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Research Article

Validity and reliability study of metacognitive listening strategies teaching self-efficacy scale for teachers

Murat Ermiş[1*], **Şafak Uluçınar Sağır**[2]

[1]Amasya University, Institute of Social Sciences, Amasya, Türkiye
[2]Amasya University, Faculty of Education, Amasya, Türkiye

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Abstract: In this study, an attempt was made to develop a valid and reliable measurement tool to determine teachers' self-efficacy levels for teaching metacognitive listening strategies. The study group consisted of 205 teachers for EFA and 248 teachers for CFA. As a result of the analyzes, a scale consisting of 16 items with 4 factors was developed. It was determined that the scale explained 74.10 of the total variances. For EFA, Kaiser-Mayer-Olkin (KMO) test, Barlett test, total variance, item-total correlation, common factor variance, factor loadings, χ^2/df RMSEA, SRMR, RMR, NFI, NNFI, CFI, GFI, AGFI, IFI, RFI, CR, AVE, MSV and ASV values and Cronbach Alpha statistics were performed. The KMO value of the scale is .915, the result of Barlett's Test of Sphericity is significant (p=.000) and the Cronbach Alpha value is .932. Five of the fit indices showed excellent fit and six of them showed acceptable fit. The CR, AVE, MSV and ASV values showed that it provided divergent and convergent validity. After the analysis, it was concluded that the Self-Efficacy Scale for Teaching Metacognitive Listening Strategies for Teachers is valid and reliable.

1. INTRODUCTION

Flavell introduced metacognition as a concept that refers to the forecasting, planning, monitoring and evaluation of one's own cognition. Metacognition includes awareness and control of cognitive strategies as well as knowledge of the person, task and strategy variables that affect an individual's learning and problem-solving. Listening is an important basic skill in education as well as in many areas of daily life. People can develop various listening strategies according to their own cognitive processes and make their listening more efficient. Metacognitive listening strategies are thought to positively affect students' listening skills. Therefore, it is important for teachers to teach these strategies and their use to their students. In this study, a measurement tool was tried to be developed in order to determine teachers' self-efficacy in teaching these strategies.

*CONTACT: Murat ERMİŞ ermismurat05@gmail.com Amasya University, Institute of Social Sciences, Amasya, Türkiye

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1.1. Metacognition

The concept of metacognition was based on Flavell's meta-memory concept in the 1970s and first appeared in Flavell's work. According to Flavell (1976), metacognition is a concept that includes monitoring and regulation. Since metacognition is an abstract concept, there are many definitions of metacognition. Metacognition is the individual's self-knowledge about his own learning and knowledge about his cognition (Flavell, 1979). According to Brown (1978), metacognition is students' awareness and regulation of their own thinking processes in previously planned learning activities and problem situations. According to McCormick *et al.* (1989), it refers to the knowledge that individuals have about their own thinking processes and strategies, as well as their monitoring and regulation abilities in these learning processes (Melanlıoğlu, 2011). Doğanay and Kara (1995) state that the individual's awareness of his own thinking; Taylor (1999) stated that the individual's evaluation of what he knows is metacognition. Hacker and Dunlosky (2003) defined metacognition as the awareness of the mental activities carried out in the human brain and the ability to control them. Although there are some differences between these definitions, metacognition is generally defined as "the individual's planning, monitoring and regulating how he knows by thinking about his own learning" (Melanlıoğlu, 2011).

In order to make metacognition more understandable, it is important to explain its relationship with cognition (Sarıkaya, 2021). While cognitive learning does not include any critical perspective, metacognitive learning is different in terms of pre-planning, monitoring and evaluating the process (Katrancı, 2012). However, it is also important to know metacognitive knowledge and metacognitive strategies in understanding metacognition. According to Akın (2006), metacognitive knowledge is the individual's knowledge and awareness about his own cognition. The individual knows what he can or cannot do about himself, and can compare his own cognition with other individuals. According to Schraw (1998), metacognitive knowledge is the individual's understanding and comprehension of his or her own thought processes.

Metacognitive strategies refer to the tools that individuals use to keep their learning processes under control. Thinking about learning, making a learning plan, detecting meaningful situations in the learning process, and checking whether a product is produced are using metacognitive strategies (Chamot *et al*., 1987). The task of these strategies is to control learning processes, and regulate cognition and thinking (Schraw & Moshman, 1995). Metacognitive strategies refer to the processes that enable cognition and regulate the cognition process (Brown & Palincsar, 1982). Metacognitive strategies are the ability of individuals to control themselves consciously and for certain periods of time in order to determine whether they have achieved their goals or not and to decide whether to make a change in their strategies (O'Neil & Abedi, 1998). Or making plans to learn and produce knowledge, developing awareness about the steps and strategies for solving problems and evaluating themselves are metacognitive strategies (Costa, 2008). According to Wenden (1998), metacognitive strategies are skills that consist of planning, monitoring evaluating and managing, directing and regulating the individual's learning. Hauck (2005) states that the number of strategies used and the intervals in which these strategies are used are distinguishing features for the success of individuals.

