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Adaptation of the Children's Perceived Academic Self-Efficacy Scale: Validity and Reliability Study

Neslihan Tugce Ozyeter[1,*], **Omer Kutlu**[2]

[1]Kocaeli University, Faculty of Education, Department of Educational Sciences, Kocaeli Türkiye
[2]Ankara University, Faculty of Education, Department of Educational Sciences, Ankara Türkiye

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Abstract: Academic self-efficacy, which is the belief that the student can achieve an academic task, has a highly strong impact on the academic performance of students. It is known that students with high academic self-efficacy show high academic performance, see the academic difficulties they encounter as areas of development and continue to strive for success. The review of the related literature has identified no scale whose validity and reliability analyses have been carried out by following the necessary scientific procedures that can be used to measure this quality for the 9-13 age group. Therefore, in the current study, an adaptation study of the scale developed by Jinks and Morgan into the Turkish language and culture was performed. The study group consisted of secondary school students, and the data were collected in two separate sessions. Upon completion of the adaptation-based translation of the scale, its degree of validity was calculated based on the linguistic, content, construct and criterion approaches and its degree of reliability was calculated by Cronbach Alpha and Composite Reliability coefficient. The findings show that the adapted scale can be used to obtain valid and reliable results for the 9-13 age group.

1. INTRODUCTION

Various explanations and theories have been put forward to answer the questions about how the organism learns since the 1900s. Due to the inadequacy of the Behavioral Theory to explain all learning of organisms (Tolman, 1948), theorists have started to argue that there are some cognitive processes determining the relationship between stimulus and behavior of an organism (Özdel, 2015). Based on this view, a number of scientists have developed cognitive theories, which advocate the role of cognitive structures in the learning processes. One of these theories is the Social Cognitive Theory, developed by Albert Bandura.

The Social Cognitive Theory, which postulates that the organism learns from its social environment, was first put forward by Rotter. Rotter (1990) stated that the individuals' reactions are not merely instantaneous responses to stimuli, but are shaped by their previous learning, observations and experiences and the results they draw. Social Cognitive Theory was developed by Albert Bandura. Bandura (1976) stated that not only observations and information obtained from others, but also reward and punishment play a role in learning. Accordingly, the first of

*CONTACT: Neslihan Tugce OZYETER simsekneslihantugce@gmail.com Kocaeli University, Faculty of Education, Department of Educational Sciences, Measurement and Evaluation Department, Türkiye

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the foundations of social learning is that learning is not just behavioral. Learning is a cognitive process that mostly develops in social settings. Learning involves not only observing a behavior, but also observing the consequences of this behavior. This is called a vicarious reinforcer. Based on these first two foundations, observation of a behavior may not be necessary for the learning to take place. In other words, when an organism observes that the result of a certain behavior is negative it does not perform that behavior, and this is a learning process. However, it cannot be observed because there is no behavior. The environment in which the organism is located, its cognition and behavior interact with one another in the learning process.

In addition to mentioned discussions regarding learning and behavior, Bandura brought the concept of self-efficacy, which has been viewed as critical for observation-based learning. Self-efficacy, which is defined as the self-belief of the organism's ability to do a task or job (Bandura, 1977), has an essential role in determining how an individual tackles the difficulties he or she encounters in life, in achieving his/her goals, attempting to perform an action, and having a new experience. According to this theory, the social and cognitive processes of the organism are affected by the observations and experiences of individuals in their social environment. This is closely related to self-efficacy, which is the perception on oneself of the social experiences perceived externally by the person. It is the belief that s/he can have these experiences him/herself. Accordingly, individuals with high self-efficacy in a field are those who believe that they will perform well in that field. They have a strong belief that they can cope with tasks in this particular field but not with those in other fields. When this belief turns into action, the individual will probably achieve it, and this belief will be reinforced (Türkçapar, 2008). Similarly, individuals with low self-efficacy about entering unfamiliar environments will avoid this task due to their low belief that they will fulfill this task, and will not achieve their best performance in this field. Wood and Bandura (1989) define self-efficacy as an individual's belief in his or her capacity in the qualities (motivation, cognitive features, etc.) necessary to achieve certain situational goals. Self-efficacy levels of individuals determine how they feel, think, act and self-motivate. Bandura (2002) states that individuals' self-efficacy beliefs determine their ways of thinking, how they motivate themselves when they are faced with a challenge, and how they make their choices. Individuals with high self-efficacy in a specific area see the difficulties they encounter as obstacles to be overcome. They have a very high motivation and interest in getting over these impediments. People with low self-efficacy see the same obstacles as threats. They are more likely to give up whenever they encounter some. Their interest and motivation are low (Bandura, 1997; Driscoll, 2000).

Social learning theorists argue that processes such as thinking, planning, decision making, and believing have an important role in the learning of the organism (Bayrakçı, 2007). As such, the person's belief that s/he can complete a task becomes important. Yıldız (2014) emphasizes that the individual's perception of self-efficacy is critical in the learning process. In their research, Doğan et al., (2012) found that individuals with positive self-efficacy perceptions want to achieve higher-standard goals, and thus they make much more effort. According to Bandura (1997), whether individuals will be successful in a task or not is not only related to their cognitive capacities. In other words, cognitive skills are indispensable but not sufficient for high academic performance. Students usually know what to do, but they do not make the effort to cope with the difficult processes required by the task (Digiunta et al., 2013). The studies highlight the fact that students who learn to organize their own learning are more effective in making this necessary effort (Zimmerman & Martinez-Pons, 1988), which requires self-efficacy (Digiunta et al., 2013).

Academic self-efficacy is defined as an individual's belief in his or her own capacity to learn or perform an academic task at the targeted level (Schunk & Pajares, 2002). According to Pajares (1996), this belief has a wide range of manifestations. In other words, while a person's belief in

his or her general performance at school reflects his/her academic self-efficacy, his/her belief in his/her capacity to perform only four actions is a part of his/her academic self-efficacy. Students' beliefs about their academic performance stand out in every moment of their academic life. Their belief in themselves (self-efficacy) plays an effective and major role in many areas such as thinking effectively, thinking positively or negatively, how they motivate themselves or show determination when they encounter academic obstacles, and how they regulate their own ideas and behaviors. Consequently, all these processes contribute to the student's performance at school.

