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RESEARCH ARTICLE

The Sustainable Scale of Earthquake Awareness, Development, Validity and Reliability Study

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Abstract

The study group of this research, which is planned to develop the Sustainable Scale of Earthquake Awareness, consists of the students studying at Duzce University in the academic year 2018-2019. 276 volunteer individuals (213 females, 63 males) participated to the research group determined by random sampling method. For confirmatory factor analysis, 434 female and 129 male volunteer students participated. 839 students, 647 of them were females (77,12%) and 192 of them were males (22,88%), supported the study. As a result of the exploratory factor analysis which is completed after testing the suitability of the data for analysis, the scale was constituted of three sub-factors consisting of 22 items. The factors that make up the scale explain 46,393% of the variance. The sub-factors of the scale were named based on the knowledge about the earthquake. The suitability of the obtained model was 0.072 for RMSEA; 0.90 for NFI, 0,89 for GFI, 0.063 for RMR and 0.86 for AGFI. As a result of the reliability analysis, the internal consistency coefficient (Cronbach alpha) of the scale was determined as 0.884. It is thought that this developed scale will provide support as a tool for educational purposes. It is recommended to carry out different researches that can help to investigate the awareness level about the earthquake with different variables.

Keywords: Earthquake, earthquake awareness, sustainable earthquake awareness, disaster.

Introduction

Bangladesh Cyclone in 1990, Luzon Island 1991 Mt. Pinatubo explosion in the Philippines, floods in China between 1991 and 1995, 1994 Colombia Landslide, 1995 Indian Earthquake, 1995 Kobe Earthquake, 2004 Southeast Asian Tsunami, 1996 US Hurricane Fran, 2007 Peru Earthquake and 2011 Japan Earthquake are the major current examples of the destruction of natural disasters (Munich; 2010). The fact that more than half of the world's population is in cities and the continuous rise in this rate increases the risks of loss in cities (UNCHS, 2009). One of the most important impacts of natural disasters is on the infrastructure systems in cities and these negative effects become clear as the economic levels of the countries decrease (DHA, 1995). Natural disasters are natural events that have important implications for human life in every country and their economic, social and sociological effects. In other words, disasters are the events that society will have difficulty to overcome. They also affect the society in general by disrupting daily life and human activities, which poses great problems in terms of economic, physical and social aspects (Ergünay, 1996). Natural disasters are earthquake, storm, avalanche, flood, landslide, drought, volcano eruptions, and frost and so on (Munich, 2010; Şahin and Sipahioğlu, 2007; Kanat, 2016). The negative effects of natural disasters to life are increasing day by day. The loss of life caused by natural disasters in the world in 2009 was four times higher than in the 1980s. It was determined that 950 natural disasters occurred in 2010 were much higher than the previous 30-year average (Munich, 2010: 20). The earthquake is one of the disasters

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that occur naturally. Earthquakes are geological and geomorphological disasters. They are the quakes that take its source from the Earth's depths (İzbırak, 1991; Şahin and Sipahioğlu, 2007). According to their character of occurrences, earthquakes can be grouped as tectonic, collapse and volcanic. Lots of area is highly affected by the earthquake. The largest distribution on earth belongs to tectonic earthquakes. When the tectonic earthquake is compared to others, the earthquake region is much wide than the volcanic earthquakes and its severity and destructiveness are much more effective. The region where the tectonic earthquakes are most common in the world is the Pacific Ocean, also called the Pacific Fire Circle. It is followed by an Alpine-Himalayan-Caucasian Belt. Turkey is the second major earthquake zone on the Mediterranean Earthquake Belt also known as the Alpine-Himalayan-Caucasian Belt (Şahin and Sipahioğlu, 2007).

After many earthquakes, importance of disaster management activities in countries and studies in this area has increased. Disaster Management is a concept that emphasizes to prevent disasters and minimize their losses. All institutions and organizations need to put their efforts and resources against disasters to plan and implement what needs to be done (Ergünay, 1996). In particular, it is of great importance that the entire society, especially those with high earthquake risk, should be made aware of the disasters and especially against earthquakes, and that the society is prepared in this regard. Earthquakes cause big problems and disruptions in education. Physical environments of education, teachers, students and families may face significant difficulties (Yıldız, 2000). Earthquakes adversely affect motivation and success in educational environments (Sert, 2002).

