

## Scale Development Study on Match Analysis

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### Abstract

Match analysis is a method used to evaluate and improve teams' game understanding, tactical structure, and individual-based player performances. Today, with match analysis methods, coaches can make detailed analyzes of both their own teams, rival teams and individual athletes. This present study aims to develop a scale for match analysis. Within the scope of this objective, an item pool consisting of 51 items was created by the researchers, and a 47-item scale was drafted by excluding 4 items in line with expert opinions. Explanatory and confirmatory factor analyses, internal consistency analysis and test-retest reliability methods were used for statistical purposes. As a result of the exploratory factor analysis, a measurement structure was obtained consisting of 4 sub-scales and a total of 22 items. The fit indices of the scale were evaluated within the relevant reference range. The reliability of the scale was examined by test-retest method and internal consistency analysis. As a result, the stability coefficient of the scale was calculated as 0.792 and the Cronbach Alpha internal consistency coefficient as 0.911. Internal consistency analysis results showed that the items had high reliability. The current scale has a 7-point Likert-type rating. There are negative items in the scale. In this context, these items should be reversed when scoring. It was concluded that the scale developed is a reliable and valid measurement tool.

**Keywords:** Match, Match analysis, Scale development

### Maç Analizine Yönelik Ölçek Geliştirme Çalışması

#### Öz

Maç analizi, takımların oyun anlayışlarını, taktiksel yapılarını, bireysel bazlı oyuncu performanslarını değerlendirmek ve geliştirmek için kullanılan bir yöntemdir. Günümüzde maç analiz yöntemleri ile antrenörler hem kendi takımlarının hem rakip takımların hem de bireysel bazlı sporcu analizlerini detaylı bir şekilde yapabilmektedirler. Çalışmanın amacı, maç analizine yönelik ölçek geliştirmektir. Bu amaç kapsamında araştırmacılar tarafından 51 maddeden oluşan madde havuzu oluşturulmuş, uzman görüşleri doğrultusunda 4 madde kapsam dışı bırakılarak 47 maddelik taslak ölçek elde edilmiştir. İstatistiksel yöntem olarak açımlayıcı ve doğrulayıcı faktör analizleri, iç tutarlılık analizi ve test tekrar test yöntemi kullanılmıştır. Taslak ölçeğe uygulanan açımlayıcı faktör analizi sonucunda 4 alt boyut ve 22 maddeden oluşan bir ölçek yapısı elde edilmiş, doğrulayıcı faktör analizi sonucu 4 alt boyut ve 22 maddelik yapının geçerliği teyit edilmiştir. Ölçeğin uyum indekleri ilgili referans aralığı kapsamında değerlendirilmiştir. Ölçeğin güvenilirliği test tekrar test yöntemi ve iç tutarlılık analizi ile incelenmiştir. Yapılan analizler sonucunda ölçeğin kararlılık katsayısı 0,792, Cronbach Alpha iç tutarlılık katsayısı ise 0,911 olarak hesaplanmıştır. İç tutarlılık analiz sonuçları, maddelerin yüksek güvenilirliğe sahip olduğunu göstermiştir. Mevcut ölçek, 7'li likert tipi derecelendirmeye sahiptir. Ölçekte olumsuz maddeler yer almaktadır. Bu kapsamda puanlama yapılırken bu maddeler tersine çevrilmelidir. Bu bulgulara göre geliştirilmiş olan ölçeğin güvenilir ve geçerli bir ölçme aracı olduğu sonucuna varılmıştır.

**Anahtar Kelimeler:** Maç, Maç analizi, Ölçek geliştirme

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## INTRODUCTION

Although the human eye-brain function is excellent for problem solving and obtaining results, its capacity for observing and remembering is rather limited. It is rather difficult for the coach to observe the match accurately and objectively due to the limited abilities of the ears, eyes, concentration, and continuity of attention and memory capacity. Many of the events attended by the brain are forgotten when the stored information is not repeated and used. Thus, "mental notes" created by the coach using his memory and eyes are naturally forgotten (Müniroğlu & Deliceoğlu, 2008). The rationale behind the analysis of sporting events dates back to centuries. For example, Egyptians use pictograms (pictures and crayons) to read dancers, and Romans use basic symbolic methods to record movements. The method of analysis that began in this way continues to this day with the observation method developed by Rudolf Laban in 1948, inspired by his dance teacher (Carling et al., 2005).