There are four sources from which students derive their academic self-efficacy (Bandura, 1997; Pajares, 1996). These are their own past experiences, those of others (indirect experiences), social persuasion, and physical and emotional states. The past experiences of the individual are related to his/her previous performance for a similar academic task. If the individual has achieved a result that s/he thought to be successful in the past, this will increase his/her self-efficacy in that field or task. Similarly, if s/he has had a result that s/he has described as unsuccessful in the past, s/he will exhibit a lower self-efficacy. However, the experience of the individual may be limited or the individual may doubt his/her self-efficacy. In this case, s/he uses the experiences of others as a reference to build his/her own self-efficacy. If the individual develops a similarity between him/herself and the person s/he observes, s/he will be more affected by the results obtained by the person based on this similarity. Social persuasion includes words of encouragement or discouragement that students hear from others. While the student receiving encouraging verbal stimuli develops positive self-efficacy, discouraging stimuli can even weaken his/her strong self-efficacy. Finally, the student's physical and emotional state also play a role in shaping his/her academic self-efficacy. Experiencing depression, one may feel less confident about his/her own skills or feeling physically poor may impact one’s way of thinking of how to deal with the issues. On the other side, the confidence and sense of achievement that s/he feels when his/her task is completed can also strengthen the student's self-efficacy. In summary, the process of creating and using students' academic self-efficacy beliefs is intuitive. They participate in an academic task, interpret their results. By using their interpretations based on these results for similar contexts and tasks at a later time, they form a belief that they can perform a task themselves.

The review of the related literature clearly shows that academic self-efficacy is an important determinant of student performance at all educational levels (Bassi et al., 2006; Doğan, 2005; Ferla et al., 2009; Khan, 2014; Mercer et al., 2011; Zajacova et al., 2005). Studies reveal that there is a positive and significant relationship between academic self-efficacy and academic performance of students from almost every age group.

As far as the available scales of academic self-efficacy are concerned, one concludes that these are mostly adaptations. The adaptation studies measuring the academic self-efficacy were conducted on preservice teachers by Yılmaz, Gürçay and Ekici (2007), on high school students by Kemer (2006), and on university students by Ekici (2012). A scale was adapted by Telef and Karaca (2012) to measure social and emotional self-efficacy, which make up students’ general self-efficacy perceptions. The target group of this scale is adolescents aged 12-19. When all these studies are examined, no scale has been found in Turkey, measuring academic self-efficacy at the secondary school level. However, an international scale adapted to Turkish was identified. When the adaptation study of the scale was reviewed, it can be concluded that the scientific adaptation procedures had not been followed. it is clear that the adaptation process did not come up to standards necessary for a valid and reliable scale as the report provided almost no information about how the study group for adaptation process was selected and what characteristics it covered. Furthermore, the researcher (the adaptor) conducted an explanatory process to re-examine the factor structure of the scale whose factor structure was already

determined. Explanatory studies are suggested in scale development studies. Adapting a scale means if the original scale functions in another culture as well, that's why, researchers are held responsible for the equity and the meaning of the construct between cultures. Another point is the removal of 9 items according to the results of EFA and researcher mentioned nothing about the probable causes and discussions behind it; s/he only presented statistical issues to justify the exclusion of 9 items. Also, there are no information regarding the exclusion process (eg. Which criteria were taken into account, which item was removed in the first place and what the reason was, etc.). The last problem is the very low reliability of the third subscale for the adapted form (0.51). All these reasons lead the researcher to go through the adaptation process by following the standard adaptation steps offered by International Test Commission (ICT) (2017) and Hernandes et al. (2020). Therefore, the current study aimed to adapt the Children's Perceived Academic Self-Efficacy Scale originally developed by Jinks and Morgan (1999) into Turkish, by following the requisite scientific steps indicated in the literature and to introduce this scale, which can measure academic self-efficacy at the secondary school level, to the national literature. The reason why the adaptation of this scale is considered crucial is its vivid relationships with the academic performance. It is thought that by making this scale usable in the national literature, measuring the target trait in younger age groups, and applying support and guidance strategies, if necessary, would be possible, and this can help to increase the academic self-efficacy and therefore academic performance of secondary school students.

2. METHOD

2.1. Study Design

This study is designed as a cross-sectional survey. Survey studies are generally carried out to describe the characteristics (belief, knowledge, attitude, etc.) of a community, and cross-sectionality means one-time data collection on the same group (Fraenkel & Wallen, 2006).

2.2. Study Group

The study group was chosen with maximum variation sampling and consisted of the students from urban and suburban cities, with both lower and higher economic levels as well as various ethnic identities, in accordance with the original study group. The data were collected at two different times using online platforms. The first step aimed to gather evidence for the construct validity of the scale, which was translated based on adaptation. Thus, the scale given to the students in the online environment was filled by a total of 313 students. Table 1 shows the distribution of the pre-tested group by grade levels.

Table 1. *Perceived academic self-efficacy scale study group 1.*

Grade Level	N
5th grade	79
6th grade	80
7th grade	74
8th grade	80
Total	313

As shown in Table 1, the distribution of grade levels is similar. The second step was performed for criterion validity and validity studies based on group differences. Questions were added to the online form about what the students' grades were in the Turkish, Mathematics, Science and Social Studies courses in 2020-2021 Fall semester, and what they think their grades will be in these courses at the end of 2020-2021 Spring term. This tool was administered to a total of 173 secondary school students. 14 students with missing data were excluded from the dataset. In Table 2, the distribution of the data collected in the second application for validity study by

grade levels is given. As Table 2 shows, the distribution of the data collected in the second step by grade levels is close to each other.

Table 2. *Perceived academic self-efficacy scale study group 2.*

Grade Level	N
5th grade	41
6th grade	21
7th grade	57
8th grade	40
Total	159

2.3. Data Collection Instruments

The instrument used in this study to collect data is the adapted form of the Perceived Academic Self-Efficacy Scale.

2.3.1. *Perceived academic self-efficacy scale*

The scale development process suggested by DeVellis (1991) was followed in the development of the Perceived Academic Self-Efficacy Scale developed by Jinks and Morgan (1999), and 53 items were created by the researchers to measure academic self-efficacy. These items were subjected to content validity study in three separate sessions. In the first of the sessions, 5 instructors (academics), in the second, 4 secondary school teachers, and in the last panel, 15 secondary school students gave their assistance. The 53 items were written under four sub-dimensions called ability, effort, task difficulty, and context. In the first and second panels, teachers and instructors (teacher trainers) were asked to place all the items in the item pool into the four predicted sub-dimensions of the scale. After placing each item, they were asked to mark on a scale from 1 (not sure) to 5 (very sure) how sure they were about the decision they made about the sub-dimension. Items with ambiguity in their narration were either rewritten or removed. If the level of agreement of the experts about the sub-dimension in which the item is located was low, it was decided to remove the item even if the sub-dimension in which the item was included was consistent. The third panel was held with a group of 15 secondary school students. Here, students were asked to think aloud about the ease of reading and intelligibility of the items.