Sustainable awareness and preparedness against earthquakes, which are a serious threat to countries, are vital. In schools, proper and effective training on natural disasters and especially earthquake should be applied. If the earthquake training is not carried out correctly and effectively, the lack of information will cause great damages (Tsai, 2001; Ross and Shuell, 1993). In addition to having the right information about earthquake awareness and this consciousness, it is also necessary to develop the right attitudes towards where and how to be treated against the earthquake (Demirci and Yıldırım, 2015). Countries and regions include courses for natural disasters in educational institutions in order to know the natural disaster that they can face and to raise awareness of the society. For example, in North America, 41,2% of colleges and universities have courses on natural disasters and more regionally oriented courses (Cross, 2000).

It is very crucial to determine the earthquake awareness of the university students who will create an important workforce of a country in the future. It is very important to enhance the knowledge of university students on natural disasters and especially for earthquake and to plan future studies for students in universities to make this knowledge permanent and practicable. For these reasons, it is important to determine the level of earthquake awareness and point of view of university students, and to reveal earthquake awareness in their environment and faculties from their perceptions. In this study, a scale was developed in this direction. Earthquake is an important natural disaster worldwide. It is unpredictable when, where, in which country, in which region of the world. Therefore, it is very important to be prepared for a possible earthquake. With this scale, it was tried to answer the question of how ready we are against earthquakes. It is an important fact that there may be earthquakes anywhere in the world at any moment. For this reason, it is necessary to be prepared for the earthquake all over the world. For all these reasons, this scale is an internationally feasible scale.

When the literature was examined, (Karancı et al. 1996; Bozkurt, 1999; Kasapoğlu and Ecevit, 2001, Erkan, 2010) it was seen that the psycho-social effects of the earthquake, (Aksoy and Sözen, 2014; Demirci and Yıldırım, 2015; Demirkaya 2007a; Demirkaya, 2007b; Aydın, 2010; Bozkurt, 1999; Erdoğan, 2007; Erkan, 2010; Kaya and Aladağ, 2017; Kayalı 2018; Öcal, 2005; Sert, 2002; Şimşek, 2007; Öztürk, 2013) especially earthquake education and various dimensions of the earthquake in students were working with various scales. In environmental and earthquake areas education is very important (Genç, 2015). Therefore there are more studies about the earthquake and its effects. However, there is no study investigating the sustainable earthquake awareness of university students. A sustainable earthquake awareness scale is needed for this type of research.

Purpose of Study

Many factors such as the geographic location of the countries, the existence and structure of the earthquake fault lines convert the variety of measurement tools that are used to determine whether the individuals aware about the earthquake to a need. For these reasons, the aim of this research is to develop a measurement tool that can evaluate the level of awareness of individuals about the earthquake quickly and easily. In addition, the aim of this study was to develop and test the validity of a short, easy, clear and easy-to-use scale that allows making an adequate assessment of individuals' knowledge about the distribution of earthquake zones and the effects of earthquake.

Methodology

In this research, the exploratory sequential design was used. In this approach, the investigator starts with a qualitative research stage and explores the participants' views. Subsequently, the qualitative data are analyzed in order to use the information to feed into the second stage, the quantitative research (Creswell and Creswell, 2018). In many applications of this chaining design, the researcher develops a tool as a common step between the stages created based on qualitative results and uses this tool while collecting quantitative data. For this reason, this design is also referred to as the vehicle development design (Creswell, Fetters, and Ivankova, 2004) and the subsequent quantitative design (Morgan, 1998).

Working Group

The study group consists of the students of Duzce University. The sampling of the study was determined based on simple random sampling method. As it is known, the sampling is a small group which is selected according to certain rules from a certain group, and it is accepted to represent this certain group (Karasar, 2005, p. 110- 111). It is very important that the sampling is neutral and represents the group (Kaptan, 1983, p. 135). In simple random sampling, each possible combination of elements in the universe has an equal probability to be included in the sample (Kerlinger & Lee, 1999). In order to use this method, the information about the problems should be homogenous according to the universe. In simple random sampling, a sample frame should be made that includes all elements of the universe (Mertens, 2014).

In the study group, 22,88% (192) of the students are male and 77,12% (647) are female. The class levels of students are 23,60% 1st grade (198), 25,03% 2nd grade (210), 23,00% 3rd grade (193) and 28,37% 4th grade (238) student. 728 participants from different faculties were included in the study. In this context, from the prospective teachers studying at the faculty of education, 839 of them attended the study (276 for the Exploratory Factor Analysis and 563 for the Confirmatory Factor Analysis).