Today, video and computer analysis technology is changing and developing very rapidly. It is not possible to ignore the contributions of technology to match analysis, game and athlete performance (Carling et al., 2005). The most important feature of computer science is software programs that can make advanced applications. Early applications used for match analysis in computer technology were limited to data processing only. The movements of the athlete were detected and classified, and then the analysis was performed. Prior to the development of computer technology, analyzes were difficult and time consuming (Lames, 2008). Analyzes that were previously made with the paper-pencil method have started to be performed in more detail thanks to the development of computer video technology and advanced tracking systems (Rein & Memmert, 2016). Due to the fact that both statistical records can be kept and reported and visual analyzes can be made, the increase in match analysis by computer and video is much higher (Mackenzie & Cushion, 2016). In today's world, a lot of research is done about football and it is tried to contribute to this field (Strudwick, 2016). Although the number of studies in football is very high, it is seen that this area is very limited in the field of analysis, especially in our country. Again, although professional clubs recruit analysts to provide analysis support to their teams in the world, it is observed that the number of studies in this field is quite limited (Mackenzie & Cushion, 2016).

As mentioned above, match analysis is very important to achieve sportive success (Carling, 2010; Sarmiento et al., 2014). Match analysis is the objective analysis and evaluation of all behaviors that occur during the match (Carling et al., 2005). It is also the evaluation of all positive and negative actions of teams or individual athletes with video and computer technology (Michailidis et al., 2013). The main purpose of match analysis is to provide feedback to coaches about their teams and athletes (Donoghue, 2004). Again, it is to analyze all the movements that occur during the match and training in an objective way and to reveal the numerical results about the parameters taken into consideration (Müniroğlu, 2009). Match analysis assists coaches in preparing the team, evaluating, and gaining insights into various performance strategies. Key strategies are discussed in three stages: pre-game analysis, half-game and post-game analysis. Coaches should know when and what kind of analysis should be done at which stages and should prepare accordingly. In addition, match analysis can be used to objectively evaluate the performance of the team and players in pre-season, mid-season and

end-of-season, training and preparation matches (Carling et al., 2005). When the literature is examined, no measurement tool has been found to scientifically reveal the attitudes and thoughts of the participants towards sports branches. In this context, this present paper aims to develop a scale that will measure the thoughts of the participants about the match analysis.

## **METHOD**

### **Research Model**

In the research, scanning model, which is one of the quantitative research methods, was applied. Within the scope of scale development, construct and content validity were taken into account.

### **Study Group**

The study group consists of 785 people (500 men, 285 women) knowledgeable about match analysis. Convenience sampling method was preferred to define the research group. Data were collected from the participants through an online data collection tool. Data from 270 individuals (171 males, 99 females) were used for exploratory factor analysis, which was required in the phase of examining the construct validity, and data from 291 individuals (190 males, 101 females) were used for confirmatory factor analysis, and these two examples were independent of each other. In the reliability analysis of the scale, data from 71 individuals (53 males, 18 females) were evaluated by the test-retest, and data from 153 individuals (86 males, 67 females) were evaluated for the item analysis and calculation of the Cronbach Alpha coefficient.

### **Scale Structure**

The scale was developed based on a 7-point likert type rating. Items in the scale are scored ranging from “7=Strongly Agree”..... to “1=Strongly Disagree”. Higher score from the items shows that the level of agreement with the proposition in that item is high, and as it approaches lower scores, the level of agreement is indicated to be lower. Items with expressions reflecting a negative attitude about the subject are reverse scored.

The steps followed for the scale development study are:

- ✓ Creating the item pool (literature review),
- ✓ Submitting the item pool to expert opinion to examine the content validity,
- ✓ Presenting the draft scale to the language experts and applying it to the study group,
- ✓ Performing Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to evaluate the construct validity of the scale,
- ✓ Making item analysis,
- ✓ Evaluating the reliability of the scale through test-retest,
- ✓ Calculating the Cronbach Alpha internal consistency coefficient regarding the reliability of the scale.

### **Creating Item Pool**

The items in the pool were created by the researchers. In creating the items for the scale to be developed, resources related to match analysis in the literature were used. Thus, a pool of 51 items (47 positive, 4 negative) was prepared by taking the opinions of trainers, athletes, and technical directors as well as sports scientists.