The response category of the scale is a 4-point Likert scale. The ranking is performed between the highest level of agreement (1) and the lowest level of agreement (4). In the piloting of the scale, students were asked to write down the grades they received the last semester on the Turkish, Mathematics, Science and Social Studies courses. In the piloting of the scale, 900 usable observations from 3 different schools were obtained.

Items with an item-total correlation of less than .30 were excluded from the exploratory factor analysis results of the scale. A 3-dimensional structure for a total of 30 items was adopted for the scale. The correlations of the total score of the scale and the subscale scores with the grades of the students reported in the Turkish, Mathematics, Science and Social Studies courses were examined. These correlations were found to be moderate and high and statistically significant. Thus, it was concluded that valid results would be obtained with the developed scale.

The Cronbach Alpha reliability coefficients of the scale, which consists of a total of 30 items in three sub-dimensions, are 0.78 for 13 items in the talent sub-dimension, 0.70 for 13 items in the context sub-dimension and 0.66 for 4 items in the effort sub-dimension (Jinks & Morgan, 1999).

2.4. Data Collection

The translation of the scale, which was completed based on the principles of adaptation, was transferred to the online environment by taking into account the layout of the original scale. An instruction on how to complete the form was added to the form, which was sent to be filled by 5th, 6th, 7th and 8th grade students using Google form. The IRB research ethics permission required for the study was obtained from Ankara University. At the end of the scale, a section is reserved for students to note the situations that they have difficulty or do not understand during the administration phase. The piloting step was completed, and the scale was revised with the feedback of the students before the validity analysis of the scale began.

In order to sustain data quality, the online forms were sent to the teachers directly by the authors. The teachers were selected based on the school they work (in terms of the financial status of the families, school neighborhood and type of residence). The authors received information about the general atmosphere of the online classroom for each of the classroom. All teachers were provided with the exactly same instruction for the test to be read loud just before the test to make the data collection process standardized as possible. As teachers had students fill out the forms during instruction hours, it was made sure that students completed them in person. The link of the scale was activated before the courses and deactivated afterwards to restrain multiple entries by the same students. The form was carried out in each classroom only for once to avoid the repetitive entries.

2.5. Data Analysis

Before engaging in the adaptation work, the literature was reviewed. No scale could be identified measuring academic self-efficacy for the 9-13 age group in Turkey or adapted to Turkish by following scientific processes. In addition, the scale developed by Jinks and Morgan (1999) for the targeted age group was examined. Adapting this scale was decided for reasons such as the eliminating the costs of developing a new scale and the difficulty of collecting data during the COVID-19 outbreak. The adaptation of the scale to Turkish culture had been carried out by Öncü in 2002.

Scale adaptation steps are collected under five main headings by ICT (2017) and Hernandez et al. (2020). These are Pre-Adaptation, development process (Test Development), verification process [Confirmation (Empirical Analyses)], implementation (Administration), scale scores and comments (Score Scales and Interpretation), and reporting (Documentation). Pre-adaptation steps are about decisions that need to be made before starting the translation/adaptation process. The development process is the main part of the adaptation work and includes explanations and suggestions about the adaptation process. The verification phase is about collecting empirical evidence about the validity, reliability and comparability of the scale. The next two steps refer to the implementation of the scale and the scoring processes, and reporting refers to the writing of the actions taken. This adaptation study has been reported in detail by selecting the relevant adaptation standards under these headings.

2.5.1. *Pre-adaptation*

The first step in this process is to obtain permission from the developers of the original scale for the scale adaptation study, which was also taken for the current study. The next stage involves a review of the extent to which the structure measured by the scale is compatible (overlaps) with its counterpart in the target culture, and how appropriate the items in the original scale are for the group in the target culture. For this, the expert opinions were obtained. The last step of this phase is to review the details that will make a difference in the measured structure related to the physical characteristics of the scale such as the suitability of the item type to the target culture and age group, the application period of the scale, and the materials used in the

implementation. It was observed that there was no feature in the scale that might cause problems in the target culture.

2.5.2. *Adaptation*

The translation process, one of the most important steps in the adaptation process, is under this heading. This process also stands for the content validation proofs of the scale. The first aim in the adaptation-based translation process is to ensure linguistic, psychological and cultural equivalence. Performing this step meticulously is the prerequisite for the scale to produce valid and reliable results in the target culture. Therefore, choosing the experts who will carry out the translation and adaptation very well is strongly advised. An expert is defined as a person who has sufficient knowledge in the target and source language, target and source culture, the scope of the test and the test process (ITC, 2017). Due to the difficulty of finding experts in all of the four fields specified above, the experts who met the most of the four criteria were selected for this study.

In the first step of the adaptation process, the scale was translated into Turkish by translators who are proficient at the C1 level in both English and Turkish translated the scale into Turkish. 21 items in the article translated and published by Öncü (2012) were added to the translation form. The expert group was asked to examine the translation by considering the structure and age group for items with only one translation; and for the items with two translations, they were asked to choose the better translation, and/or write their own suggestions. The expert group for the translation consisted of an English teacher, a British citizen who has been living in Turkey for 4 years, and an assessment and evaluation specialist with expertise in the source language.

Another step in the test adaptation process is the process of collecting evidence that the target group is familiar with the item type, response category, administration process, and other test-related processes. The original scale is structurally suitable for the target group. The item structure used in the scale is one of the most frequently used item structures. Since the administration of the scale was to be performed online, this was predicted to pose some challenges for the students. Therefore, some trials were run with the students to identify any problems. The last step here was conducting a small-group piloting before proceeding to the actual implementation. At this point, the scale was sent to 10 students before the actual pre-trial. At the end of the implementation, these students were asked about whether the process, the instructions and the expressions in the items were clear and unambiguous, and the necessary adjustments were made accordingly. A sample item for each dimension included in the original scale and the adaptation-based translation is given in Table 3.

Table 3. *Sample items from original scale and adapted scale for each sub-scale.*

Sub-Scale	Original Scale	Adapted Scale
Talent	It is not hard for me to get good grades in school.	Okulda iyi notlar almak benim için zor değil.
Context	No one cares if I do well in school.	Okulda başarılı olmam kimsenin umurunda değil.
Effort	I always get good grades when I try hard.	Çok çalıştığımda her zaman iyi notlar alırım.

