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Development of Critical Media Literacy Scale for Primary School Students

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Abstract

As the internet and social media have become increasingly widespread, critical media literacy and the ability to measure this skill from an early age have become increasingly important. In Turkey, no valid and reliable measurement tool suitable for this age group has been found. For this reason, in this study, it was aimed to develop a critical media literacy disposition scale for 3rd and 4th grade primary school students. For this purpose, a literature review was conducted to develop a draft scale, an item pool was created, expert opinion was sought, a pilot application was conducted, EFA was conducted with 344 students, CFA was conducted with 541 students, and internal consistency coefficients of the items in the scale were calculated. With the completion of these stages, the scale consisted of 12 items and two dimensions, 7 of which were critical media reading (CMR) and 5 of which were critical media writing (CMW). As a result, EFA and CFA analyses show that the scale is valid. The reliability value of the CMR dimension of the scale was calculated as 82.5 and the reliability value of the CMW dimension was calculated as 79.4. The reliability coefficient of the total scale was calculated as 87.2. These coefficients show that the scale has a reliable structure.

Keywords: media, media literacy, critical media literacy, primary school.

1. Introduction

It has been found that false information spreads six times faster than true information on social media (Aimeur et al., 2023; Vosoughi et al., 2017). In a study conducted by Vosoughi et al. (Vosoughi et al., 2017), it was discovered that while the first 1 % of fake news reaches between 1,000 and 100,000 people, true news rarely reaches more than 1,000 people. This situation leads to individuals, particularly children, being exposed to false or dangerous content (such as viruses, spam, unwanted pop-up windows, fraud, harassment, bullying, sharing of private life, advertisements, etc.) (Bibizadeh et al., 2023; Fedorov et al., 2022).

On the one hand, the number of false and fake news and information sharing on social media is rapidly increasing, while on the other hand, the number of internet-addicted individuals (especially children and young people) is growing daily. To protect children and young people from the negative effects of the internet and social media,it is essential to shield them from these dangers. However, the way to protect them from the harmful effects of media is not to completelyisolate them from this environment, but to equip them with critical media literacy skills. Additionally, it is necessary to measure and evaluate the training provided, both to receive feedback and to use it in academic studies. For this purpose, measurement tools with proven validity and reliability are required.

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When examining the scales developed for critical media literacy in Turkey, the Digital Literacy Scale for primary school students (Şahin et al., 2022), the Media Literacy Scale for 36-72 month-old children (Kadan, Aral, 2020), the Media Literacy Skills Scale for general media users (Erişti, Erdem, 2017), the Media Literacy Rubric (Çocuk, Uzun, 2018), the Media Literacy Teacher Efficacy Scale (Kaplan, 2017), the Sugary Drinks Media Literacy Scale (Demir, Bektaş, 2021), the Media Literacy Scale Sensitive to Entertainment Purposes for secondary school students (Ulu Aslan, Baş, 2022), and the Digital Literacy Scale for secondary schools (Avinç, Doğan, 2024) have been developed. There are also some scale development studies conducted outside of Turkey (Ashley et al., 2013; Chang et al., 2011; Literat, 2014). However, these scales are generally suitable for middle school and older age groups. Literature review has been conducted, but no critical media literacy disposition scale specifically developed for primary school students has been found.This study is expected to contribute to addressing this gap in the field.

In this framework, the study sought to answer the following sub-problems:

– Do the results of the exploratory and confirmatory factor analyses of the Critical Media Literacy Scale developed for 3rd and 4th grade primary school students meet the validity criteria?

– Does the Critical Media Literacy Scale developed for 3rd and 4th grade primary school students meet the reliability criteria?

2. Materials andmethods

In this study, it was aimed to develop a critical media literacy disposition scale with validity and reliability for 3rd and 4th primary school students. The study was designed in cross-sectional survey model. In the cross-sectional survey model, the researcher tries to collect data from a group for a single time in a certain period of time (Christensen et al., 2015).