Formation of the Item Pool

For the formation of the item pool, first a literature review was made, and the scales related to the earthquake have been examined. For example, Inal (2015) has developed a scale to evaluate individual preparedness for emergencies/disasters by using the "Health Belief Model" as a theoretical framework. In research It was determined that it has sub-dimensions such as ‘‘Perceived Susceptibility,’’ ‘‘Perceived Severity’’, ‘‘Perceived Benefits’’, ‘‘Perceived Barriers’’, ‘‘Cues to Action’’ and ‘‘Self Efficacy”. Otherwise, Yöndem and Eren (2008) developed the scale of strategies for coping with earthquake stress in their study. This scale has mostly been used in studies on coping with stress after an earthquake. In this study, the results of analyses revealed that the scale consists of three sub-dimensions which are “Positive Reappraisal”, “Seeking Social Support”, and “Religious Coping”. The items and the data used in the studies were analyzed and an item pool was formed. The content of the item pool was examined by three faculty members who are experts in the field of educational research, and content validity was achieved. At this stage, in order to ensure content validity, three independent experts evaluated the items, and some items were removed while reconciled items remained the same and some items were combined. After examining the content and scope of the scale, the comprehensibility and compliance of grammar rules of the items were examined from an expert. As a result, a 22-item draft trial form was created. In order to evaluate the scale's validity of the scale, the opinions of four experts were taken, and if at least three of the four experts found the relevant item appropriate for each item, the item was included in the scale, and the other items were excluded from the scale. As a result of the evaluation, the reliability of the scale was determined by using the expert opinion/consensus formula suggested by Miles and Huberman (1994). The formula is as follows; Reliability = (Consensus) / (Consensus + Disagreement). The consensus in the formula; For all reports, the number of items that experts the same score represents, and the difference of opinion represents the number of items with different scores. Accordingly, the consensus was found as .90. This value is an acceptable value for the reliability of the research (Miles & Huberman, 1994). Pilot implementation was carried out to determine the functioning of the scale items arranged in line with the recommendations of the experts. The survey was finalized based on the data obtained from the pilot application with ten pre-service teachers. The Sustainable Scale of Earthquake Awareness consists of 22 items in positive sentence form. Items were scaled with a five-point Likert scale. Likert style expressions are; “totally disagree”, “disagree”, “neutral”, “agree” and “totally agree”. The lowest score is 22 and the highest score is 110. If scores increase, it means individuals have more awareness about the earthquake.

Process and Data Analysis

Exploratory Factor Analysis for the construct validity of The Sustainable Scale of Earthquake Awareness and Confirmatory Factor Analysis (Schermelleh-Engel, Keith, Moosbrugger and Hodapp, 2004) was used to test the accuracy of the gained factor structure. Basic Component Analysis Method was used in Exploratory Factor Analysis and Maximum Likelihood Method was used in Confirmatory Factor Analysis. The Cronbach’s alpha value, which aims to get the internal consistency coefficient for the reliability of the sub-factors of the scale, has been accepted as a criterion.

Factor Analysis is a widely used method for validity studies of scales. Factor Analysis, which is a multivariate statistical method aims to find a few unrelated and conceptually meaningful new variables by bringing together the boundless variable related to each other, is discussed in two forms: Exploratory and Confirmatory (Erkuş, 2003). Exploratory Factor Analysis examines the structure of the relationship between substances and tries to discover the construct validity of the measurement tool (Schermelleh-Engel, Moosbrugger and Müller, 2003). Confirmatory Factor Analysis aims to test the model claimed by the exploratory method and test the model fit (model fit) according to some criteria (Tabachnink and Fidell, 2001). After Exploratory Factor Analysis (EFA) studies, testing of the results with Confirmatory Factor Analysis (CFA) is a frequently used method in the literature (Maruyama, 1998) and is considered to be a proof that the study has a strong theoretical basis (Şimşek, 2007). The suitability of the collected data for Factor Analysis is considered important. The suitability of the sample is tested by Kaiser-Meyer-Olkin (KMO) and Barlett's test (Büyüköztürk, 2007). Data were analyzed with statistical methods.