### **Expert Opinion for Content Validity**

For a scale to have content validity, all of the items covered by the scale should measure all the characteristics to be measured, and every detail of the measured characteristic should be questioned by the items in the scale (Kartal & Bardakçı, 2018). The item pool, which was created for the purpose of evaluating the match analysis scale items in the context of content validity, was presented to 8 experts (trainer, athlete, technical director, sports scientist) who have knowledge, skills and experience in match analysis and their opinions were taken. All opinions from eight experts were obtained via e-mail.

An important issue as to scope validity is meeting the Content Validity Index (CVI). The minimum CVI value of eight expert opinions is calculated as 0.75 (Karagöz & Bardakçı, 2020). In this context, experts evaluated each item in the item pool whether it should be included in the scale or not, and consequently of the calculation, 4 items (positive) with a CVI value below 0.75 were removed from the scale. In this way, a draft scale including a total of 47 items was obtained of which 43 favorable and 4 unfavorable. The expressions in the scale were rearranged and the draft scale was finalized by consulting 2 academics who are experts in the field of Turkish Language, about whether the item expressions in the draft scale were appropriate in terms of expression and their compliance with the spelling rules.

### **Research Publication Ethics**

The ethics committee approval of the research was obtained with the decision numbered 45513789-770-E.62965 of the Ethics Committee of Yozgat Bozok University, which was given at the ethics committee meeting dated 21.03.2022 and numbered 31/07.

### **Analysis of Data**

The analysis of the data collected within the scope of the study was carried out step by step. First, the draft scale was created. Exploratory Factor analysis was applied to the data collected within the scope of the draft scale. After EFA, data were collected again with the remaining items and Confirmatory Factor Analysis was applied to the collected data. After CFA, data were collected again and Cronbach's alpha was calculated by the correlation between the collected data and the item-total score. In addition, data were collected within the scope of test-retest. The data collected for all these analyzes were obtained from different groups.

## **FINDINGS**

### **Findings on Construct Validity**

In scale development studies, it is stated that factor analysis is the most widely used method to reveal structure. As a result of factor analysis, information is obtained about the general factor and the number of sub-scales. By naming the existing sub-scales, a scale structure is created (Tavşancıl, 2002). Firstly, exploratory factor analysis was applied on the data obtained from 270 participants in order to determine the structure of the scale.

The first of the necessary criteria for applying EFA to a data set is the existence of sufficient sample size. In this context, first of all, Kaiser-Meyer-Olkin (KMO) statistics were taken into

account in order to determine the factor analysis adequacy of the sample size. Kaiser states that the calculated KMO value is excellent at 0.90, very good at 0.80, mediocre at 0.70 and 0.60, and unacceptable if below 0.50 (Tavşancıl, 2002). At this stage, the KMO statistics for the data of the 47-item draft scale were calculated as 0.932. Accordingly, it was determined that the sample size was perfectly adequate for factor analysis. Another test required to apply EFA to the data set is the Bartlett sphericity test. In factor analysis, a high correlation relationship is sought between the variables. The Bartlett test is used to examine whether there are significant relationships between the variables in the population (Nakip, 2006). In order to provide the assumption of sphericity, it is expected that the Bartlett test statistics shall be high and significant as a result of the analysis (Tavşancıl, 2002). As a result of the analysis for the draft scale, a high and significant relationship between the variables was found and the assumption of sphericity was satisfied ( $\chi^2=3572,621$ ;  $p<0.001$ ).

In order to determine the factor structure of the match analysis scale, EFA was applied to 47 items in the draft scale by using Principal Components Analysis and Varimax Rotation methods. Items that did not fit under any factor and whose factor loadings were very close in two or more factors and could be described as overlapping were determined and removed from the scale. In this way, after removing 25 (positive) items from the scale, EFA was ultimately applied to the remaining 22 items (18 positive, 4 negative) and relevant results were provided in the table (Table 1).