Participants

The participants of the scale development process consisted of three groups. The first group consisted of 30 students to whom the draft scale was piloted. The second group consisted of 344 students for whom exploratory factor analysis was conducted. The third group was a group of 541 students for which confirmatory factor analysis was conducted. Information about the participants is given in tables (Tables 1–3).

Table 1. Participants subjected to the pilot study

Variables	*Categories*	*F*	*%*
Gender	Male	14	46,7
	Girl	16	53,3
Class level	3rd grade	15	50
	4th grade	15	50
Total		30	100

Among the students in the pilot study group, 14 (46.7 %) were male and 150 (53.3 %) were female. Fifteen (50 %) of the students were 3rd graders and 15 (50 %) were 4th graders.

Table 2. Participants who underwent EFA

Variables	*Categories*	*F*	*%*
Gender	Male	194	56,4
	Girl	150	43,6
Class level	3rd grade	174	50,6
	4th grade	170	49,4
Total		344	100

Among the students in the study group applied for EFA, 194 (56.4 %) were male and 150 (43.6 %) were female. 174 (50.6 %) of the students were 3rd graders and 170 (49.4 %) were 4th graders.

Table 3. Participants who underwent CFA

Variables	*Categories*	*F*	*%*
Gender	Male	268	49,5
	Girl	273	50,5
Class level	3rd grade	221	40,9
	4th grade	320	59,1
Total		541	100

Among the students in the study group applied for CFA, 268 (49.5 %) were male and 273 (50.5 %) were female. Of the students, 221 (40.9 %) were 3rd graders and 320 (59.1 %) were 4th graders.

Scale Development Process

The development of the critical thinking disposition scale involved the following steps: (a) creation of the item pool, (b) obtaining expert opinions on the items, (c) pilot implementation, (d) data collection and analysis for exploratory factor analysis, (e) data collection and analysis for confirmatory factor analysis, (f) reliability analysis, and (g) reporting.

Creation of the Item Pool

To create the item pool, a comprehensive literature review was first conducted. Relevant sources were examined, and definitions and explanations regarding critical media literacy were explored. Subsequently, an item pool was developed based on the dimensions deemed important by experts on critical media literacy. The items considered for inclusion in the scale, along with their equivalents in the literature, were compiled into a spreadsheet (Arısoy, 2009; Aufderheide, 1993; Ausat, 2023; Bawden, 2001; Bostancı, 2023; Çakmak, Müezzin, 2018; Çiftçi, 2018; Güney, 2017; Horowitz-Kraus, Hutten, 2018; Kargın, Demir, 2023; Kartal, 2007; Korkmaz, Yeşil, 2011; Literat, 2014; Okur-Berberoğlu, 2015; Özdemir, 2021; RTÜK, 2024; Savcı, Aysan, 2017; Smith, 2016; Solmaz, Yılmaz, 2012; Uyar, Asrak Hasdemir, 2023; Treske, 2007; Yıldırım, 2019; Young, 2004). The initial draft item pool comprised 30 items. Efforts were made to ensure that the scale items were designed to measure characteristics of critical media reading and writing, consistent with the study's objectives. The scale utilized a Likert-type format with three response options: (1) never, (2) sometimes, and (3) always, to be more suitable for 3rd and 4th grade primary school students. Keywords were labeled to facilitate item classification.

Receiving Expert Opinion

Following the creation of the draft scale, expert opinions were sought to evaluate the content validity of the scale and its suitability for measuring critical media literacy disposition. The draft item pool was reviewed by two groups of experts. The first group consisted of two experienced teachers with master's degrees in classroom teaching who instruct 3rd and 4th grade students. They assessed whether the items were appropriate for these grade levels and whether the students comprehended the items correctly. The second group included two academicians with doctoral degrees in the field of classroom teaching. Based on the feedback from both groups, 10 items were removed due to concerns related to the appropriateness of the statements for the target age group, item length, comprehensibility, and overall number. Revisions were made to 4 items while maintaining content validity. The revised scale contained 20 items and encompassed two dimensions: media reading (Aufderheide, 1993; Bawden, 2001; Hobbs, 2006; Kartal, 2007; Malik, 2008; RTUK, 2024) and media writing (Aufderheide, 1993; Hobbs, 2006; Malik, 2008; RTUK, 2024; Solmaz, Yılmaz, 2012; Uyar, Asrak, 2023).