The main strategies are preparation, planning, control, problem-solving and monitoring. The general view is that individuals use metacognitive strategies to plan, monitor and evaluate his own learning (Brown & Palincsar, 1982; Brown *et al.*, 1982; Cohen, 1994; Deseote & Roeyers, 2002; Kim, 2013; O'Malley *et al*., 1987; Schraw & Moshman, 1995; Wenden, 1998; Wey, 1998). The development of the ability to use metacognitive strategies increases many skills such as more efficient use of previously known strategies, better understanding of the problem and finding different solutions (Schraw, 1998).

There are also various metacognitive strategy models, with a few differences. These are the Oxford model, O'Malley and Chamot model, Cohen model, Greenfell and Harris model (Liu, 2010), Rubin model, and Anderson model (Anderson, 2002; Chamot & Robins, 2005). The

more accepted and referenced model in research is the O'Malley and Chamot model. The O'Malley and Chamot model is taken as a reference in this study as it includes forecasting, planning, monitoring and evaluation strategies.

1.2. Listening

Language consists of five basic skills. These basic skills are listening, speaking, reading, writing and visual literacy. Although listening comprehension was previously thought to be a passive skill that develops with speaking and reading, today this skill is recognized as an active skill that can be taught (Rost, 2013). This idea may also be an explanation for the limited number of studies on listening compared to other skills (Melanlıoğlu, 2011). Listening is a process that requires training. The training of this skill should begin at an early age (Melanlıoğlu, 2011). Before school age, this task falls to mothers and fathers, and at school age, it falls to teachers (Temur, 2001).

Listening is a critical component of effective communication and plays a vital role in our personal and professional lives (Arnold, 2014). Listening is a fundamental language skill that is often overlooked by language teachers despite its importance (Malureanu & Enachi-Vasluianu, 2016). Listening is not only a skill area in language performance but also an important way of acquiring a second language (Rost, 2001). Listening allows us to process language in real time, using the speed, coding units and pauses that characterize spoken language (Hattingh, 2014). In terms of all these functions, listening is an important language skill.

Metacognitive listening strategies have been used in many studies on listening education. Although it has been mostly used in experimental studies on foreign language teaching, there are also studies in which it is used in native language education (Berman, 1994; Chamot & Robbins, 2005; Cohen & Brooks-Carson, 2001; Manchon *et al*., 2009; Rubin, 2001; Wolfersberger, 2003). In studies investigating the effects of metacognitive strategies on listening, it has been concluded that the use of metacognitive strategies has a positive effect on listening skills. Birjandi and Rahimi (2012) stated that students who use metacognitive listening strategies more effectively are better listeners. Bozorgian (2012) stated that thanks to strategy teaching, especially less skilled listeners can become more efficient listeners. According to Coşkun (2010), strategy instruction should be included in curricula in order for students to become better listeners. Cross (2010) and Goh and Taib (2006) stated that while strategy-based instruction improves the listening skills of less skilled students, this improvement is very low in more skilled students. Ghapanchi and Taheryan (2012) stated that as individuals' metacognitive knowledge and their ability to use metacognitive listening strategies increase, their speaking and listening skills also increase. According to Imhof (2001), strategy use and self-assessment facilitate listening. According to Kurita (2012), metacognitive strategy use not only improves listening skills but also reduces anxiety. Strategy use in foreign language teaching enables individuals to become better listeners (Vandergrift, 2003; Vandergrift *et al*., 2006).

1.3. Self-Efficacy

Self-efficacy is one of the concepts that Bandura (1977) attaches importance to in his Social Learning Theory; It expresses the individual's self-belief in doing a job and being successful in that job. Ermiş (2019) examined studies and determined that self-efficacy has been shown to affect individuals' motivation, cognitive skills, and behavior. Gülebağlan (2003) concluded that teachers with high levels of self-efficacy do not have difficulty in making certain decisions in teaching activities and show a more determined attitude in this regard. According to Klassen and Tze (2014), teachers' self-efficacy about teaching a subject or using a skill also affects their teaching efficiency.

In order to teach metacognitive strategies to students, teachers must first learn these strategies and be models for students by using these strategies. Teachers can use these strategies out loud

if necessary, and make students feel what they are doing at each stage, which strategies they are using, or what questions they are asking themselves. By teaching metacognitive strategies, students can be enabled to use these strategies independently. In each of the stages of forecasting, planning, self-monitoring and evaluation, the teacher can contribute to the development of students' skills in using metacognitive strategies by giving explicit instructions. Thus, students will be able to learn which strategies to use when listening and which strategies improve their listening skills.

Studies should be conducted to organize activities that can improve the skills of both students and teachers in using metacognitive strategies (Melanlıoğlu, 2011). Determining teachers' self-efficacy levels in teaching metacognitive listening strategies will provide significant support to the studies. Determining teachers' self-efficacy levels in teaching metacognitive listening strategies and, if necessary, organizing training programs for teachers on the use and teaching of these strategies can contribute to more reliable studies that reveal the effects of metacognitive listening strategies on students' listening skills.