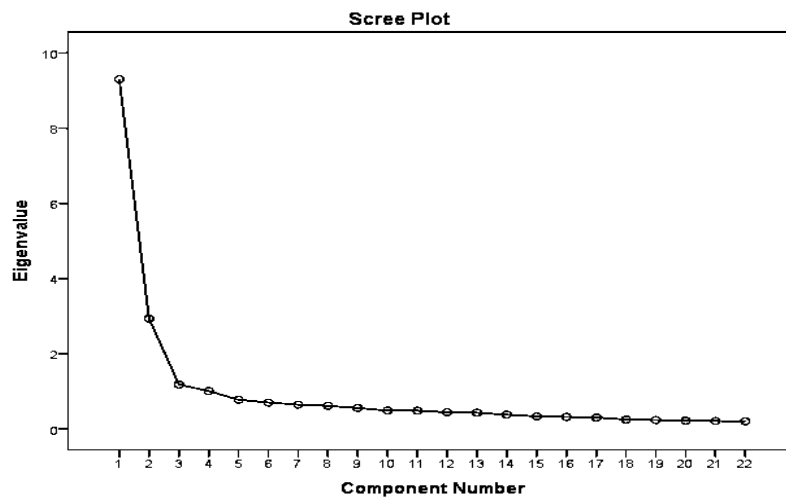
**Table 1.** Results of exploratory factor analysis

Sub-scales	Items	Factor Loading Value	Eigenvalue	Variance (%)	Cumulative Variance (%)
<b>Factor 1: Performance</b>	Item 17	0.752	9.304	42.289	42.289
	Item 15	0.727			
	Item 31	0.702			
	Item 13	0.685			
	Item 29	0.668			
	Item 19	0.653			
	Item 33	0.617			
<b>Factor 2: Progress</b>	Item 14	0.770	2.936	13.344	55.633
	Item 16	0.756			
	Item 12	0.720			
	Item 20	0.645			
	Item 10	0.632			
	Item 18	0.622			
<b>Factor 3: Importance status</b>	Item 45	0.883	1.179	5.360	60.994
	Item 44	0.882			
	Item 43	0.866			
	Item 46	0.854			
<b>Factor 4: Appreciation</b>	Item 47	0.703	1.008	4.583	65.576
	Item 37	0.680			
	Item 38	0.670			
	Item 39	0.611			
	Item 36	0.603			

The eigenvalue is an important coefficient used to determine the appropriate number of

factors, and in practice, factors with an eigenvalue of 1 or greater than 1 are usually taken as the appropriate factor. This criterion is called the Kaiser criterion (Kartal & Bardakçı, 2018). As can be seen in Table 1, as a result of EFA, 4 sub-scales with an eigenvalue greater than 1 were obtained according to the Kaiser criterion. Another criterion that is important in determining the number of sub-scales in the scale and ensuring construct validity is the total explained variance. Considering the explained variance values in Table 1, it is seen that the 4-factor structure in question explains 65,576 % of the total variance. The variance rates explained by the factors were 42.289 % for Factor 1: Performance, 13,344 % for Factor 2: Progress, 5.360 % for Factor 3: Importance status and 4.583% for Factor 4: Appreciation.

In the literature, it is stated that values above 0.45 are generally sufficient for factor load values in the selecting the items (Büyüköztürk, 2002). Upon the analysis, it was determined that the factor load values of the items of the current scale were in the range of 0.603-0.883. Accordingly, it can be said that the factor loading values of each item in the 4-factor model are high and sufficient (Table 1).



**Figure 1.** Scree Plot of EFA

As seen in the Scree plot in figure 1, there are four sub-scales with eigenvalues greater than 1. These sub-scales and related items are given in Table 2. As a result of the explanatory factor analysis, CFA was applied to the data of 291 participants, who formed another independent sample, in order to examine the validity of the measurement structure of the 4-factor 22-item scale.

**Table 2.** Critical values for goodness of fit indices

Fit Indices	Good Fit	Acceptable Fit
$\chi^2/sd$	$\leq 3$	$\leq 5$
GFI	$\geq 0.90$	$\geq 0.85$
IFI	$\geq 0.95$	$\geq 0.90$
TLI	$\geq 0.95$	$\geq 0.90$
CFI	$\geq 0.97$	$\geq 0.95$
RMSEA	$\leq 0.05$	$\leq 0.08$

Whether or not the measurement model established as a result of CFA is compatible with the data is determined by the goodness of fit indices. These goodness-of-fit indices  $\chi^2/sd$ , GFI,

IFI, CFI, RMSEA, TLI (Karagoz, 2016) and the critical values they must provide (Meydan & Şeşen, 2015) are as in Table 2.