Findings

The suitability of the data and sample to the factor analysis was tested by Kaiser-Meyer-Olkin (KMO) and Barlett's test. The KMO value, which is the determinant of the sample fit, was found to be 0.841 with an appropriate level and similarly the value of the Barlett Sphericity test was found to be significant (c^2=2071,939; sd=2311; p<0,00). KMO value is between 0.80-0.90 and Bartlett Sphericity test is significant; it shows that the data are well suited to the analysis (Leech, Barrett and Morgan, 2005; Şencan, 2005; Tavşancıl, 2005; Büyüköztürk, 2007). The normality distribution for the total score obtained from the scale was tested with Kolmogorov-Smirnov. According to the Kolmogorov- Simirnov test (Z=1,101; p=0,177 ≥ .05), the total score variables showed a normal distribution. When the data set was subjected to factor analysis, factors with an Eigen-value above 1 were taken into account.

Exploratory Factor Analysis

EFA examines the structure of the relationship between items and tries to discover the validity of the measurement tool (Tabachnick and Fidell, 2001). With the EFA, optimal sizing is made according to the factor load values of the items in the scale.

As a result of the EFA performed by Varimax Upright Rotation, it was decided to exclude the items in the draft form from the scale because of being less than 30. After another analysis, it was seen that all items had a load value of over 0.410. Besides the Basic Component Analysis, item - total score correlations were examined to analyze to what extent the items are discriminating. Accordingly, when deciding on an item to be included in the scale, the load value of this item is based on a value of 0.320 and higher. According to the Scree Plot graph, the scale was made as 3 factors.

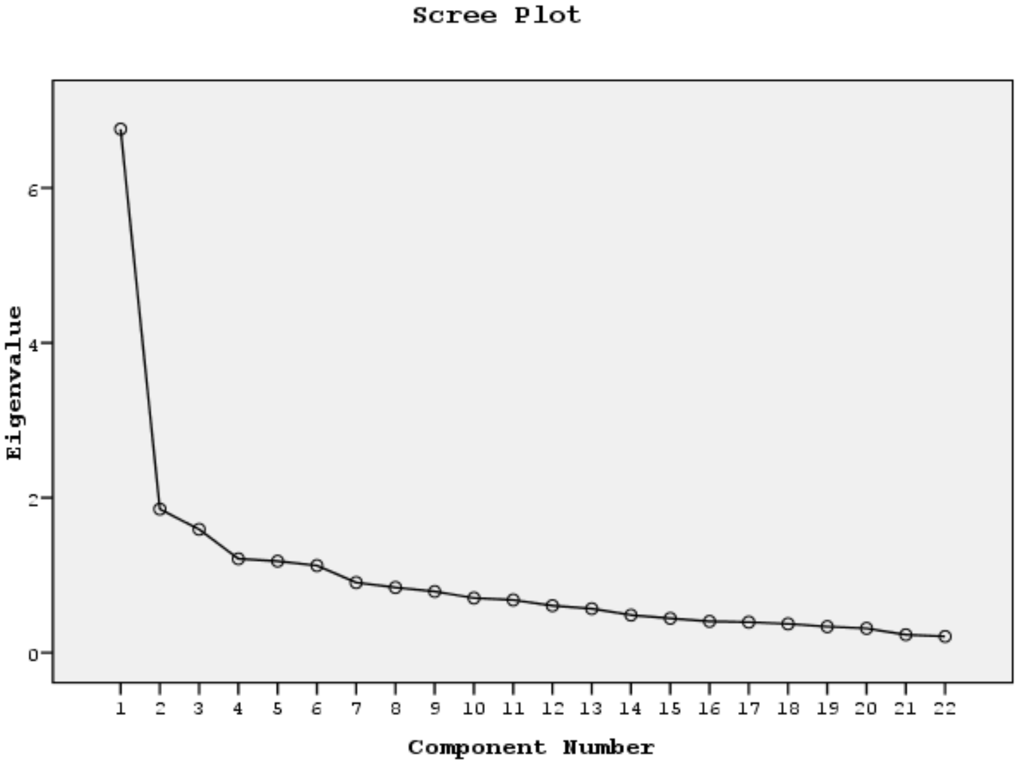

Figure 1. Scree Plot Graph

According to the items included in the scale, factor names are given. Factor numbers obtained with the specified names, the items within the factors, and the amount of variance explained by each factor are given in Table 1 below.

Table 1.

Item Numbers, Eigenvalues, Variances and Reliability Coefficients of Factors

Factors	Item Numbers	Eigen values	% Variances	Cronbach's Alpha
Earthquake Structure Relationship	4	6,761	30,730	.752
Earthquake Preparation Application	11	1,854	8,426	.838
Earthquake Preparedness	7	1,592	7,237	.827
Total	22		46,393	.884

The factor eigenvalues of the scale was calculated as 6,761 for the first factor; 1,854 for the second factor and 1,592 for the third factor. According to these values, the first factor determined as significant is 30,730% of the total variance of the scale; the second factor is 8,426% and the third factor explains 7,237%. The variance explained by three factors was determined as 46,393%. Table 2 shows the factor structure and item-total correlations and item load values obtained as a result of EFA.