Pilot Implementation

The draft scale was initially administered to a sample of 30 students. During this pilot phase, any difficulties that students encountered in understanding the items were noted. Based on these observations, while the number of items remained unchanged, some items were simplified.

Exploratory Factor Analysis

Following the pilot study, the finalized scale was administered to a sample of 344 students for exploratory factor analysis.

Confirmatory Factor Analysis

Subsequent to the exploratory factor analysis, confirmatory factor analysis (CFA) was conducted on the scale. For CFA, the scale was administered to 541 students from various schools.

Inter-Dimensional Correlation and Reliability Analysis

Pearson correlation analysis was performed to assess whether the binary correlations between dimensions posed a multicollinearity issue. Item-total correlation coefficients and Cronbach's alpha internal consistency reliability coefficients were calculated to determine the reliability of the scale items.

3. Discussion

Media Categorization and Impact

Media can be broadly classified into traditional and new media tools. Traditional media tools include television, radio, and newspapers, which have a longer historical presence, while new media tools encompass platforms such as YouTube, Instagram, and Facebook (Yılmaz, 2020). The significance of new media tools, particularly social media, is increasing rapidly. Between 2023 and 2024, 97 million new individuals began using the internet, resulting in a 1.8 % increase in the total number of internet users. As of now, global internet users have reached 5.35 billion, indicating that over 66 % of the global population is online. Moreover, the number of actively used social media accounts exceeds 5 billion, corresponding to 62.3% of the world's population (Datareportal, 2024).

The extensive reach of media presents both benefits and challenges. One notable issue is internet addiction. In the virtual realm, individuals often create idealized personas, seeking increased followers. The brain perceives more likes and shares as rewards, which can lead to addictive behaviors (Burhan, Moradzadeh, 2020; Kargın, Demir, 2023; Westbrook et al., 2021).

Several studies highlight that new media tools can lead to significant problems regarding the mental health of young people. Health issues such as sleep disorders and a sedentary lifestyle are associated with media use (Keleş et al., 2019). Additionally, maintaining multiple social media accounts can contribute to mental health disorders (Rosen et al., 2013). The need to manage time across several platforms and adhere to their specific demands can induce anxiety. Excessive use of social media has also been linked to increased bullying behaviors (Demircioğlu, Akar, 2024). Conversely, social media has facilitated the rise of 'phenomena', individuals with substantial followings recognized through these platforms (De Veirman et al., 2017; Djafarova, Rushworth, 2017). Some phenomena achieve extraordinarily high follower counts (Smith, 2006) and exert considerable influence on children and adolescents, with effects that can be both positive and negative. Notably, idealized and unrealistically perfect personas can negatively impact individuals (Kotsonis, Dunne, 2024).

While research indicates various adverse effects associated with new media, it also suggests that this medium is often not utilized effectively. Despite growing up in the digital era, many students struggle with essential digital skills such as information searching and evaluation (Avinç, Doğan, 2024). This underscores the importance of acquiring media literacy skills, particularly for children and adolescents. Media literacy is increasingly recognized as a critical 21st-century skill (Eyal, Te'eni-Harari, 2023; Snavely, Cooper, 1997).

