAM, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Data Availability The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Human Participants and/or Animals Statement Ethics committee approval was obtained for this study. The authors report that the study was conducted in accordance with the Helsinki Declaration.

Informed Consent The parents, adolescents, and other participants were informed beforehand of the study, and their informed consent and assent were collected. The research was carried out with only voluntary participants.

Competing interests The authors declare no competing interests.

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