As it can be seen in Table 1, the scale consists of three factors. Sub-factors were determined according to EFA performed after Varimax Steep Rotation. The factors constituting the scale were named according to the substance expressions determined considering the related literature. According to this, the first factor was "Earthquake Structure Relationship"; the second factor was "Earthquake Preparation Application" and the third factor was "Earthquake Preparedness". The first sub-factor is four (4); the second sub-factor is eleven (11); the third sub-factor is represented on the scale with seven (7) items.

As a result of the reliability analysis, the Cronbach alpha internal consistency coefficient of the scale was 0.752 for the first sub-factor; 0.838 for the second sub-factor and 0.827 for the third sub-factor. The internal reliability coefficient (Cronbach's alpha) calculated for all items of the SSEA was found to be 0.884.

Table 2.

Factor Pattern of the Sustainable Scale of Earthquake Awareness (SSEA) (Vertical Rotation-Varimax)

Items	Earthquake Structure Relationship	Earthquake Preparation Application	Earthquake Preparedness	Common Factor Variance
M10	,106	,691	,033	0,60
M12	,070	,676	,317	0,56
M08	-,122	,607	,249	0,45
M13	,013	,607	,338	0,48
M03	,277	,601	,057	0,44
M02	,337	,562	,179	0,46
M15	,035	,537	,396	0,45
M09	,297	,526	,100	0,37
M14	-,100	,514	,334	0,39
M11	,150	,488	,085	0,27
M07	,252	,416	,220	0,34
M22	,089	,066	,723	0,54
M21	,069	,024	,712	0,51
M20	,165	,045	,688	0,50
M18	,064	,320	,632	0,51
M16	,128	,356	,613	0,52
M17	,187	,406	,612	0,57
M19	,065	,255	,583	0,41
M04	,802	,051	,115	0,66
M01	,799	,059	,051	0,65
M06	,474	,322	,321	0,43
M05	,410	,223	,273	0,29

Confirmatory Factor Analysis (CFA)

Under some criteria, CFA aims to test the model claimed by the exploratory method and test the suitability of the model (Simsek, 2007). To evaluate the validity of the model in CFA, numerous fit indexes are used (Schermelleh-Engel et al., 2003). However, although it is not clear which adaptation indices will be taken into consideration for the fit of the model (Şimşek, 2007), RMSEA, AGFI, CFI, NFI, RMR and GFI indices are frequently used in the studies (Kayri & Gunuç, 2009). The most commonly used ones among these are the Chi-Square Fit Test, the Good Fit Index (GFI), the Corrected Good Fit Index (AGFI), the Square Root of Mean Errors (RMR) and the Average Square Root of Approximate Errors (RMSEA). For model data compliance, GFI and AGFI values are expected to be higher than 0.90 and RMSEA values should be less than 0.05. On the other hand, when the GFI value is higher than 0.85, the NFI and AGFI values are higher than 0.80 and the RMS value is less than 0.10; it is accepted as a criterion for the compatibility of the model with actual data.

The model obtained as a result of EFA was tested with CFA. Sumer (2000) reports that if the c2 / sd value is less than 5, the model will be in a good fit with the actual data. In this context, the model obtained ($c^2/sd=792,68/201=3,944$) appears to be suitable. However, it was evaluated in the literature that c^2 statistics cannot be sufficient for a good fit (Şimşek, 2007). Therefore, the suitability of the model obtained tested with RMSEA, NFI, GFI, AGFI and RMR compliance criteria. As a result of the analysis, the compliance values calculated for the suitability of the model were 0.072 for RMSEA; 0.93 for NFI; 0.89 for GFI, 0.041 for RMR and 0.86 for AGFI. Considering all criteria, it can be argued that a three-factor structure obtained from the CFA has an acceptable model.

The latent variable which is tried to be predicted in CFA is a three-factor structure. When the dependent variable and the items that try to explain the implicit variable are considered as independent variables, the diagram of the model obtained from the analysis is presented in Figure 2.