Goodness of fit index values of the scale in which Confirmatory Factor Analysis was applied were calculated as  $\chi^2/df=1.974$ , GFI=0.889, IFI=0.952, TLI=0.944, CFI=0.952 and RMSEA=0.058. When the relevant values were compared with the critical values in Table 3, it was determined that the model showed a good fit according to the  $\chi^2/sd$  index, and an acceptable level of fit according to the goodness of fit indices such as IFI, TLI, GFI and RMSEA. The findings obtained as a result of CFA showed that the validity of the 4-factor measurement structure revealed by EFA was also confirmed on an independent sample.

The regression coefficients must be significant in order for the regression to be valid (Karagöz, 2016). In this context, CFA was applied to the data and the regression coefficients of the items in the scale were found to be significant.

**Table 3.** Standard regression coefficients of items based on DFA

<b>Factor and Related Items</b>	<b>Factor Load</b>
<b>Factor 1: Performance</b>	
17. Match analysis can help athletes mentally prepare for match.	0.754
15. Match analysis helps coaches make a positive difference in the match.	0.768
31. Match analysis has an important effect on the maximum performance of the athletes in the matches.	0.675
13. As a result of the statistical data obtained through the match analysis, the coaches adopt different tactics.	0.745
29. Match analysis objectively reveals all the behaviors of the athletes during the match.	0.676
19. With match analysis, coaches objectively evaluate the performances of the opponents.	0.709
33. Match analysis allows the athletes to get to know themselves in the sportive sense.	0.749
<b>Factor 2: Progress</b>	
14. Match analysis helps coaches in their professional development.	0.689
16. Match analysis increases the knowledge of the coaches about their branch.	0.721
12. Match analysis provides information about the opponent's weaknesses.	0.742
20. Match analysis allows coaches to improve their tactical skills.	0.797
10. Match analysis helps to collect data on many parameters (sports performance etc.) during the match.	0.657
18. With match analysis, coaches evaluate the performance of their athletes objectively.	0.740
<b>Factor 3: Importance status</b>	
45. The field of sports sciences does not place a high importance on match analysis.	0.927
44. Match analysis is of no importance for athlete development.	0.946
43. Coaches do not attach importance to match analysis.	0.849
46. Match analysis methods do not have an important place in winning the matches.	0.819
<b>Factor 4: Appreciation</b>	
47. Thanks to the rapid development of match analysis, there is an increase in the number of clubs that need analysts.	0.446
37. There is an increase in the number of analysts working in clubs.	0.667
38. Match analysis has turned into a profession, match analyst.	0.721
39. With the development of technology, the level of development of analysts interested in match analysis is increasing.	0.702
36. There is an increase in the number of scientific publications on match analysis.	0.624

In terms of construct validity, it is important that the standard factor load values are above 0.40 based on CFA (Hair et al., 1999). It is safe to state that the lowest values of the factor loads of

the items in the scale are above 0.40, which means that the values are acceptable as to construct validity (Table 3).

### Findings as to Item Analysis

The item analysis of the scale was carried out with the data obtained from 153 people. The scale which consists of 4 sub-scales and 22 items was previously revealed to have construct validity. For this reason, item analysis method based on item-total score correlation was used.

### Item Analysis Based on Item-Total Score Correlation

Item-total score correlation is an objective criterion that reveals the correlation between the scores obtained from each item in a scale and the total score obtained from the scale (Tezbaşaran, 1996). The item-total correlation coefficient should not be less than 0.20. Items with an item-total correlation less than 0.20 should be removed from the scale, and items with values between 0.20-0.30 should be included in the scale if deemed necessary. Items with an item-total correlation value higher than 0.30 is concluded to act in a similar direction with the scale in general and these items should remain in the scale (Büyüköztürk, 2010). The item-total correlation scores for the scale items developed for the match analysis were calculated and the findings are provided in Table 4.

**Table 4.** Item-total score correlations

Item	Item-Total Correlation	Item	Item-Total Correlation
Item 10	0.680	Item 31	0.610
Item 12	0.710	Item 33	0.566
Item 13	0.753	Item 36	0.530
Item 14	0.636	Item 37	0.511
Item 15	0.733	Item 38	0.552
Item 16	0.651	Item 39	0.624
Item 17	0.650	Item 43	0.337
Item 18	0.700	Item 44	0.395
Item 19	0.684	Item 45	0.401
Item 20	0.707	Item 46	0.363
Item 29	0.717	Item 47	0.437

Item analysis determined that the item-total correlation values of all 22 items in the scale were greater than 0.30 (Table 4). Therefore, it was concluded that all of the items were in line with the scale in general, and therefore, no item were removed from the scale.