An important change made in the adaptation process concerns response categories. On the original scale, 1 represents the highest agreement and 4 the lowest, which drew the attention of the experts. The review of the Likert-type scales developed for Turkish secondary school students (Bakırtaş & Tonga, 2016; Can & Topçuoğlu Ünal, 2017; Karakuş Tayşi & Özbay, 2016; Karakuş Tayşi & Taşkın, 2018; Kukul et al., 2017; Mete, 2021;) revealed that the response categories were generally arranged from negative to positive. Thus, based on the literature review and the expert opinions indicating that Turkish students were accustomed to this format, the response categories of the scale were revised. In other words, the scale was revised to begin with 1 “Strongly disagree” and end with 4 “Strongly agree” (See Appendix).

2.5.3. *Verification*

This stage involves the pre-trial administration of the translated scale and the calculation of some of its psychometric properties. Empirical evidence at this stage can prove that the scale is usable in the target culture. As already mentioned in the study group, the socio-economic levels and the location they live were taken into consideration. The size of the study group was deemed important because only then can the evidence of proofs of validity and reliability be obtained when the group is large enough.

Linguistics validity, content validity, construct validity and the criterion validity evidences of the scale were investigated for verification process. Linguistic validity evidences were gathered based on experts' opinions for whether the translated items cover the original meaning. After the item editing was completed, the percentage of agreement calculation process developed by Davis (1992) was planned to calculate the agreement among experts. The process, whose main function is to determine the content validity index, was used in this study to calculate the expert agreement between the English items and the adapted Turkish items. While calculating the rate of agreement among experts, the agreed items are summed up and divided by the total number of items. Whereas inter-expert agreement 1 (translation not appropriate) and 2 (translation should be seriously reviewed) denote to non-use, 3 (translation should be slightly revised) and 4 (translation appropriate) indicate that the translation is usable. The ratio of the items with observed agreement to the total number of items yields the measurement of agreement among experts.

Content validity is studied if the adapted items are thought to measure the academic self-efficacy in Turkish language and culture. For this aim, an expert group was formed to evalate the appropriateness of the items with the structure in Turkish culture. In other words, they assessed if the items could measure the academic self-efficacy in Turkish context. The expert group consisted of an academician who has a doctoral degree in psychology and lived in England for 6 years, and a Turkish teacher working in a secondary school.

To conduct construct validity, confirmatory factor analysis and testing group differences were carried out. The confirmatory factor analyses are carried out to test whether the structure intended to be measured with the adapted scale works in the target culture (Kline, 2005) in adaptation studies.

Before proceeding to the analysis, nine items that needed to be reverse coded were done so. There was no missing data in the dataset. Some assumptions had to be met to be able to perform the confirmatory factor analysis. Harrington (2009) and Kline (2005) suggest examining the dataset in terms of univariate normality, univariate outlier, multivariate normality and multivariate outlier. The univariate normality and univariate outlier analysis were performed based on the kurtosis and skewness values, and the z standard scores. The calculations based on the Mahalanobis distance and residuals revealed multivariate outlier and multivariate normality. As a result, univariate and multivariate outliers were found in the dataset. The clusters in certain categories in the student responses were identified as the reason for these outliers. These are the natural reactions of the students. Therefore, this distribution of the target trait was considered as the reflection of the natural distribution of the target trait. The univariate normality values are given in Table 4.

Table 4. *Descriptive statistics of items for perceivedacademic self-efficacy scale.*

Items	Kurtosis (s.e.)	Skewness (s.e.)	Items	Kurtosis (s.e.)	Skewness (s.e.)
m1	1.33(0.27)	-1.28(0.14)	m16	0.08	-0.88
m2	4.79	-2.09	m17	22.70	-4.65
m3	-1.13	-0.23	m18	0.39	-0.98
m4	-1.29	-0.48	m19	-0.98	-0.22
m5	-0.53	-0.69	m20	8.19	-3.07
m6	1.89	-1.57	m21	2.67	-1.71
m7	0.86	-1.60	m22	-0.97	-0.64
m8	3.65	-2.04	m23	4.26	-2.32
m9	5.99	-2.47	m24	-0.51	-1.02
m10	0.43	-0.99	m25	1.18	-1.31
m11	0.63	-1.04	m26	0.15	-0.87
m12	.071	-1.31	m27	1.70	-1.45
m13	7.92	-2.95	m28	13.60	-3.84
m14	0.13	-0.88	m29	0.85	-1.42
m15	-0.97	-0.73	m30	-.45	-0.45

When the kurtosis and skewness values given in Table 4 were examined, it was found that some items had sharp and skewed item score distributions, which was taken into consideration while determining the estimation method.

The confirmatory factor analysis was carried out using the Mplus 7 program. Before the confirmatory factor analysis began, the related literature was reviewed to identify the estimation method that would be the best fit for the descriptive features and scale levels of the items. Rhemtulla, Brosseau-Liard, and Savalei (2012) demonstrated the importance of the estimation method to be used in the analysis to ensure model-data fit and to estimate standard errors and factor loads in an unbiased way. Accordingly, the WLSMV estimation method produced more unbiased results in the non-normally distributed simulative dataset with fewer than 5 response categories. Newsom (2017), on the other hand, states that with the Likert scale, measurements with 7 or more response categories can be estimated continuously, and the others should be analyzed sequentially. Thus, the estimation method used in the CFA process of the scale, which was developed as a 4-point Likert scale, was decided to be the WLSMV.

Another evidence for construct validity is the studies based on group differences (Crocker & Algina, 2008). In studies based on group differences, the significance of the difference between the mean scores obtained from the scale of the groups that are expected to differ in terms of the measured feature is tested. Finding a statistically significant difference indicates that the scores obtained from the scale can identify individuals with and without the trait of interest.

Considering the relationships between students' academic achievement and self-efficacy and the theoretical structure, students with high self-efficacy are expected to have high grades on their report card and a high perception of the grades they will get, whereas the students with low self-efficacy are expected to have low grades and similarly low expectations for the grades they will get. First of all, the students were ranked from the lowest to the highest according to their total scale scores. The listed observations were examined in terms of the assumptions of the analysis technique. The SPSS 22.0 program was used in the analysis. At this point, the data set was analyzed in terms of univariate normality and univariate outliers. Univariate normality analysis was performed based on the kurtosis and skewness coefficient, and univariate extreme value (outlier) analysis was performed using standard z scores. Univariate outliers were

removed from the data set. The analysis was performed with 149 observations. Two groups with low and high academic self-efficacy were formed as lower and upper 27% (n_{lower}=40). Here, it is expected that the average score of the students in the lower and upper groups, and the average of the report card grades they hope to get at the end of the current semester will differ significantly. The kurtosis and skewness coefficients for examining the distributions of the dependent variables of these analyses in the categories of the independent variable are given in Table 5.