Media Literacy and Its Relationship with Critical Thinking

Media literacy aims to cultivate an awareness that enables individuals to accurately comprehend media content and critically evaluate it (Martin, Grudziecki, 2006; Walther et al., 2014). In this context, there are significant overlaps between media literacy and critical thinking, with both competencies recognized as essential 21st-century skills (Xie et al., 2019). Critical thinking, historically referred to as wisdom, involves the capacity to make objective, purposeful, logical, applicable, realistic, and goal-oriented judgments free from bias, based on one's knowledge, experience, and research (Ennis, 1993; Li, 2023; Lipman, 2003; Mazer et al., 2007; Paul, Elder, 2001). Media literacy is defined as "the ability to access, analyze, evaluate, and communicate messages in various forms" (Aufderheide, 1993). Another definition of media literacy is "the ability to access various types of media messages (visual, auditory, printed, etc.), to critically analyze and evaluate the accessed media, and to produce one's own media messages" (RTÜK, 2024). As evidenced, both critical thinking and media literacy involve common skills such as thinking, questioning, analyzing, evaluating, and generating new ideas or products. Thus, it is essential to teach media literacy within the framework of critical media literacy.

4. Results

In this part of the study, EFA, CFA, item total correlation coefficients and reliability findings of the critical media literacy disposition scale are presented.

Exploratory Factor Analysis (EFA) Results

First, exploratory factor analysis was conducted to determine whether the measurement tool formed the expected dimensions. The purpose of EFA is to understand and reduce many items in the draft scale to latent constructs that represent the main dimensions of the scale (Field, 2009).

Before the exploratory factor analysis, the KMO (Kaiser Mayer Olkin) coefficient was calculated to test whether the data were suitable for EFA (Tabachnick, Fidell, 2013). Since the KMO coefficient was above .70 (.906), the analysis was deemed appropriate (Büyüköztürk, 2011). One of the analysis types to be considered in EFA is Barlett's Test of Sphericity. The test assumes that the sampling adequacy in the study group is at a certain degree and significance level (Sipahi et al., 2010). The coefficient of Barlett's Test of Sphericity was calculated as [$\chi(344)= 1372.578$; $p=0.00$] and found to be significant (Brace et al., 2003).

After the prerequisites for EFA were fulfilled, the items were rotated with 9999 iterations of the Varimax Rotation technique. 8 items in the draft scale consisting of 20 items were removed from the scale because the item was not suitable for the relevant factor, the item was included in many factors and the factor loading of the item was below 0.45. As such, the scale was reduced to 12 items, 7 of which were critical media reading (CMR) and 5 of which were critical media writing (CMW) (Büyüköztürk, 2011; Sipahi et al., 2010). As a result of EFA, it was concluded that the scale was combined into two factors.

The scree plot showing how many dimensions the scale consists of is given in (Figure 1).