### Findings as to the Reliability of the Scale

#### *Test-Retest Reliability of the Scale*

Stability is a reliability criterion that aims to measure the characteristics that are permanent and not easily changed, such as attitudes (Tavşancıl, 2002). The stability of the match analysis scale was handled by the test-retest method. The difference between the scores of the match analysis scale and its sub-scales, which were applied to 71 participants at two different times, were tested with the dependent groups' t-test. The stability coefficients of the scale and sub-scales were obtained by calculating the pearson correlation coefficients (Table 5).



**Table 5.** Test-retest reliability results

Scale and Sub-scales	Tests	N	Avg.	SD	t	p	r (p)
<b>Factor 1</b>	First Application	71	6.35	0.52	0.824	0.413	0.804 (0.000)
	Second Application	71	6.31	0.58			
<b>Factor 2</b>	First Application	71	6.52	0.44	-0.308	0.759	0.837 (0.000)
	Second Application	71	6.53	0.45			
<b>Factor 3</b>	First Application	71	1.18	0.34	-0.261	0.795	0.787 (0.000)
	Second Application	71	1.19	0.35			
<b>Factor 4</b>	First Application	71	6.24	0.67	-1.252	0.215	0.679 (0.000)
	Second Application	71	6.32	0.69			
<b>Total</b>	First Application	71	5.42	0.36	-0.747	0.457	0.792 (0.000)
	Second Application	71	5.44	0.39			

T test results showed that there was no significant difference between the first and second application results of the whole scale and its sub-scales ( $p > 0.05$ ). Finding similar results between two different application is an indicator of the reliability of the scale (Aksayan & Gözüm, 2002). The analyzes showed that the test-retest stability coefficients of the whole scale and its sub-scales were significant (Table 5).

### Internal Consistency Analysis

In developing a likert-type scale, one of the basic assumptions is that each item should measure basically the same attitude (Tavşancıl, 2002). In the literature, it is considered appropriate to calculate the Cronbach  $\alpha$  coefficient to control this assumption and determine its reliability. It can be said that the higher the  $\alpha$  coefficient of the scale, the more consistent the items in the scale are (Tezbaşaran, 1996). The fact that the Cronbach  $\alpha$  internal consistency coefficient of the scale items is greater than 0.70 can be interpreted that the scale is reliable (Kartal & Bardakçı, 2018). The internal consistency reliability of the scale was calculated based on the data collected from 153 participants for item analysis. This calculation was applied to the overall scale and its sub-scales (Table 6).

**Table 6.** Cronbach  $\alpha$  coefficients of the scale

Scale	Sub-scales	Number of items	Cronbach $\alpha$ coefficient for sub-scales	Cronbach $\alpha$ coefficient for total scale
Match Analysis	Performance	7	0.913	0.911
	Progress	6	0.891	
	Importance status	4	0.944	
	Appreciation	5	0.839	

Cronbach  $\alpha$  values were found to be greater than 0.70. It can be said that these values are sufficient for the reliability of the scale (Table 6).

## **DISCUSSION and CONCLUSION**

In the present study, it was aimed to develop a likert type scale to measure the attitudes of individuals towards match analysis, and to perform its reliability and validity analyzes. To this end, an item pool consisting of 51 items was created in the first place. It was presented to the opinions of the experts and 4 items were excluded upon their feedback. Thus, a draft scale consisting of 47 items was obtained. After proof-reading the draft in terms of Turkish language and expression, the scale was given its final form before its administration. It was seen that the scale developed in the study conducted by Tabuk consisted of 3 sub-dimensions and 9 items (Tabuk, 2022). It was determined that the developed scale consisted of 2 sub-dimensions and 13 items (Taşmektepligil et al., 2014). In another study, it was determined that the developed scale consisted of 20 items and 4 sub-dimensions (Kayhan et al., 2020).