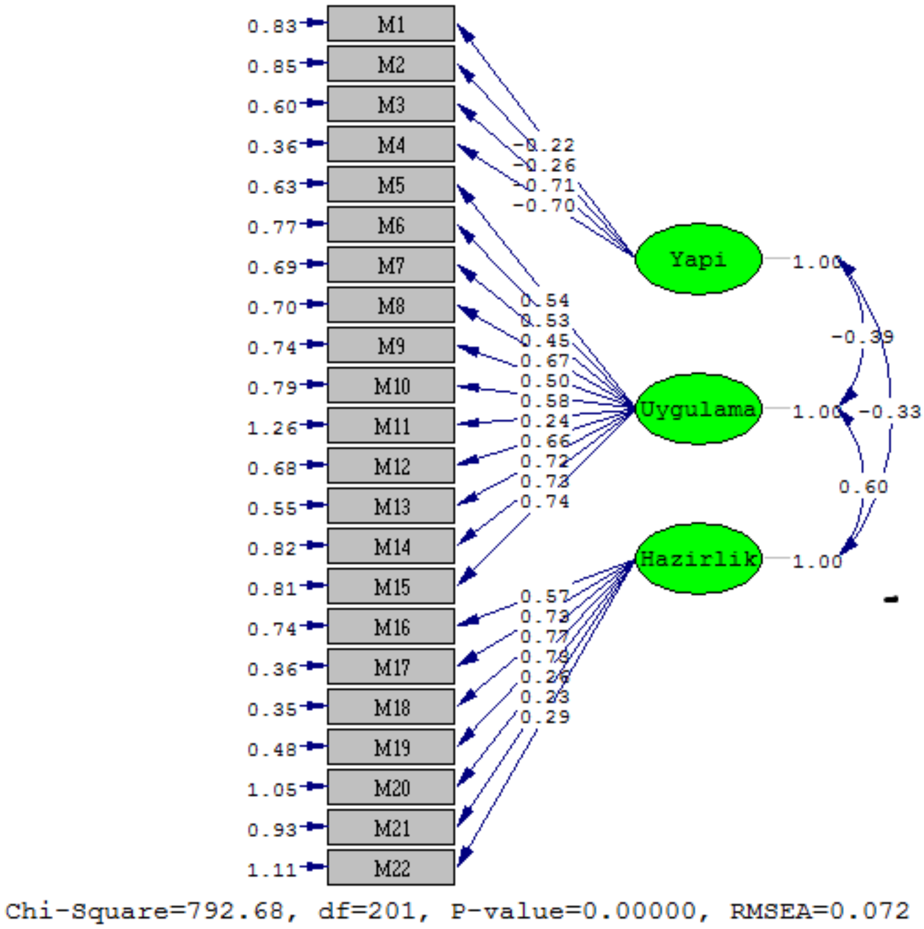

Figure 2. Diagram for Confirmatory Factor Analysis

Figure 2 shows the effect amounts and correlation coefficients of each substance on the implicit dependent variable. Item correlations were 0.22 to 0.71 in the first sub-factor; 0.24 to 0.74 in the second sub-factor and 0.23 to 0,77 in the third sub-factor. When this situation was evaluated in terms of all items in the scale, the correlation coefficients of the items were observed to vary between 0.22 and 0.77. In the study, the correlation between the items and the model which defines 22 items in three factors, can be said to have an acceptable good fit considering the C^2 (Chi-Square) statistics as well as RMSEA, CFI, GFI, RMR and AGFI values.

Validity and reliability analyzes were performed and the levels of the sustainable scale of earthquake awareness (SSEA) which were generated with 22 items of information, were scaled with a five-point Likert scale. Likert style expressions are; “Totally disagree”, “Disagree”, “Neutral”, “Agree” and “Totally agree”. All items in the scale are in positive form. There is no inverse substance in the scale and the score from the scale varies between 22 and 110.

Conclusion

The 22-item tool was developed based on three theoretical factors which aimed to measure earthquake awareness of university students. The first of these factors the Earthquake Structure Relationship, the second one is Earthquake Preparation

Application and the third one is Earthquake Preparedness. In this context, exploratory factor analysis was performed to determine the factor pattern of the tool.

Before the exploratory factor analysis, Kaiser-Meyer-Olkin (KMO) test was applied to test the suitability of the size of the sample for factorization. The KMO value was found to be .841. As a result of this, it was concluded that the size of the sample is "sufficient "for factor analysis (Leech, Barrett and Morgan, 2005; Şencan, 2005; Tavşancıl, 2005; Büyüköztürk, 2007). In addition, when the Bartlett sphericity test results were examined, it was found that the chi-square value obtained was significant (c^2=2071,939; sd = 2311; p <0,00). The distribution of the data set was tested with Kolmogorov-Smirnov. According to the Kolmogorov-Simirnov test (Z=1,101; p=0,177 ≥ .05) the total score obtained from the SSEA was found to be normal. In this respect, it is assumed that the data comes from the multivariate normal distribution.