Self-efficacy determination tools enable individuals to determine their level of perception of their own skills in a certain field (Aypay, 2010). Thus, individuals will be able to identify their advantageous and disadvantageous aspects and take steps to eliminate them. After the literature review, scales related to metacognition were used to measure individuals' metacognitive beliefs in psychopathology (Tosun & Irak, 2008), and students' metacognitive awareness (Haghighi *et al.*, 2019; Kaplan & Duran, 2016; Nix, 2016; Vandergrift *et al.*, 2006; Zhang & Zhang, 2011), metacognitive self-efficacy (Thomas *et al.*, 2008), metacognition skills (Hameed & Cheruvalath, 2021) and teacher candidates' metacognitive skills (Melanlıoğlu, 2011; Okur & Azizoğlu, 2016; Topaç, 2019), but a scale to determine teachers' self-efficacy levels in teaching metacognitive listening strategies could not be reached. It was thought that determining teachers' self-efficacy levels in teaching these strategies would contribute to the evaluations regarding the teaching of the strategies, and in this study, an attempt was made to develop a measurement tool to determine teachers' self-efficacy in teaching metacognitive listening strategies.

2. METHOD

2.1. Study Group

The sample of the study consists of classroom teachers. Since Exploratory Factor Analysis and Confirmatory Factor Analysis will be conducted within the scope of the research, there are two sample groups in the research. In this study, the bisection method was used for the data obtained as a result of the same application. According to DeVellis (2016), even if there is no problem with the scale items, the mental states of two different groups of participants such as fatigue and boredom during answering may prevent the real situation from emerging. In addition, no matter how similar the two samples are, conducting the analyses by dividing the first sample gives valuable information about the stability of the scale. For this reason, the data were divided into two halves and reliability analysis was performed. Some information about the EFA and CFA study groups is presented in Table 1.

Data obtained from 205 participants were used for EFA. Of the 205 teachers, 51.7% are women (n=106) and 48.3% are men (n=99). 2.4% of the teachers have associate degrees (n=5), .5% have institute graduate degrees (n=1), 72.2% have undergraduate degrees (n=148), 22.9% have master's degrees (n=148). n=47) and 2% are PhD graduates (n=4). 15.2% of the participating teachers had 0-5 years of experience (n=31), 14.6% had 6-10 years of experience (n=30), 30.7% had 11-15 years of experience (n=63). 39.5% have 16 years or more (n=81) professional experience. 18.1% of the teachers work in the village (n=37), 11.7% in the town (n=24) and 70.2% in the city center (n=144).

Table 1. *Information on the study group.*

		First Study Group (EFA)		Second Study Group (CFA)	
		n	%	*n*	%
Gender	Female	106	51.7	142	57.3
	Male	99	48.3	106	42.7
	Total	205	100	248	100
Education Status	Associate Degree	5	2.4	2	.8
	Institute	1	.5	0	0
	Undergraduate	148	72.2	186	75
	Master's Degree	47	22.9	57	23
	PhD	4	2	3	1.2
	Total	205	100	248	100
Professional Experience	0-5 Years	31	15.2	29	11.7
	6-10 Years	30	14.6	38	15.3
	11-15 Years	63	30.7	50	20.2
	16 Years and More	81	39.5	131	52.8
	Total	205	100	248	100
Region of Assignment	Village	37	18.1	40	16.1
	Town	24	11.7	40	16.1
	City Center	144	70.2	168	67.8
	Total	205	100	248	100

Data obtained from 248 participants were used for CFA. Of the 248 teachers, 57.3% are women (*n*=142) and 42.7% are men (*n*=106). .8% of the teachers had an associate degree (*n*=2), 75% had an undergraduate degree (*n*=186), 23% had a master's degree (*n*=57) and 1.2% had a doctorate degree (*n*=3). 11.7% of the participating teachers had 0-5 years of experience (*n*=29), 15.3% had 6-10 years of experience (*n*=38), 20.2% had 11-15 years of experience (*n*=50). 52.8% have professional experience of 16 years or more (*n*=131). 16.1% of the teachers work in the village (*n*=40), 16.1% in the town (*n*=40) and 67.8% in the city center (*n*=168).

2.2. Collection and Analysis of Data

Ethics Committee Permission was obtained for the scale on 16.12.2022 and an online form was created via Google Forms. For the validity and reliability studies of the scale, data were collected using these forms within 4 months. DeVellis (2016) suggested a 7-stage method for scale development studies. In this study, these 7-step scale development stages were used.

2.2.1. *Stage 1: Determination of the feature to be measured*

In this study, we tried to develop a valid and reliable measurement tool to determine teachers' self-efficacy in teaching metacognitive listening strategies. During the development stages of the Metacognitive Listening Strategies Teaching Self-Efficacy Scale for Teachers, the relevant literature was first examined, but a scale to determine teachers' self-efficacy levels in teaching metacognitive listening strategies could not be reached. It has been seen that there are scales mostly to measure the metacognitive skills of students and teacher candidates (Hameed & Cheruvalath, 2021; Haghighi, *et al.*, 2019; Kaplan & Duran, 2016; Karakelle & Saraç, 2007; Melanlıoğlu, 2011; Nix, 2016; Okur & Azizoğlu, 2016; Thomas *et al.*, 2008; Topaç, 2019; Vandergrift *et al.*, 2006; Zhang & Zhang, 2011). After this scanning, the features to be measured were determined.