With the EFA applied to the scale, items that did not fit into any factor or were expressed as overlapping were removed from the scale. The measurement structure, which ended up with 4 sub-scales and a total of 22 items after the exclusion of certain items from the scale, explained 65,576 % of the total variance. In this context, it can be said that the variance explained by the scale structure is sufficient in terms of construct validity. In addition, it can be said that the factor load values of the items of the developed scale are in the range of 0.603-0.883 which are sufficient values. As a result of CFA applied to the data collected from another independent sample after EFA, it was determined that the 4-factor model consisting of 22 items showed good agreement with the data. This agreement showed that the scale structure revealed by EFA was also valid on a different sample. In addition, item analysis based on item-total correlation was applied, and it was concluded that no item should be removed from the scale. When the literature is examined, it has been concluded that the scale is a valid and reliable measurement tool, it will provide ease of application due to the small number of items, and the variance is explained at the level of 72.71% (Tabuk, 2022). The factor loads of the items of the developed scale were found to be between 0.466 and 0.775 (Taşmektepligil et al., 2014).

The reliability of the current scale was discussed in the context of its stability and Cronbach  $\alpha$  internal consistency. A test-retest was performed to determine the stability of the scale. The scale was applied to the same sample with an interval of two weeks, and it was determined that the scores were similar. This finding indicates the invariance and stability of the measurement results. The internal consistency of the scale was examined by calculating the Cronbach's  $\alpha$  coefficient for the whole scale and its sub-scales. Cronbach  $\alpha$  coefficient values higher than 0.70 indicate that the scale has internal consistency. As a result, it is safe to say that the scale for match analysis consisting of 4 factors and 22 items is a valid and reliable measurement tool.

**Conflicts of Interest:** The authors declare that they have no conflict of interest.

**Authors' Contribution:** All three authors have made a substantial and intellectual contribution to the study and approved it for publication.

**Research Ethics Informations:**

**Ethics Committee:** Yozgat Bozok University, Ethics Commission

**Date:** 21.03.2022

**Decision No:** 31/07

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**APPENDIX –MATCH ANALYSIS SCALE**

Draft Item Number	Item Number	ITEMS	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<b>-PERFORMANCE-</b>									
17	1	Match analysis can help athletes mentally prepare for match.	1	2	3	4	5	6	7
15	2	Match analysis helps coaches make a positive difference in the match.	1	2	3	4	5	6	7
31	3	Match analysis has an important effect on the maximum performance of the athletes in the matches.	1	2	3	4	5	6	7
13	4	As a result of the statistical data obtained through the match analysis, the coaches adopt different tactics.	1	2	3	4	5	6	7
29	5	Match analysis objectively reveals all the behaviors of the athletes during the match.	1	2	3	4	5	6	7
19	6	With match analysis, coaches objectively evaluate the performances of the opponents.	1	2	3	4	5	6	7
33	7	Match analysis allows the athletes to get to know themselves in the sportive sense.	1	2	3	4	5	6	7
<b>-PROGRESS-</b>									
14	8	Match analysis helps coaches in their professional development.	1	2	3	4	5	6	7
16	9	Match analysis increases the knowledge of the coaches about their branch.	1	2	3	4	5	6	7
12	10	Match analysis provides information about the opponent's weaknesses.	1	2	3	4	5	6	7
20	11	Match analysis allows coaches to improve their tactical skills.	1	2	3	4	5	6	7
10	12	Match analysis helps to collect data on many parameters (sports performance etc.) during the match.	1	2	3	4	5	6	7
18	13	With match analysis, coaches evaluate the performance of their athletes objectively.	1	2	3	4	5	6	7
<b>- IMPORTANCE STATUS -</b>									
45	14	*The field of sports sciences does not place a high importance on match analysis.	1	2	3	4	5	6	7
44	15	*Match analysis is of no importance for athlete development.	1	2	3	4	5	6	7
43	16	*Coaches do not attach importance to match analysis.	1	2	3	4	5	6	7
46	17	*Match analysis methods do not have an important place in winning the matches.	1	2	3	4	5	6	7
<b>-APPRECIATION-</b>									
47	18	Thanks to the rapid development of match analysis, there is an increase in the number of clubs that need analysts.	1	2	3	4	5	6	7
37	19	There is an increase in the number of analysts working in clubs.	1	2	3	4	5	6	7
38	20	Match analysis has turned into a profession.	1	2	3	4	5	6	7
39	21	With the development of technology, the level of development of analysts interested in match analysis is increasing.	1	2	3	4	5	6	7
36	22	There is an increase in the number of scientific publications on match analysis.	1	2	3	4	5	6	7

The Match analysis scale consists of a total of 22 items and 4 factors (sub-scales). There are 18 positive and 4 negative statements in the scale. Items in the importance status sub-scale with negative meaning (\*) should be reverse coded while scoring.