In order to determine the factor design of the Sustainable Scale of Earthquake Awareness, the main component analysis as the factorization method and the maximum variability (varimax) from the rotation methods as the rotation method were selected.

As a result of the analysis, it was seen that there are three components that their value is above. The contribution of these components to the total variance is 46,393%. These three components are examined by considering the total variance table and slope-accumulation graph and it is seen that the three components contribute importantly to the variance considering the importance of their contribution to the total variance. In the analysis of the three factors, the contribution of the factors to total variance was found to be 30.730% for the first factor a, 8.426% for the second factor b, and 7.237% for the third factor c. The total contribution of the three factors to the variance was 46,393%. Four items of the scale items were collected in the first factor, 11 in the second factor and 7 in the third factor.

Three items (20, 21, 22) in the Awareness for Earthquake sub-factor are scored in the opposite direction as they contain negative statements about the awareness for the earthquake (totally disagree: 5 points, totally agree: 1 point). As a result of the reliability analysis, the Cronbach alpha internal consistency coefficient of the scale was 0.752 for the first sub-factor; 0.838 in the second sub-factor and 0.827 in the third sub-factor. The internal reliability coefficient (Cronbach alpha) calculated for all items of SDIF was found to be 0,884. These values are evaluated within the acceptance limits for a scale (Çokluk, Şekercioğlu and Büyüköztürk, 2012).

The level of acceptance for factor loadings was determined as .32 in the exploratory factor analysis to present the factor pattern of the Sustainable Scale of Earthquake Awareness. In the analysis made for the three factors, it was determined that there is no need for the items to be excluded from the scale when they were evaluated in terms of their level of acceptance and factor load. The obtained factor pattern is given in Table 2.

As a result of the analysis, it was seen that the theoretically defined substances were collected under their own factors. As it can be seen in Table 2, factor load values at subscales change between .410 and .802 for the Earthquake Structure Relation a), .416 and .691 for the Earthquake Preparation Application b) and .583 and .723 for the Earthquake Awareness.

In the literature, the fact that the ratio calculated with CFA ($\chi 2$/sd) is less than 5 can be seen as an indicator of good fit of the model with real data (Sümer, 2000). The model obtained in this context (c^2/sd=792,68/201=3,944) appears to have a good fit. Although it was evaluated in the literature that c^2 statistics would not be sufficient for a good fit, it was not stated which of the adaptation indices would be taken into account for compliance of the model (Şimşek, 2007). RMSEA, AGFI, CFI, RMR and GFI indices are frequently used in the studies (Kayri & Gunuç, 2009). For model data compliance, GFI and AGFI values are expected to be higher than 0.90 and standardized RMS and RMSEA values should be less than 0.08 (Hooper, Coughlan and Mullen, 2008; Jöreskog, and Sörbom, 1993; Sumer, 2000). On the other hand, if the GFI value is higher than 0.85, the AGFI value is higher than 0.80 and the RMS value is less than 0.10; it is accepted as a criterion for the compatibility of the model with the actual data (Anderson and Gerbing 1984; Marsh et al., 1988; et al., 2003). It was found 0.072 for RMSEA, 0.90 for NFI, 0.89 for GFI, 0.063 for RMR and 0.86 for AGFI. In the study, the correlation between the items and the model which defines 22 items in three dimensions can be said to have an acceptable good fit considering C^2 (Chi-Square) statistics as well as RMSEA, CFI, GFI, RMR and AGFI values.

When all these data are taken into consideration, it can be said the SSEA is a measurement tool that can be used for screening in earthquake's aftermath and has validity and reliability values for measuring the post-earthquake trauma level. Unlike this study, it is seen that in previous similar studies, researchers focused on the relationship between different types of trauma and earthquake experiences with psychological disorders (Kılıç & Ulusoy, 2003; Pınar & Sabuncu, 2004). Later, studies on the relationship between earthquakes and education started (Öcal, 2005; Kaya & Aladağ, 2017; Kayalı, 2018). In Öcal (2005) study; he stated that teachers have deficiencies in earthquake education. He emphasized the importance of earthquake education and learning about the effects of earthquakes in line with the dimensions of the developed scale. Similarly, Kaya and Aladağ (2017) determined the conceptual frameworks of prospective teachers about the earthquake concept in their study. In their research, they have reached categories in which Earthquake-related concepts, damages of earthquakes, types, and causes of earthquakes, landforms caused by earthquakes, and other effects are defined. This result is similar to the dimensions of the developed scale. In his study, Kayalı (2018) used an earthquake attitude test to determine the attitudes of middle school eighth-grade students against earthquakes. In the study, it was stated that it is important for students to have information about earthquakes and the damages they cause. This situation supports that the scale developed is important.