2.2.2. *Stage 2: Creating the item pool*

At this stage, the item pool for the scale is created. An item pool of 78 items was created by using the scales developed in studies conducted for students and the information obtained from articles and theses covering metacognition teaching sections (Hameed & Cheruvalath, 2021; Haghighi *et al.*, 2019; Kaplan & Duran, 2016; Melanlıoğlu, 2011; Nix, 2016; Okur & Azizoğlu, 2016; Thomas *et al.*, 2008; Topaç, 2019; Tosun & Irak, 2008; Vandergrift *et al.*, 2006; Zhang & Zhang, 2011). The created item pool was examined by 1 measurement and evaluation expert and 2 Turkish education experts. As a result of the review, it was seen that there were items measuring the same skills and the number of items was reduced to 40.

2.2.3. *Stage 3: Determining the format of the scale*

In the third stage, the format of the scale is determined. It was decided that the scale to be developed to determine teachers' self-efficacy levels in teaching metacognitive listening strategies would be Likert type. The scale was created as a five-point Likert and the options "Never, Rarely, Sometimes, Often and Always" were selected.

2.2.4. *Stage 4: Submission of the article pool for expert opinion*

At this stage, the created items are presented to expert opinion. Content validity refers to the ability of a scale to measure the desired feature. In studies, when it is not possible to apply it during the scale development stages, content validity rates are used. Content validity rates are determined by statistically calculating expert opinions (Yurdugül, 2005).

To ensure the content validity of the scale, the Lawshe technique was used by utilizing expert opinions. The Lawshe technique consists of 6 stages.

a) Establishing a group of field experts

b) Preparation of candidate scale forms

c) Obtaining expert opinions

d) Obtaining content validity rates for the items

e) Obtaining content validity indexes for the scale

f) Creating the final form according to the content validity rates/index criteria.

The Lawshe technique requires the opinions of at least 5 and at most 40 experts. Experts' opinions about the items are collected and content validity rates are calculated. The content validity rate (CVR) is obtained by subtracting 1 from the ratio of the number of experts expressing a “Necessary” opinion on any article to half of the total number of experts expressing an opinion on the article. (Yurdugul, 2005).

These 40 items were presented to the opinions of 2 classroom education experts, 2 measurement and evaluation experts and 3 Turkish language teaching experts. In line with the recommendations of experts, phrases that may be difficult to understand were changed and 1 item with a KVR value below .99 was removed from the scale. Thus, the first draft of the 39-item scale was created.

2.2.5. *Stage 5: Finalizing the item pool*

At this stage, it is decided whether to add items to the scale. In this study, after expert opinions, it was concluded that there was no need to add anything to the scale.

2.2.6. *Stage 6: Implementation*

Researchers have different opinions about the required sample size in scale development studies. Field (2005) stated that there should be at least 300 participants for EFA. However, there are also researchers who suggest that the sample size should be determined according to a certain multiple of the number of items. Kline (1994) suggested that there should be 2 times the number of items, MacCallum *et al.* (2001) 4 times, Bryman and Cramer (2004) 5 times, and Nunnally (1978) 10 times the number of participants. In this study, it was aimed to reach 5

times the number of participants for EFA and the data obtained from 205 participants were used. However, there are different opinions about the sample size required for CFA. Anderson and Gerbing (1984) stated that it should be larger than 100, Boomsma (1985) stated that it should be 100-200 participants, Jackson (2001) stated that it should be larger than 200, Stevens (2002) stated that it should be 5-10 participants for each item, De Winter *et al*. (2009) stated that it should be 3, 6, 20 participants for each item. In this study, data obtained from 248 participants were used for CFA. Çokluk *et al.* (2010) stated that meeting at least two of the sample size criteria specified in the literature is appropriate for scale development studies. In this study, the number of participants was reached in a way to provide two of the opinions stated separately for EFA and CFA.

2.2.7. *Stage 7: Analyzing the scale and finalizing the scale*

In the seventh stage, validity and reliability analyzes of the scale to be developed are performed. At this stage, information about the analyzes performed and the procedures performed during the analyzes is given. Studies conducted to ensure content validity for the Metacognitive Listening Strategies Teaching Self-Efficacy Scale for Teachers were included in the previous stages. Statistics should be used to ensure the construct validity of the scales (Yurdubakan, 2010). Exploratory and Confirmatory Factor Analysis were conducted to ensure the construct validity of the scale tried to be developed in this study.

In order to determine the discriminatory power of the scale, it was checked whether the difference between the lower group and upper group scores was significant. 27% of 205 participants correspond to 55 participants. The averages of the scores received by the participants were listed from highest to smallest, and then the scores of the group with 55 participants in the lower group and the group with 55 participants in the upper group were calculated by independent sample t-test analysis. As a result of the analysis, the difference between the two groups was found to be significant (p = .00). According to this result, it was seen that the scale items enabled the measurement of the feature that was intended to be measured.

The reliability study of the scale was conducted with Exploratory Factor Analysis, and it was decided whether the items in the scale would be removed or not. The factor load values of the items obtained in the Exploratory Factor Analysis were .30, which was accepted as the limit value (Büyüköztürk, 2020). In this study, .40 was determined as the limit value for item loads, and EFA examined whether there were any items with item loads below .40. Since there was no item with an item load below .40, no item was removed due to this criterion.