Table 5. *Kurtosis and skewness values of lower and upper 27% groups.*

Lessons	Groups	Kurtosis	Skewness
1.Turkish (1)	Lower	-1.04	-0.46
	Upper	10.22	-3.02
2.Mathematics (1)	Lower	-0.89	-0.50
	Upper	7.36	-2.67
3.Science Studies (1)	Lower	-1.22	-0.30
	Upper	14.88	-3.47
4. Social Studies (1)	Lower	-0.77	-0.78
	Upper	7.68	-2.69
5.Turkish (2)	Lower	-0.67	-0.66
	Upper	8.85	-2.88
6.Mathematics (2)	Lower	-1.16	-0.22
	Upper	5.80	-2.31
7. Science Studies (2)	Lower	-0.49	-0.74
	Upper	6.51	-2.36
8. Social Studies (2)	Lower	-1.22	-0.43
	Upper	3.84	-1.84

(1) 2020-2021 Fall
(2) 2020-2021 Spring

Based on the kurtosis and skewness values, it can be said that the levels of the independent variable do not have a normal distribution. The Levene test results regarding the homogeneity of variances are given in Table 6.

Table 6. *Levene test results.*

Lessons	F	*p*
1. Turkish (1)	27.44	0.00
2. Mathematics (1)	28.98	0.00
3. Science Studies (1)	38.07	0.00
4. Social Studies (1)	49.05	0.00
5. Turkish (2)	17.99	0.00
6. Mathematics (2)	19.71	0.00
7. Science Studies (2)	4.30	0.04
8. Social Studies (2)	42.95	0.00

As shown in Table 6, the assumption of homogeneity of variances is violated. The Mann Whitney U test, which is used to test the significance of the difference between the two means from the nonparametric tests, was used.

Criterion validity- another critical evidence for validating a scale- was performed. Criterion-based validity is achieved by examining whether the measurement tool has predictive power for the feature of interest (Bilican Demir, 2017). Thanks to this process, the compatibility of the developed/adapted scale with a number of other related measures is determined. High correlation between variables means high criterion-based validity, and low correlation means

low validity. The most important issue regarding criterion-based validity is the determination of the criterion measure. The relations of the selected criterion with the structure whose validity is tested must be theoretically and empirically proven (Crocker & Algina, 2008).

For their own criterion validity analysis of the original perceived academic self-efficacy scale, Jinks and Morgan (1999) asked students to indicate their last grades in four core subjects (reading, mathematics, science and social studies) because the students with high academic self-efficacy were expected to have high grades in these courses. Accordingly, in this adaptation study, the original form was adhered to. The theoretical and empirical relationships between self-efficacy and achievement and perception of success are known as well (Ayotola & Adedeji, 2009; Lee et al., 2014; Sebaee et al., 2017; Tenaw, 2013; Wilcox & Nordtokke, 2019). The scale, whose verification analysis was completed, was revised online to obtain information about the grades of the students and a total of 8 questions were added. For concurrent validity, the validity of the criterion measure needs to be obtained recently through the scale under examination. These questions are about the students' grades in Turkish, Mathematics, Science and Social Studies courses in 2020-2021 Fall semester and what they think their scores will be in these courses at the end of the 2020-2021 Spring term. The questions are presented below:

What was your grade for the Turkish class on your report card last semester?
What was your grade for the Mathematic class on your report card last semester?
What was your grade for the Social Studies class on your report card last semester?
What was your grade for the Science class on your report card last semester?
What do you think your grade for the Turkish class on your report card will be at the end of this semester?
What do you think your grade for the Mathematic class on your report card will be at the end of this semester?
What do you think your grade for the Social Studies class on your report card will be at the end of this semester?
What do you think your grade for the Science class on your report card will be at the end of this semester?

Differing from the original study, the students participating in the study were asked about their final report card scores as well as those which they would receive at the end of the current semester. The reason for this is that the data collection phase of the adaptation study was carried out during the COVID-19 outbreak. It was thought that during the pandemic, school education could not be systematically continued in either face-to-face or online environment, so the report card grades given to the students may not have been the scores that reflect their actual performances. In addition, the report cards they expect at the end of the current term reveal how confident they are about their success in school lessons. For these reasons, the students were asked to write both the most recent report card grades and the grade they will receive in the four basic learning areas. The correlations between the grades reported by the students and the total score, ability subscale score, context subscale score, and effort sub-score on the perceived academic self-efficacy scale under study were analyzed. A total of 173 students were included in the study group. The number of students excluding missing data is 159. The analyses were performed with the SPSS 22.0 program based on 159 participants. The normal distributions of the variables were tested before proceeding to the correlation calculation. Outliers were detected in some variables. When these values were examined, it was concluded that these values existed due to the nature of the collected data. For example, students stated that their last report card grade in mathematics was between 40 and 50 points. Since this value was far from the distribution, it was determined as an outlier. Since removing these values from the observation set would damage the nature of the collected data, no observations were excluded

from the dataset. Spearman Brown Rank Differences Correlation Coefficient, which is used in cases where the distribution does not show a normal distribution, was calculated.

For the reliability studies, Cronbach Alpha Coefficient and composite reliability were calculated for the total score as well as subscale scores. The study of the original scale was taken into consideration and calculations were made based on the original scale.

3. RESULT

The findings of the validity studies for the Perceived Academic Self-Efficacy Scale are given below. First, the confirmatory factor analysis was performed for the construct validity of the scale.

3.1. Linguistic Validity

In the adaptation-based translation, the adapted form was sent to three experts in English, who lived in the United States and whose native language was Turkish. Based on the feedback from the experts, three experts were cross-paired, and the percentage of agreement was calculated for each expert group of two. Accordingly, the percentage of agreement among experts varied between 77% and 97%. If this ratio is above 0.70, it is an indication of agreement between experts (Davis, 1992).

3.2. Content Validity

To collect proof of content validity of the scale, the translated form was sent to the experts, who were asked to evaluate it in terms of the presentability of the construct in Turkish language and culture as well as items' power to measure the academic self-efficacy. One Turkish language teacher who works at the secondary school level was intentionally invited to the expert group to see if the language is appropriate for those/students between 9-13; whether there are any statements or words students might not know or misunderstand. Besides, one academician whose study field covers the self-efficacy construct and who has doctoral degree in the field of psychology was asked to assess whether the items can measure the target trait or not.