**Note:** You can use the scale without permission within the framework of citation rules.

## EK-MAÇ ANALİZİ ÖLÇEĞİ

Taslak Madde No	Madde No	MADDELER	Kesinlikle Katılmıyorum	Katılmıyorum	Pek Katılmıyorum	Kararsızım	Kısmen Katılıyorum	Katılıyorum	Tamamen Katılıyorum
<b>-PERFORMANS-</b>									
17	1	Maç analizi, sporcuların zihinsel antrenman hazırlıklarına olumlu katkı sağlar.	1	2	3	4	5	6	7
15	2	Maç analizi, antrenörlerin oyun içerisinde olumlu yönde farklılık yaratmasına yardımcı olur.	1	2	3	4	5	6	7
31	3	Sporcuların maçlarda maksimum performans göstermelerinde maç analizi önemli bir etkiye sahiptir.	1	2	3	4	5	6	7
13	4	Maç analizi ile elde edilen İstatistiksel veriler sonucunda antrenörler, farklı taktikler belirler.	1	2	3	4	5	6	7
29	5	Maç analizi, sporcuların maç içerisindeki bütün davranışlarını objektif bir şekilde ortaya koymaktadır.	1	2	3	4	5	6	7
19	6	Maç analiziyle antrenörler, rakip sporcuların performanslarını objektif olarak değerlendirir.	1	2	3	4	5	6	7
33	7	Maç analizi, sporcuların sportif anlamda kendilerini tanımalarına olanak sağlar.	1	2	3	4	5	6	7
<b>-GELİŞİM GÖSTERME-</b>									
14	8	Maç analizi, antrenörlerin mesleki gelişimlerine yardımcı olur.	1	2	3	4	5	6	7
16	9	Maç analizi, antrenörlerin branşı ile ilgili bilgi birikimlerini artırır.	1	2	3	4	5	6	7
12	10	Maç analizi rakibin zayıf yanları hakkında bilgi edinilmesini sağlar.	1	2	3	4	5	6	7
20	11	Maç analizi, antrenörlerin taktiksel yetilerini geliştirmelerine olanak sağlar.	1	2	3	4	5	6	7
10	12	Maç analizi, maç esnasında birçok parametre (sportif performans vb.) hakkında veri toplamaya yardımcı olur.	1	2	3	4	5	6	7
18	13	Maç analiziyle antrenörler, sporcularının performanslarını objektif olarak değerlendirir.	1	2	3	4	5	6	7
<b>-ÖNEM DURUMU-</b>									
45	14	*Spor bilimleri alanında maç analizine önem verilmez.	1	2	3	4	5	6	7
44	15	*Sporcu gelişimi için maç analizinin bir önemi yoktur.	1	2	3	4	5	6	7
43	16	*Antrenörler maç analizine önem vermez.	1	2	3	4	5	6	7
46	17	*Maç analiz yöntemleri, maçların kazanılmasında önemli bir yere sahip değildir.	1	2	3	4	5	6	7
<b>-DEĞER GÖRME-</b>									
47	18	Maç analizinin hızlı gelişimi sayesinde analiste ihtiyaç duyan kulüp sayısında bir artış söz konusudur.	1	2	3	4	5	6	7
37	19	Kulüplerde çalışan analist sayısında bir artış söz konusudur.	1	2	3	4	5	6	7
38	20	Maç analistliği bir meslek dalına dönüşmüştür.	1	2	3	4	5	6	7
39	21	Teknolojinin gelişmesiyle birlikte maç analizi ile ilgilenen analistlerin gelişim düzeyi artmaktadır.	1	2	3	4	5	6	7
36	22	Bilimsel çalışmalarda maç analiziyle ilgili yapılan yayın sayısında bir artış söz konusudur.	1	2	3	4	5	6	7

Maç Analiz ölçeği, toplam 22 madde ve 4 faktör (alt boyut)'den oluşmaktadır. Ölçekte 18 olumlu, 4 olumsuz ifade yer almaktadır. Önem Durumu alt boyutunda yer alan ve olumsuz anlam içeren (\*) maddeler, puanlama yapılırken tersine kodlanmalıdır.

**Not:** Ölçeği, alıntı yapma kuralları çerçevesinde izin almadan kullanabilirsiniz.