Using one of the rotation techniques in factor analyzes makes it easier to interpret the analysis (Osborne, 2015). If the number of factors is thought to be more than 2, it is more useful to use one of these orthogonal rotation techniques. If one of the orthogonal rotation techniques is to be used in social science studies, the varimax technique is generally used (Çokluk, Şekercioğlu & Büyüköztürk, 2010). In this study, the Varimax technique, one of the orthogonal rotation techniques, was used, considering that factorization would give a more conceptually meaningful result. After this rotation process, the scale revealed a 4-factor structure. The difference between the loading values of items on more than one factor should be higher than 0.10. As a result of the analysis, UST4, UST6, UST11, UST12, UST14, UST15, UST18 and UST35 were removed from the scale because they were included in more than one factor and the difference between the load values was less than 0.10. As a result of these procedures, the scale showed a structure consisting of 4 factors and 31 items. In this form, EFA was applied and KMO Test and Bartlett Test were calculated. In the EFA results, the KMO value is expected to be greater than .60 and the Bartlett Test is expected to be significant (Büyüköztürk, 2020).

Confirmatory Factor Analysis (CFA) of the scale was conducted with the data obtained from 248 participants. CFA is an attempt to prove the accuracy of a theoretically based scale, thanks to the collected data (Gürbüz, 2021; Weston & Gore, 2006). In order to determine whether a

scale model is appropriate or not, it must meet certain criteria as a result of CFA. As a model, CFA differs from Exploratory Factor Analysis in that it starts from a theoretical basis (Byrne, 2001; Schreiber *et al.*, 2006).

The criteria required to determine the suitability of the model in CFA are based χ^2/df, Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Root Mean Square Residual (RMR), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Incremental Fit Index (IFI) and Relative Fit Index (RFI) values. In the literature, researchers have expressed different opinions about the fit indices that should be looked at to determine fit (Baumgartner & Homburg, 1996; Bentler, 1980; Bentler & Bonett, 1980; Kline, 2015; Marsh *et al.*, 2006; Schermelleh, Moosbrugger, & Müller, 2003). These fit indices were taken as criteria for the fit of the model during CFA. Low factor loadings of the items may cause the reliability coefficient of the model to decrease. In such cases, removing the items would be a healthier method (Gürbüz, 2021).

Following the analyses, items with low item factor loadings (UST5, UST7, UST8, UST9, UST10, UST13, UST34 and UST39) were removed from the scale. Additionally, modifications must be made from time to time to ensure the compatibility of the model. The fewness of these modifications are important and affect reliability. Items that caused an increase in modifications and affected the fit of the model (UST16, UST 17, UST19, UST27, UST28, UST31, UST33) were also removed from the scale.

According to Gürbüz (2021), when an item or factor is removed as a result of CFA, EFA can be performed again, and the validity and reliability analyzes of the scale can be done again. Since item removal was in question in this study, Cronbach Alpha values and factor analyzes were re-done to calculate the internal consistency reliability of the scale to ensure structural reliability.

In the study, SPSS 25 program was used for Exploratory Factor Analysis and AMOS program was used for Confirmatory Factor Analysis. For EFA, Kaiser-Mayer-Olkin (KMO) test, Barlett test, total variance, item-total correlation, common factor variance, and factor loadings statistics were performed. While conducting CFA, researchers agree on reporting the χ^2/df value (İlhan & Çetin, 2014). In addition, McDonald and Ho (2002) suggested that CFI, GFI, NFI and NNFI (TLI) should be reported, Brown (2006) suggested that RMSEA, SRMR, CFI and NNFI (TLI) should be reported, and Iacobucci (2010) suggested that CFI and SRMR values should be reported. In the light of these opinions, RMSEA, SRMR, RMR, NFI, NNFI, CFI, GFI, AGFI, IFI, RFI, CR, AVE, MSV and ASV values and Cronbach Alpha were calculated in order to determine the convergent and divergent validity of the scale along with model fit.

3. RESULTS

KMO value and Barlett Sphericity Test, scale total variance and Cronbach's Alpha value were analyzed for the Self-Efficacy Scale for Teaching Metacognitive Listening Strategies for Teachers and presented in Table 2. The Scree Plot graph of the scale is shown in Figure 1.

Table 2. *KMO and Barlett Sphericity test results.*

KMO Sample Suitability Measure		.915
Barlett's Test of Sphericity	Chi-Square	2613.551
	fd	.120
	p	.000