The suggestions from the experts were examined by the researcher, it was observed that most of the feedback was regarding the wording of the items. Expert group concluded that the translated form can successfully measure and evaluate the academic self-efficacy of secondary school children, and the expressions are appropriate for the age group. The revision of the adapted items was completed in line with expert opinions.

3.3. The Confirmatory Factor Analysis

The very first construct validity evidence of the adapted scale was collected with confirmatory factor analysis. When confirmatory factor analysis was run, the model worked even though the data fit with the model was low. The modification indices suggested by the program were taken into consideration. While making modifications, as suggested by Hayduk (1989), improving the model was a priority; however, maintaining compatibility with the theoretical model is still a must. Thus, before the covariances between the observed variables suggested by the model were drawn, the meanings of the items and their connotations for the students were considered. The first pair of items that were related to each other were the items in the second sub-dimension, namely the context sub-dimension. Both items can be accepted as an indicator of the importance that the student attaches to high school education, and whether he/she wants to complete this level of education. The other items in the first sub-dimension, the talent sub-dimension, reflect the students' beliefs that they are good students, even in different courses.

The model that was run after the modifications is presented in Figure 1. The recommendations made by Hooper et al. (2008) were taken into account when deciding which indices to report on model fit, as the authors recommend reporting at least one index from each of the absolute fit indices, incremental fit indices and parsimony-adjusted indices categories. The absolute fit

indices are the most basic indicators that show how well the proposed theoretical structure fits the data. Thus, the absolute fit indices χ^2/df and RMSEA were reported. The incremental fit indices show if the established model fits better than the null model. The CFI and TLI were reported from indices in this group. The final group, the parsimony-adjusted fit indices, are used to decide which model is more useful when different models are built on the same dataset (Hooper et al., 2008). Reporting this final group of fit indices is irrelevant here, as the current study aims to confirm a predicted theoretical structure. The goodness-of-fit indices for the model are presented in Table 7.

Figure 1. *Confirmatory factor analysis model of the perceived academic self-efficacy scale.*

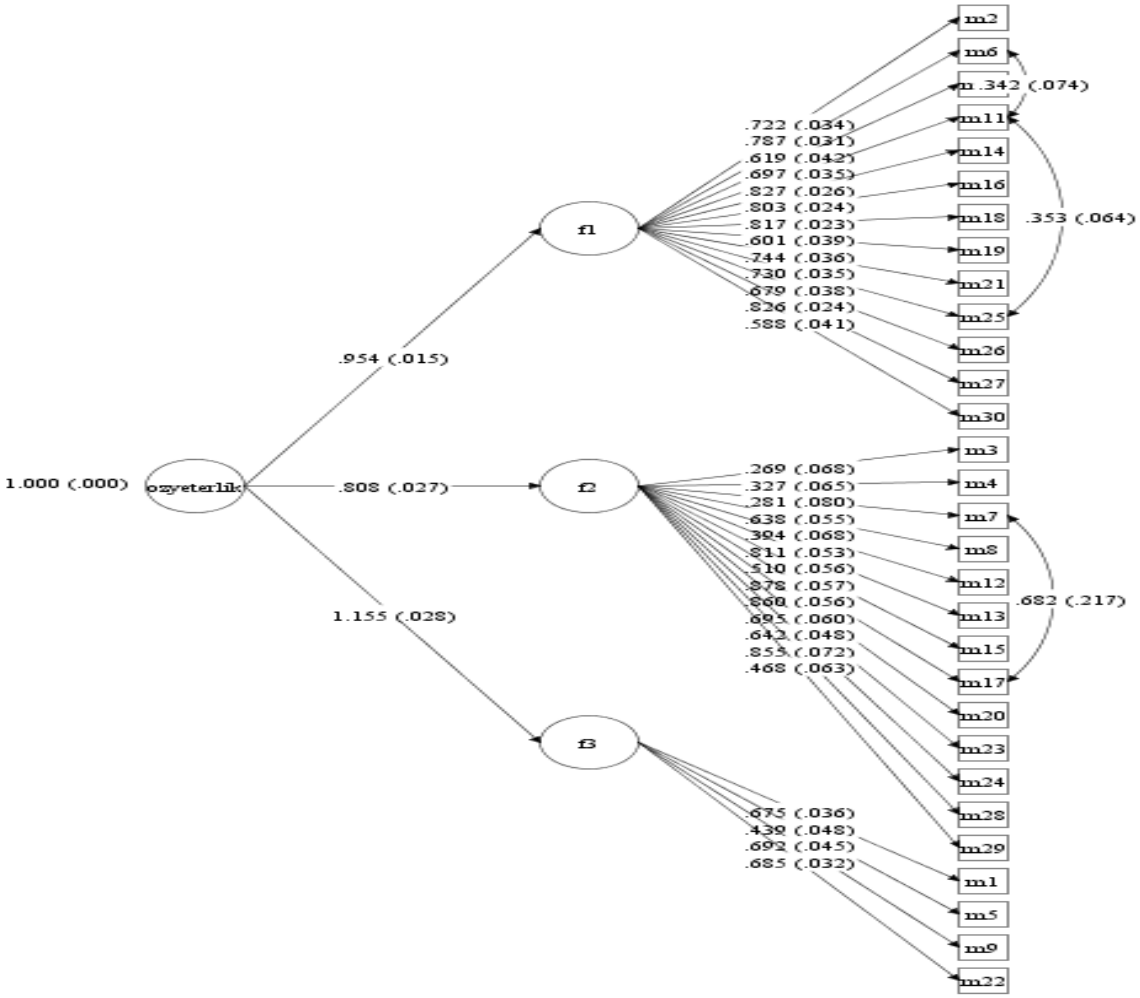

Table 7. *Goodness of fit indices.*

Goodness of Fit	Criteria	Model Value
x^2/df	<2; <5	2.33
RMSEA	<0.05 0.05-0.08	0.06
RMSEA 90% CI	-	0.06-0.07
CFI	>0.95 >0.90	0.90
TLI	>0.95 >0.90	0.90

The relationships between the sub-dimensions are presented in Table 8.

Table 8. *Correlations between sub-dimensions of perceived academic self-efficacy scale.*

	1-2	1-3	2-3
Correlations Between Sub-Dimensions	0.63	0.80	0.65

In Table 9, the item-total correlations and R^2 values related to the model are given.