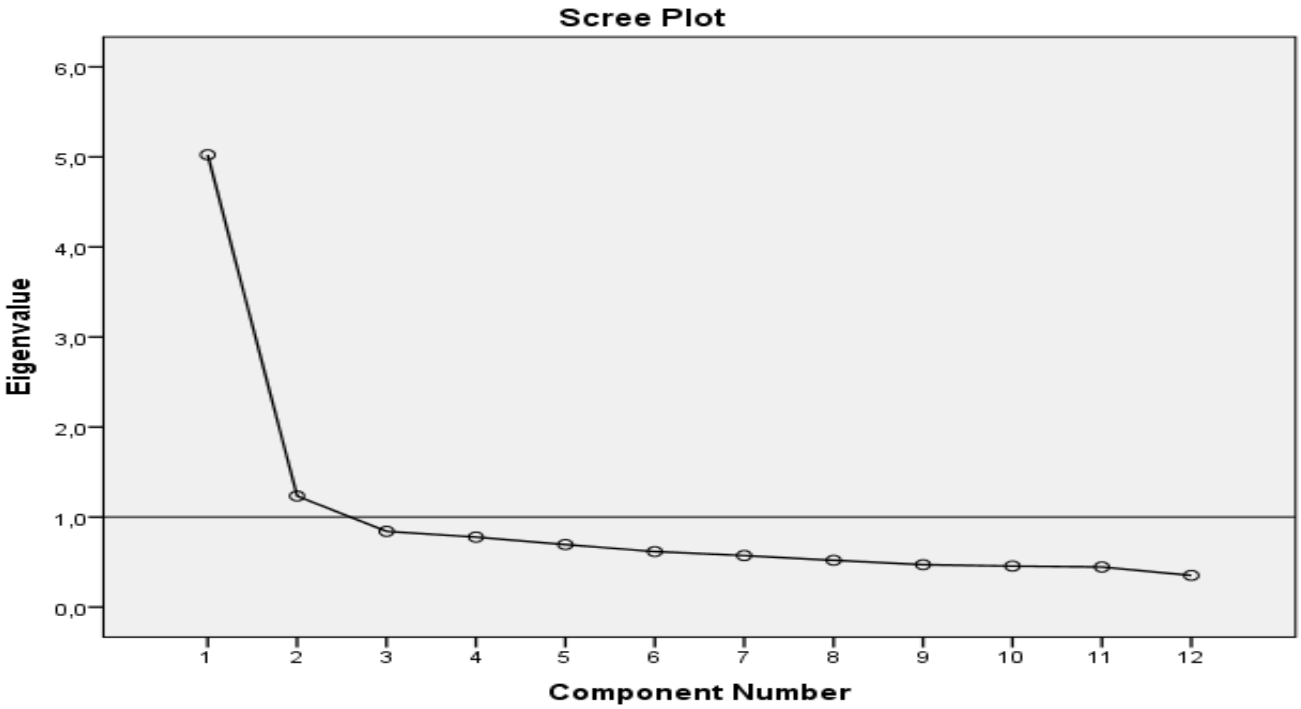

Fig. 1. Scree plot

Scree plot graph shows that the scale has 2 dimensions.

The results of the EFA Varimax Perpendicular Rotation technique analysis are given in Table 4.

Table 4. Factor structure analysed by varimax rotation technique

	1	2
3. When I see or hear information from the media, I research the subject from different sources and try to understand it.	,730	
5. I investigate whether the information in the media is reliable.	,686	
1. I try to learn new and different information from the media	,682	
6. I pay attention to whether the information given in the media	,653	

	1	2
contradicts each other.		
2. I try to understand the information I get from the media correctly.	,633	
7. I wonder whether the person providing information in the media is an expert on that subject or not.	,618	
8. I wonder and question whether the information I see and hear in the media is true or not	,612	
20. When I share something in the media, I am careful not to advertise any person, organization or thing.		,763
16. I take care not to share personal (private) information and images of others in the media without permission		,687
19. I try to be impartial when sharing something in the media.		,683
14. I try not to insult or badmouth anyone in the media.		,678
15. I make sure that the content I share in the media is appropriate for the group I target.		,668
Variance explained: (Total: 52.2)	41.9	10.3
Eigenvalue	5.02	1.23

Exploratory factor analysis was conducted using Varimax vertical rotation technique. Since the factor loading was limited to .45, items below .45 were excluded from the analysis. EFA results show that the scale has two dimensions with eigenvalues greater than 1 and representing 52.2 % of its variance. In addition, the scree plot shows how many factors were included in the scale. The explained variance values for the dimensions are 41.9 % for CMR and 10.3 % for CMW, respectively. The factor loadings of the items vary between .612 and .763.

After the results of the exploratory factor analysis, correlation analysis was performed to determine whether there was a multicollinearity problem between the dimensions. The findings are given in (Table 5).

Table 5. Descriptive statistics and correlations of critical media literacy dispositions

Size		N	Number of items	Min	Max	Mean	Ss	Correlation coefficient between dimensions
a.	Media reading	344	7	7	21	16.5	3.2	,612**
b.	Media writing	344	5	5	15	12.8	2.4	
Total		344	12	12	39	29,3	5.03	

Pairwise correlations between dimensions below .85 indicate that there is no multicollinearity problem (Litch, 1998). The findings show that the correlation coefficients are below this reference value.