Figure 1. *AFA scree plot graphic.*

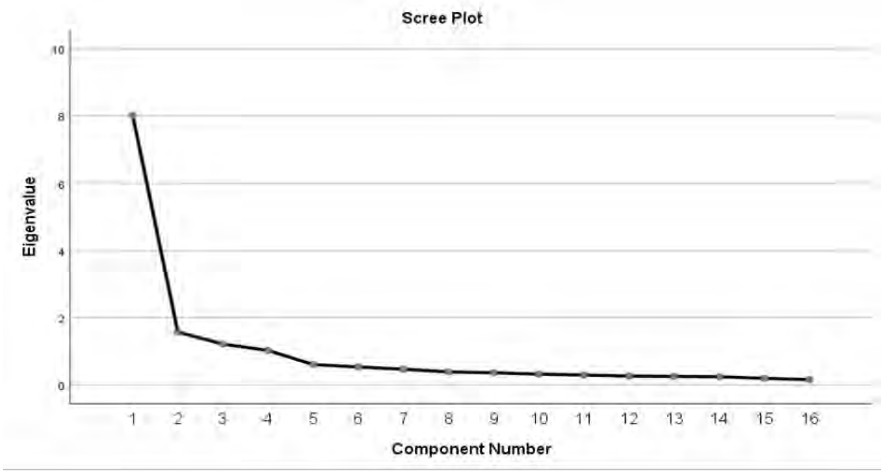

Table 3. *Rotated components table.*

Item	Factors			
	Factor 1	Factor 2	Factor 3	Factor 4
UST1			.821	
UST2			.870	
UST3			.738	
UST20		.793		
UST21		.749		
UST22		.733		
UST23		.687		
UST24		.589		
UST25	.722			
UST26	.834			
UST29	.838			
UST30	.772			
UST32	.799			
UST36				.574
UST37				.864
UST38				.809

After the analysis, the KMO value of the Metacognitive Listening Strategies Teaching Self-Efficacy Scale for Teachers was .915 and the Bartlett Sphericity Test result was significant (p = .00). According to Table 3 items of the scale, which has a 4-factor structure, had values between .574 and .870.

Table 4. *Reliability and total variance table.*

Factor	Cronbach Alpha	Explained Variance	General Cronbach Alpha	Total Explained Variance
Forecasting	.803	%15.07	.932	%74.10
Planning	.839	%13.41		
Monitoring	.917	%25.58		
Evaluation	.885	%20.02		

According to Table 3, as a result of the reliability and validity analysis, it was determined that the scale consists of 4 factors and 16 items. According to the expressions in the articles, the

factors are named Forecasting, Planning, Monitoring and Evaluation. The Cronbach Alpha value of the scale was found to be .803 for the Forecasting factor, .839 for the Planning factor, .917 for the Monitoring factor and .885 for the Evaluation factor. The Cronbach Alpha value of the overall scale is .932. According to Table 4, it was determined that the scale explained 74.10% of the total variance. This value is 15.07% for the Forecasting factor, 13.41% for the Planning factor, 25.58% for the Monitoring factor and 20.02% for the Evaluation factor.

Sample items from some factors.

Forecasting- UST2- I think I can do the activities to be done during listening.

Plannig-UST37- I think that designing metacognitive activities requires a systematic approach.

Monitoring- UST25- I can create listening activities for teaching metacognitive listening strategies.

Evaluation- UST22- I can guide my students to think about what they would do differently the next time they listen.

After CFA analyses, the values of the scale according to various indices and its fit status are given in Table 5.

Table 5. *CFA Results of metacognitive listening strategies instruction self-efficacy scale for teachers.*

Indexes	Perfect Fit Criterion	Acceptable Fit Criterion	Scale Indexes	Compliance Status
χ^2/df	0-2.5	2.5-3	2.09	Perfect
RMSEA	≤05	≤08	.069	Acceptable
SRMR	≤05	≤08	.0513	Acceptable
RMR	≤05	≤08	.027	Perfect
NFI	≥95	≥90	.922	Acceptable
NNFI	≥95	≥90	.945	Acceptable
CFI	≥95	≥90	.956	Perfect
GFI	≥90	≥85	.907	Perfect
AGFI	≥90	≥85	.869	Acceptable
IFI	≥95	≥90	.956	Perfect
RFI	≥95	≥90	.902	Acceptable

It was concluded that the chi-square fit value (χ^2=209.361, df=96, p=.00) of the Metacognitive Listening Strategies Teaching Self-Efficacy Scale for Teachers was significant. The χ^2/df value for model fit is 2.09. It can be said that this value represents perfect fit (Kline, 2015). The RMSEA value of the scale is .069. This value represents acceptable fit. The SRMR value was calculated as .0513 and this value indicates acceptable fit. GFI and AGFI values close to 1 indicate perfect fit (Raykov & Marcaoulides, 2006). After the analysis, the GFI value of the scale is .907 and the AGFI value is .869. These values indicate perfect fit for GFI and acceptable fit for AGFI. NFI and CFI values being close to 1 indicate perfect fit (Kline, 2015; Raykov & Marcaoulides, 2006). The NFI value of the scale was calculated as .922 and the CFI value was .956. These values indicate acceptable fit for NFI and perfect fit for CFI. According to the results given in Table 5, as a result of the CFA performed on the specified sample, 6 of the findings obtained from the scale were determined to be acceptable and 5 of them to indicate perfect fit. Figure 2 shows the fit diagram of the scale.

Convergent validity expresses the relationships of the items with each other and the factors they form. Divergent validity refers to the low relationship of the items with other factors. CR, which expresses the combined reliability, and AVE, which expresses the average variance explained, are important to ensure the convergent validity of the scale (Hair *et al.*, 2014). According to Table 6, for each factor in the scale, the CR value is expected to be ≥ .70, the AVE value to be

≥.50, and the CR value to be greater than the AVE value (Fornell & Larcker, 1981). The fact that the CR value is greater than the AVE value for all factors in the scale indicates that the convergent validity of the scale is achieved.