Table 9. *Item-total correlations and R^2 values.*

Items	Item-Total Correlations	R^2	Items	Item-Total Correlations	R^2
1	0.62**	0.45	16	0.65**	0.65
2	0.50**	0.52	17	0.37**	0.77
3	0.28**	0.07	18	0.70**	0.67
4	0.37**	0.11	19	0.58**	0.36
5	0.46**	0.19	20	0.44**	0.74
6	0.61**	0.62	21	0.55**	0.55
7	0.21**	0.08	22	0.69**	0.47
8	0.41**	0.41	23	0.42**	0.48
9	0.50**	0.48	24	0.51**	0.41
10	0.52**	0.38	25	0.58**	0.53
11	0.59**	0.49	26	0.59**	0.46
12	0.32**	0.15	27	0.65**	0.68
13	0.43**	0.66	28	0.33**	0.73
14	0.72**	0.69	29	0.36**	0.22
15	0.43**	0.26	30	0.50**	0.35

** 0.01

Table 8 reveals that there is a moderate and high level of correlation between the subscales. According to Figure 1, most of the factor loading were around 0.50 and above, as high as recommended by Hair et al. (2014). Item-total correlations and R^2 values given in Table 9 reveal that items are mostly moderately correlated with the total score.

3.4. Criterion Validity Study

For the criterion validity, Spearman Brown Rank Differences Correlation Coefficient between the students' scores of perceived academic self-efficacy, and their reported grades were calculated. Table 10 presents the correlations between students' scores and the scale total and subscale scores.

Table 10 demonstrates that all correlation coefficients are significant at the level of .05 or .01. The context subscale and the predicted report card grades for social studies and science classes are lowly correlated. All other relationships are moderate or high.

Table 10. *Correlations between students' grades and perceived self-efficacy scale/sub-scales scores.*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Turkish (1)	1											
2. Mathematics (1)	0.74**	1										
3. Science Studies (1)	0.76**	0.74**	1									
4. Social Studies (1)	0.80**	0.76**	0.74**	1								
5. Turkish (2)	0.50**	0.51**	0.38**	0.45**	1							
6. Mathematics (2)	0.46**	0.63**	0.50**	0.49**	0.77**	1						
7. Science Studies (2)	0.30**	0.38**	0.35**	0.27**	0.72**	0.73**	1					
8. Social Studies (2)	0.36**	0.38**	0.29**	0.47**	0.68**	0.67**	0.67**	1				
9. Academic Self-efficacy total score	0.50**	0.53**	0.53**	0.46**	0.50**	0.57**	0.44**	0.42**	1			
10. Talent Sub-Dimension	0.51**	0.54**	0.50**	0.46**	0.51**	0.60**	0.51**	0.49**	0.92**	1		
11. Context Sub-Dimension	0.32**	0.31**	0.35**	0.29**	0.30**	0.31**	0.17**	0.17**	0.75**	0.48**	1	
12. Effort Sub-Dimension	0.40**	0.42**	0.41**	0.33**	0.43**	0.53**	0.42**	0.37**	0.84**	0.76**	0.53**	1

*0.05
**0.01
(1) 2020-2021 Fall
(2) 2020-2021 Spring

3.5. Validity Analysis Based on Group Differences

To test the group differences, upper and lower 27% of the students were determined. These groups were used for the analysis. Mann Whitney U test was carried out, and the results are given in Table 11.

Table 11. *Mann Whitney U results.*

Lessons	Groups	N	Mean Rank	Sum of Ranks	U	*p*
1. Turkish (1)	Lower	40	27.53	1101.00	281.00	0.00
	Upper	40	53.48	2139.00		
2. Mathematics (1)	Lower	40	26.44	1057.50	237.50	0.00
	Upper	40	54.56	2182.50		
3. Science Studies (1)	Lower	40	26.25	1050.00	230.00	0.00
	Upper	40	54.75	2190.00		
4. Social Studies (1)	Lower	40	29.85	1194.00	374.00	0.00
	Upper	40	51.15	2046.00		
5. Turkish (2)	Lower	40	26.63	1065.00	245.00	0.00
	Upper	40	54.38	2175.00		
6. Mathematics (2)	Lower	40	25.10	1004.00	184.00	0.00
	Upper	40	55.90	2236.00		
7. Science Studies (2)	Lower	40	27.10	1084.00	264.00	0.00
	Upper	40	53.90	2156.00		
8. Social Studies (2)	Lower	40	29.90	1196.00	376.00	0.00
	Upper	40	51.10	2044.00		

(1) 2020-2021 Fall
(2) 2020-2021 Spring

A closer look at Table 11 suggests a significant difference between high and low academic self-efficacy in all learning areas covered in the study (p<0.01). This significant difference in all

learning domains favors students with high academic self-efficacy. In other words, both the report card grades and the end-of-semester grades they think they will get in the Turkish course are higher for students with high academic self-efficacy and lower for students with low academic self-efficacy. This result is also valid for the Mathematics, Science and Social Studies lessons.

3.6. Reliability Analysis of the Perceived Academic Self-Efficacy Scale

Cronbach Alpha and composite reliability coefficients were calculated after determining the validity of the scale. The Cronbach Alpha reliability coefficients of the subscales of the perceived academic self-efficacy scale were 0.91,0.71 and 0.61, respectively. The Cronbach Alpha calculated for the total scale score was 0.91 and the composite reliability was 0.96.

Similar results were obtained for the application-based reliability estimations made for the criterion validity. The Cronbach alpha reliability coefficient was 0.91 for the talent sub-dimension, 0.82 for the context sub-dimension, and 0.58 for the effort sub-dimension. The Cronbach Alpha calculated for the whole scale was 0.92. Reliability estimations of the adapted scale were compatible with the original scale study. The reliability of the results obtained by implementing the scale was high.

4. DISCUSSION and CONCLUSION

In the present study of adapting the perceived academic self-efficacy scale to the Turkish language and culture, the relevant international standards were followed. The adaptation procedure was completed in accordance with these standards and by adhering to the procedure applied for the development of the original scale. Evidence of validity of the scale was collected using linguistic validity, content validity, construct validity, and criterion validity. In the adaptation-based translation, for linguistic validity, the percentage of agreement between experts was calculated to determine the consensus of experts on the translations. The agreement among experts on linguistic quality of the original and the adapted form is excellent, ranging from 77% to 97%. As regards to the content validity, Turkish form was sent to the expert group to be evaluated in terms of its capacity to measure the academic-self efficacy and appropriateness of the expressions of the items to the age group. Feedback was received and based on it changes were made; it was concluded that the translated items could measure academic self-efficacy. The construct validity of the adapted scale was analyzed based on confirmatory factor analysis and group mean differences.