Item-Total Correlation and Reliability Findings

After the validity studies of the scale, item-total correlation coefficients and internal consistency reliability were calculated to determine the reliability of the items in the current scale. Statistical information about the data analysis related to reliability is given in (Table 6).

Table 6. Item total correlation coefficients and reliability coefficients

Dimensions	Items	Item-Total Correlation	Reliability Coefficient
Critical Media Reading	s1	,469	82.5
	s2	,528	
	s3	,570	
	s5	,618	
	s6	,585	
	s7	,568	

Dimensions	Items	Item-Total Correlation	Reliability Coefficient
	s8	,586	
Critical Media Writing	s14	,621	79.4
	s15	,665	
	s16	,493	
	s19	,528	
	s20	,485	
Total			87,2

The media literacy scale is reliable since item-total correlations for all dimensions are above .25 and internal consistency coefficients are above .60 (Field, 2009). The reliability coefficient of the entire scale was found to be .87.2.

CFA Analysis Results

In confirmatory factor analysis, some fit indices are used to determine whether the tested model is compatible with the research data. The fit indices give a value regarding whether the tested model is acceptable or not. The research data related to the indices are expected to be between the lower and upper values. Index values between these values indicate that the model is acceptable (Kline, 2011). Apart from $\chi 2$/df reporting, there is no consensus on which of the CFA fit indices should be reported (İlhan, Çetin, 2014). Since the chi-square significance level is affected by the sample size, it is recommended to use chi-square/degree of freedom (Şimşek, 2007). For other indices, McDonald, Ho (McDonald, Ho, 2002) suggested reporting CFI, GFI, NFI and NNFI (TLI) values, Garver, Mentzer 1999 (Garver, Mentzer, 1999) suggested reporting RMSEA, CFI and NNFI (TLI) values, (Brown, 2006) suggested reporting RMSEA, SRMR, CFI and NNFI (TLI) values and Iacobucci, (Iacobucci, 2010) suggested reporting CFI and SRMR values. In this study, chi-square/sd, GFI, AGFI, IFI, CFI and RMSEA indices were analysed. The findings are presented in (Table 7).

Table 7. Comparison of detected measurement values and reference fit index values

	Measurement values	Perfect fit	Acceptance can be adapted	Compliance quality
CMIN	137,518			
Sd	51			
CMIN/sd	2,696	0≤χ2 /df≤2	2≤χ2 /df≤3	Acceptable
P	,000	.05>		Not suitable
GFI	.958	0.95≤GFI≤1.00	0.90≤GFI≤0.95	Perfect
AGFI	,936	0.90≤AGFI≤1.00	0.85≤AGFI≤0.90	Perfect
IFI	, 970	0.95≤IFI≤1.00	0.90≤IFI≤0.95	Perfect
CFI	, 970	0.97≤CFI≤1.00	0.95≤ CFI≤0.97	Perfect
TLI	,920	0.95≤IFI≤1.00	0.90≤IFI≤0.95	Acceptable
RMR	0,33	005 > RMR	.06 ≤ RMR ≤.08	Perfect
RMSEA	,057	0≤RMSEA≤0.05	0.05≤RMSEA≤0.08	Acceptable

Source: Byrne, 2010; Blunch, 2008

The fit index values obtained from CFA were calculated as$\chi 2/df$= 137.518, GFI=.958, AGFI=.936, IFI= .970, TLI= .920, CFI=.970, RMR= 0.33 and RMSEA=.057. It shows that the overall fit index ($\chi 2/df$) of the tested model is within the acceptable fit range. A value below 3 indicates acceptable fit and a value below 2 indicates good fit (Bryne, 2010; Schermelleh-Engel et

al., 2003). According to the fit index value ranges,$\chi 2/df$, TLI and RMSA values have acceptable values, while GFI, AGF, IFI and CFI values have excellent fit values.