Figure 2. *CFA Diagram of the scale.*

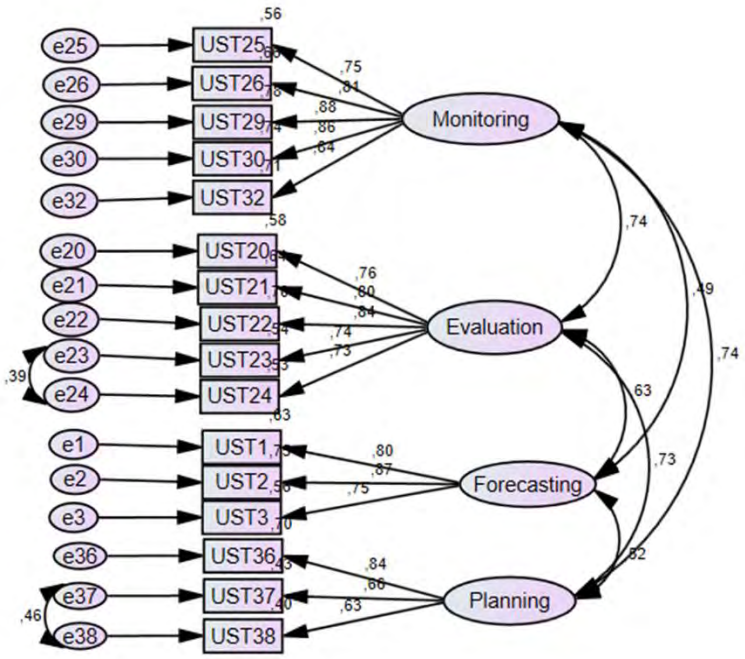

Table 6. *Convergent validity values of metacognitive listening strategies instruction self-efficacy scale for teachers.*

Factor	CR	AVE
Monitoring	.916	.688
Evaluation	.881	.549
Planning	.758	.515
Forecasting	.844	.645

CR: Composite Reliability/AVE: Average Variance Extracted

For divergent validity, MSV and ASV values need to be calculated. MSV, which expresses the Square of Maximum Shared Variance, is the square of the highest variance that a factor shares with one of the other factors. ASV, which expresses the Average of the Square of Shared Variance, is the sum of the squares of the variance shared by a factor with other factors, divided by the number of shared variances. To ensure divergent validity, MSV<AVE, ASV<MSV and the square root of AVE must be greater than the correlation between factors (Yaşlıoğlu, 2017). According to Table 7, it can be said that the scale provides divergent validity because it meets all these conditions.

Table 7. *Divergent validity values of metacognitive listening strategies instruction self-efficacy scale for teachers.*

Factors	Correlation Between Factors	MSV	ASV	Square Root AVE
Monitoring-Evaluation	.749	.561	.445	.8
Monitoring-Forecasting	.727	.528	.397	
Monitoring-Planning	.494	.244	.291	
Evaluation-Forecasting	.714	.509	.242	
Evaluation - Planning	.618	.381	.140	
Planning-Forecasting	.567	.321	.064	

MSV: Maximum Squared Variance/ ASV: Average Shared Square Variance

4. DISCUSSION and CONCLUSION

Listening skill is a skill that begins to develop in the womb and continues to develop throughout an individual's life. The limited number of studies on the development of listening skills over time has caused it to be perceived as a neglected skill. Metacognitive listening strategies are important for individuals in terms of monitoring the development of the learning process and guiding new learning. The use of metacognitive listening strategies can enable students to learn and develop their listening skills under their own control. Teaching these strategies by teachers at school will ensure that this development is rapid and planned. In this study, an attempt was made to develop a valid and reliable scale that can determine teachers' self-efficacy levels in teaching these strategies by developing the Metacognitive Listening Strategies Teaching Self-Efficacy Scale for Teachers. Following the literature review, measurement tools for measuring the metacognitive skills of students and teacher candidates were found (Melanlıoğlu, 2011; Okur & Azizoğlu, 2016; Topaç, 2019), but a measurement tool for determining the self-efficacy levels of teachers in teaching metacognitive listening strategies could not be found. Following these scales and literature review, an item pool consisting of 40 items was created. After the content validity study conducted with the Lawshe technique, one item was removed from the scale and the first draft of the scale consisting of 39 items was prepared.

EFA was performed on the scale with the data collected with the participation of 205 teachers, and after the analysis, 8 items that were included in more than one factor were removed from the scale. The item load limit for the items in the scale was determined as .40. Since it was seen that there was no item below this value, no item was removed from the scale due to the item load value. In the EFA results, the KMO value is expected to be greater than .60 and the Bartlett Test is expected to be significant (Büyüköztürk, 2020). In this form, the scale showed a structure consisting of 4 factors and 31 items.