The confirmatory factor analysis for the construct validity proved that the model and the data fit well (χ^2/df=2.33; RMSEA=0.06; CFI=0.90; TLI=0.90). The model presented in Figure 1 highlights that a path coefficient takes a value higher than 1. Jöreskog (1999) states that this is normal, that it is a regression coefficient, not a correlation. He states that the established model and the data should be checked for multicollinearity or negative residuals, most likely the researcher will notice something in these reviews, but it does not mean that there is a definite problem. The proposed checks were performed by the researcher, revealing no problems. Examining the factor loads revealed that most of them were above the 0.50 and R^2 values were higher than 0.40 mostly recommended by Hair et al. (2014). Items with lower R^2 mean they contribute to the common variance less. When investigated, the lowest R2 values are for item 3 and item 7. When the items were reviewed, it was observed that item 3 consisted of two statements and there were doubts about item 7, which might have a different meaning in Turkey than it has in the original form. For item 3, students may be confused to decide which statement to rank. For item 7, graduating from college may not match with Turkey context as it is not a corner stone as it is in Turkey. These are why the variance these items contribute to may be less than other items. However, due to the fact that this is an adaptation process, there may be items that do not work as well as they do in the original scale. This does not necessarily mean that the

contruct has not been validated for the Turkish culture. The fact that the standard estimations are statistically significant and apply in the adapted culture indicates that the scale is validated for the target culture. The correlations between subscales are moderate to high. This is also a sign that these subscales can measure the target trait. The item-total score correlations are observed to be positive, mostly moderate and statistically significant. The original structure was also confirmed for the Turkish culture.

The grade point averages of individuals with low self-efficacy in four basic learning areas were significantly lower than the averages of individuals with high self-efficacy. This finding shows that students who are more successful in their courses and those who think that they are more successful than others have higher academic self-efficacy. It was concluded that the scores obtained from the adapted scale indicated success at determining individuals with low and high academic self-efficacy. This finding is also in line with the available findings of the literature (Bassi et al., 2006; Ferla et al., 2009; Khan, 2014; Mercer et al., 2011).

For the analysis of the criterion validity, the correlations between the students' final report card grades and the expected report card grades and their scores on the adapted academic self-efficacy scale were taken into consideration and all the correlations were found to be significant. When the original scale study was examined, it was concluded that all the relationships were moderately or highly correlated. Therefore, it can be concluded that the adaptation study yielded similar results with the one including the original scale. The low level of correlation may be due to the different sample sizes in the studies. In any case, the relationships are significant, and the criterion validity of the adapted scale is high.

Cronbach Alpha and Composite Reliability were calculated to determine the reliability of the scale and the reliability estimations were found to be moderate to high. The reason for the low reliability coefficient calculated for the third subscale is the number of the items in the subscale. It is evident that reliability coefficients are closely linked to the number of the items. When the original scale was examined, it was detected that the reliability coefficient of the third subscale was calculated as low as well (Jinks & Morgan, 1999). The scale can be safely used for determining the perceived academic self-efficacy of students between 9 and 13.

Declaration of Conflicting Interests and Ethics

The authors declare no conflict of interest. This research study complies with research publishing ethics. The scientific and legal responsibility for manuscripts published in IJATE belongs to the authors. **Ethics Committee Number:** Ankara University/ Social Science Institution, 30-3-2020/54.

Authorship Contribution Statement

Neslihan Tugce Ozyeter: Investigation, Resources, Methodology, Visualization, Software, Formal Analysis, and Writing -original draft. **Omer Kutlu**: Investigation, Resources, Methodology, Formal Analysis, and Writing -original draft.

Orcid

Neslihan Tugce OZYETER https://orcid.org/0000-0003-1558-1293
Omer KUTLU https://orcid.org/0000-0003-4364-5629

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APPENDIX

Perceived Academic Self-Efficacy Scale (Turkish Form)

Çocuklar için Algılanan Akademik Özyeterlik	Katılma Düzeyiniz			
	Kesinlikle Katılmıyorum	Katılmıyorum	Katılıyorum	Kesinlikle Katılıyorum
1. Okulda çok çalışırım.				
2. Yeterince çalışırsam sınıftaki en iyi notları ben alabilirim.				
3. Sınıf arkadaşlarımın çoğu matematiği sever çünkü matematik kolaydır.				
4. Öğretmenim beni daha çok sevse, daha iyi notlar alabilirim.				
5. Sınıf arkadaşlarımın çoğu ev ödevlerine benden daha çok çalışırlar.				
6. Fen Bilgisi dersinde iyi bir öğrenciyim.				
7. Liseden mezun olacağım.				
8. İyi bir okula okuyorum.				
9. Çok çalıştığımda her zaman iyi notlar alırım.				
10. Bazen, sınıf arkadaşlarımın zor olduğunu düşündüğü ödevler bana kolay gelir.				
11. Sosyal bilgiler dersinde iyi bir öğrenciyim.				
12. Şu an iyi bir işe sahip olan yetişkinler, büyük olasılıkla çocukken iyi bir öğrenciydi.				
13. Yeterince büyüdüğümde üniversiteye gideceğim.				
14. Sınıfımdaki en başarılı öğrencilerden biriyim.				
15. Okulda başarılı olmam kimsenin umurunda değil.				
16. Öğretmenim zeki olduğumu düşünür.				
17. Liseye gitmek önemlidir.				
18. Matematik dersinde iyi bir öğrenciyim.				
19. Sınıf arkadaşlarım genellikle benden daha iyi notlar alır.				
20. Okulda ne öğrendiğim önemli değil.				
21. Genellikle nasıl bir ödev verildiğini anlarım.				
22. Çoğunlukla matematikten iyi notlar alamam çünkü matematik çok zor.				
23. Okulda başarılı olmam önemli değil.				
24. Öğretmenim yüksek puan alan öğrencilere daha çok yardım ediyor.				
25. Türkçe dersinde iyi bir öğrenciyim.				
26. Okulda iyi notlar almak benim için zor değil.				
27. Zekiyim.				
28. Mümkün olan en kısa sürede okulu bırakacağım.				
29. Öğrenciler her zaman güzel notlar almasalar da öğretmenler onları sever.				
30. Öğretmen bir soru sorduğunda diğer öğrenciler yanıtı bilmese bile ben bilirim.				