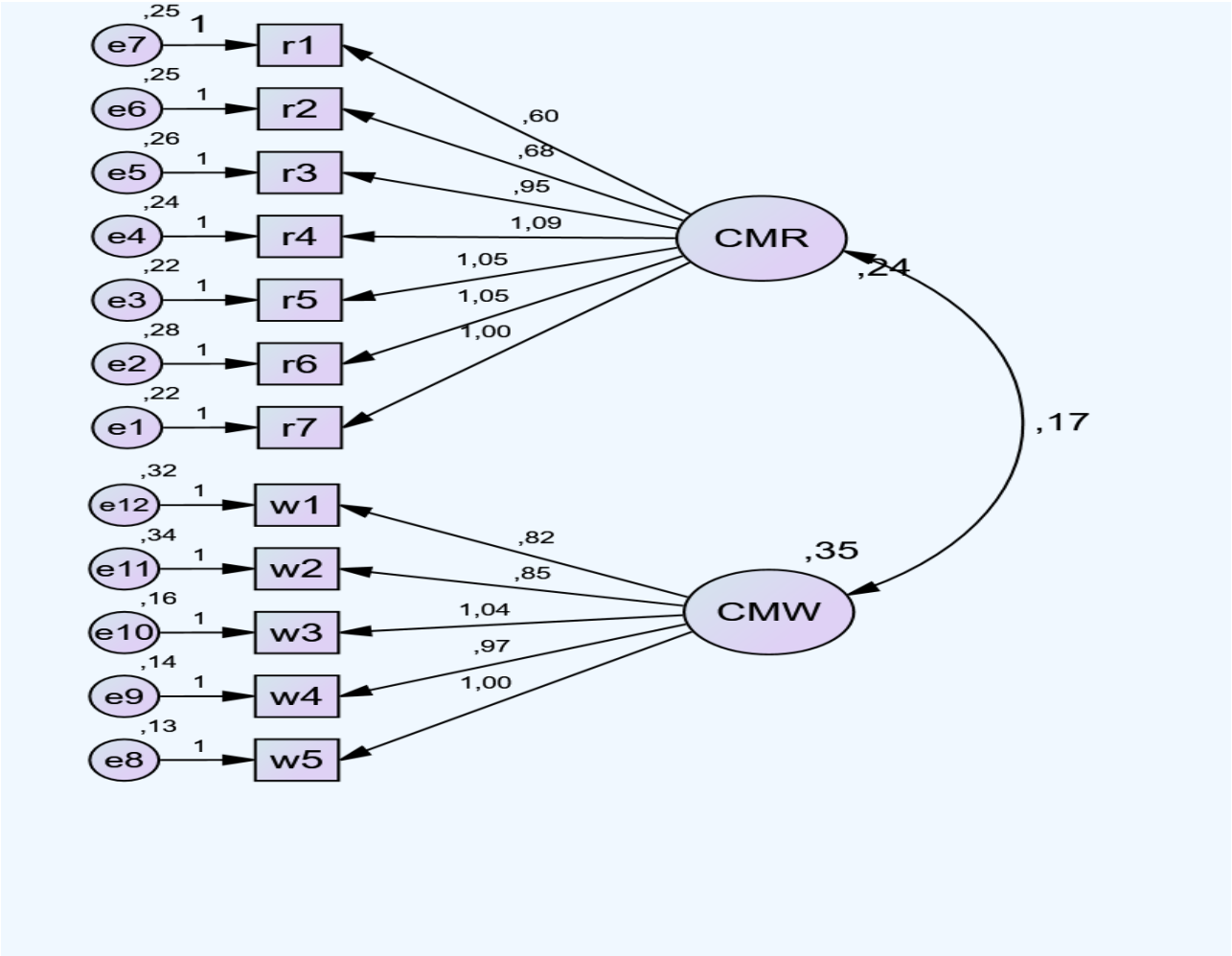

Fig. 2. CFA diagram in measurement model

5. Conclusion

This study aimed to develop a critical media literacy disposition scale for 3rd and 4th grade primary school students. The strength of the study is augmented by presenting multiple arguments to determine the validity and reliability of the scale measurements. To ensure the content validity, a comprehensive literature review on critical media literacy was conducted, leading to the creation of an item pool. Initially comprising 30 items, the draft pool was refined with expert feedback, resulting in a final draft scale of 20 items using a 3-point Likert type format. This draft scale was initially applied to a group of 30 students to observe their responses and to identify any issues with understanding or answering the items. After necessary adjustments, the final scale underwent Exploratory Factor Analysis (EFA) with 344 students to assess its construct validity. EFA results led to the elimination of 8 items, producing a refined scale with 12 items divided into two dimensions. The first dimension, 'Critical Media Literacy' (CMR), which included 7 items, explained 41.9 % of the variance. The second dimension, 'Critical Media Writing' (CMW), comprising 5 items, explained 10.3 % of the variance. The total variance explained by the scale was 52.2 %.

The scale was then subjected to Confirmatory Factor Analysis (CFA) with a separate group of 541 students. CFA results showed acceptable values for $\chi 2/df$, TLI, and RMSA, and excellent fit levels for GFI, AGFI, IFI, CFI, and RMR. These results confirmed the scale's structure. EFA and CFA analyses indicate that the scale is valid (Kline, 2011; Schermelleh-Engel et al., 2003).

To test reliability, Cronbach Alpha coefficients were calculated. The total scale's Cronbach Alpha was 87.2, with the CMR dimension at 82.5 and the CMW dimension at 79.4, indicating a

reliable structure. Item-total correlation coefficients confirmed that binary correlations between dimensions did not result in multicollinearity (Field, 2009; Tabachnick, Fidell, 2013).