Gürbüz (2021) stated that it would be appropriate to remove items or factors from the scale if necessary to ensure fit in the scale model. Therefore, 15 items that disrupted the fit in the CFA analyses were removed from the scale. After these procedures, the KMO and Barlett Sphericity Test results of the scale were examined again. The KMO value was .915 and Barlett's Test of Sphericity was significant (p=.00). The scale showed a structure consisting of 4 factors and 16 items. Scale items had item loadings between .574 and .870. The Cronbach Alpha value for the Forecasting factor of the scale was .803, .839 for the Planning factor, .917 for the Monitoring factor and .885 for the Evaluation factor. The Cronbach Alpha value of the overall scale is .932. After the analysis, it was determined that the scale explained 74.10% of the total variance. This value is 15.07% for the Forecasting factor, 13.41% for the Planning factor, 25.58% for the Monitoring factor and 20.02% for the Evaluation factor.

CFA was conducted on the scale with the data collected with the participation of 248 teachers. Within the framework of the opinions in the literature about the fit indices required to determine fit, χ^2/df, RMSEA, SRMR, RMR, NFI, NNFI, CFI, GFI, AGFI, IFI and RFI values were taken as basis to determine the suitability of the model (Baumgartner & Homburg, 1996; Bentler, 1980; Bentler & Bonett, 1980; Kline, 2015; Marsh *et al.*, 2006; Schermelleh *et al.*, 2003). The χ^2/df, RMSEA, SRMR, RMR, NFI, NNFI, CFI, GFI, AGFI, IFI and RFI values of the scale were calculated with CFA and it was determined that 6 of these values were acceptable and 5 were perfect fit. To determine the convergent validity of the scale, CR and AVE values for each factor were calculated. It was concluded that the CR value was greater than .70 for each factor, the AVE value was greater than .50 for each factor, and the CR value was greater than the AVE value for all factors. Accordingly, it can be said that the scale provides convergent validity. MSV and ASV values of the scale were calculated for divergent validity. To ensure divergent validity, MSV<AVE, ASV<MSV and the square root of AVE must be greater than the correlation between factors (Yaşlıoğlu, 2017). After the calculations, it can be said that the scale provides divergent validity.

Haghighi, Rashtchi, and Birjandi (2019) concluded that the scale they developed to determine students' metacognitive awareness had a 3-factor structure as Planning, Monitoring and Evaluation. The scale developed in this study showed a 4-factor structure. However, Planning, Monitoring and Evaluation factors are present on both scales. Kaplan and Duran (2016) stated that the scale named Mathematical Metacognition Awareness Inventory Towards Middle School Students consists of Mathematical Knowledge, Mathematical Monitoring and Mathematical Determination factors. Although the number of factors is different, the Mathematical Monitoring and Mathematical Determination factors are similar to the Monitoring and Evaluation factors. The scale developed by Nix (2016) to determine students' metacognitive awareness showed a 2-factor structure. Another scale developed to measure students' metacognitive awareness, MALQ, showed a five-factor structure (Vandergrift, Goh, & Mareschal, 2006). The scale prepared for university students learning a foreign language consists of Problem-solving, Planning and Evaluation, Translation, Person Knowledge, and Directed Attention factors. Although the number of factors is not the same, the Planning and Evaluation factor is also included in the scale developed in this study. Thomas, Anderson, and Nashon (2008) developed the SEMLI-S scale consisting of 30 items and 5 factors to determine students' metacognitive self-efficacy. Although it has more factors, it is similar to this scale in terms of the factor MEP (Monitoring, Evaluation, Planning) among the factors Cognitive Connectivity, MEP (Monitoring, Evaluation, Planning), Self-efficacy, Learning Risks Awareness and Control of Concentration. Hameed and Cheruvalath (2021) developed the MSI scale consisting of 12 items and one factor. The scale developed in this study is not compatible with MSI. Okur and Azizoğlu (2016) adapted the Metacognitive Listening Strategies Instrument (MLSI) into Turkish to determine the metacognitive skills of pre-service teachers and determined a structure consisting of 11 items and 3 factors. Among the 3 factors consisting of Attention, Planning and Evaluation and Problem-solving", the Planning and Evaluation factor is similar to our scale. The number of participants in these developed scales varies between 300 and 500. Our scale study is compatible with other scales in this respect.

In its final form, the scale showed a structure consisting of 4 factors and 16 items. The factors include metacognitive strategies of forecasting, planning, monitoring and evaluation. These sub-factors reveal teachers' self-efficacy levels in teaching these strategies. There are no reverse items in the scale. Therefore, the higher the average scores obtained from the scale, the higher the self-efficacy level. Factors can be examined in terms of the variable to be used in studies, and comments can be made about changes in self-efficacy levels according to these variables.

The concept of metacognition has been examined over time and studies on this subject are still continuing. The scale developed in this study was tried to be developed in the light of the studies carried out so far. The scale can be further developed with the contributions of future studies. However, studies can be conducted with different sample groups other than the sample group in this study. According to these results, it can be said that the Metacognitive Listening Strategies Teaching Self-Efficacy Scale for Teachers is a valid and reliable scale.

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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**: Amasya University, E-30640013-108.01-108629.

Contribution of Authors

Murat Ermiş: Literature review, Investigation, Methodology, Item writing, Data collection, Receiving experts' opinions, Writing-original draft and Statistical analysis. **Şafak Uluçınar Sağır**: Data collection, Supervision and Critical review.

Orcid

Murat Ermiş https://orcid.org/0000-0002-8803-0612
Şafak Uluçınar Sağır https://orcid.org/0000-0003-3383-5330

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