In Turkey, no critical media literacy scale suitable for primary school students exists, though some related scales have been identified. For instance, Şahin et al. (Şahin et al., 2022) developed a digital literacy scale for 3rd and 4th grade students, focusing on digital device usage rather than media message interpretation. Ulu Aslan and Baş (Ulu Aslan, Baş, 2022) created a media literacy scale for secondary school students, which resulted in a single sub-dimension after EFA and CFA. Kadan and Aral (Kadan, Aral, 2020) developed a scale for children aged 36-72, while Erişti and Erdem (Erişti, Erdem, 2017) designed a general media literacy scale with 45 items across 4 dimensions. Other scales include the media literacy rubric (Çocuk, Uzun, 2018), media literacy teacher competence scale (Kaplan, 2017), sugary drinks media literacy scale (Demir, Bektaş, 2021), and a digital literacy scale for secondary schools (Avinç, Doğan, 2024). Internationally, similar scales exist (Ashley et al., 2013; Chang et al., 2011; Literat, 2014) but are typically geared towards middle school and older age groups.

The literature review reveals that while there are media literacy scales in Turkey, none are specifically designed for primary school levels with a focus on critical media literacy. Thus, this study presents a novel contribution by addressing this gap with a scale suitable for primary school students and oriented towards critical media literacyBased on the results of the study, the following suggestions can be made:

1. It can be suggested that teachers or academicians can use the obtained scale to determine the critical media literacy levels of students.
2. It can be suggested to use the scale for various scientific studies (descriptive, relational, experimental, etc.).
3. It can be suggested to carry out scale development studies including different sub-dimensions for critical media literacy.
4. It may be suggested to examine the relationship between critical media literacy and different disciplines.
5. It can be suggested that this developed critical media literacy scale should be analysed periodically in order to increase its validity and reliability and should be updated if necessary.
6. Since the scale is easily applicable, it can also be used for 2nd grades of primary school. For this purpose, a validity and reliability study can be conducted to test the suitability of the scale for 2nd grades.

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