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RESEARCH ARTICLE

Sürdürülebilir Deprem Farkındalık Ölçeği: Geliştirilmesi, Geçerlik ve Güvenirlik Çalışması

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Özet

Sürdürülebilir Deprem Farkındalık Ölçeği'nin (SDFÖ) geliştirilmesi amacıyla planlanan bu araştırmanın çalışma evreni, 2018-2019 öğretim yılında Düzce Üniversitesi'nde öğrenim gören öğrenciler oluşturmaktadır. Tesadüfi örneklem yöntemiyle belirlenen araştırma grubunda, ilk uygulamada 213'ü kadın, 63'ü erkek olmak üzere toplam 276 gönüllü birey yer almıştır. Doğrulayıcı Faktör analizi için ise 434'ü kadın 129'u erkek gönüllü öğrenci katılmıştır. Toplam 647 Kadın (%77,12) ve 192 (%22,88) olmak üzere 839 öğrenci çalışmaya destek olmuştur. Verilerin analizlere uygunluğu sınandıktan sonra gerçekleştirilen açımlayıcı faktör analizi sonucunda, ölçek 22 maddeden oluşan üç boyutlu bir yapı sergilemiştir. Ölçeği oluşturan faktörler birlikte varyansın % 46,393'ünü açıklamaktadır. Ölçeğin alt boyutları, deprem hakkında bilgi ifadelerine dayalı olarak isimlendirilmiştir. Elde edilen modelin uygunluğu RMSEA için 0,072; NFI için 0,90; GFI için 0,89, RMR için 0,063 ve AGFI için ise 0,86 olarak bulunmuştur. Ölçekle ilgili olarak yapılan güvenirlik analizleri sonucunda ölçeğin iç tutarlık katsayısı (Cronbach alfa) ise 0,884 olarak belirlenmiştir. Geliştirilen bu ölçeğin, eğitsel amaçlı çalışmalara bir araç olarak destek sağlayacağı düşünülmektedir. Depreme ilişkin farkındalık düzeyinin farklı değişkenlerle incelenmesine yardımcı olabilecek değişik araştırmaların yapılması önerilmektedir.

Anahtar Kelimeler: Deprem, deprem farkındalığı, sürdürülebilir deprem farkındalığı, afet.

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Sustainable Scale of Earthquake Awareness (In English)

Please indicate the extent of your agreement/disagreement with the statements by using the following scale:

	Totally Disagree	Disagree	Neutral	Agree	Totally Agree
1. In case of an earthquake in the faculty; I have information about what to do.	1	2	3	4	5
2. I know how to evacuate the school (faculty) in case of danger.	1	2	3	4	5
3. I trust the earthquake resistance of the house (dormitory) I live in.	1	2	3	4	5
4. I trust the earthquake resistance of the faculty I study.	1	2	3	4	5
5. In our university, trainings are organized for the probability of an earthquake.	1	2	3	4	5
6. In my dormitory, trainings are organized for the probability of an earthquake.	1	2	3	4	5
7. Emergency exit directions are sufficient in our faculty building.	1	2	3	4	5
8. My family and I sometimes have a meeting on earthquakes.	1	2	3	4	5
9. The university organizes earthquake-related training and meetings.	1	2	3	4	5
10. My dormitory organizes earthquake-related training and meetings.	1	2	3	4	5
11. Our meetings on the earthquake are helpful.	1	2	3	4	5
12. We take the necessary precautions against the earthquake in the house (in the dormitory).	1	2	3	4	5
13. The earthquake bag in the house (dormitory) is ready.	1	2	3	4	5

14. In the house (dormitory) the items that can be fallen down are fixed to the walls.	1	2	3	4	5
15. Assembly point in the chaos that may occur during the earthquake is decided.	1	2	3	4	5
16. I'm ready for a possible earthquake.	1	2	3	4	5
17. As a whole university, we are prepared for an earthquake.	1	2	3	4	5
18. As a whole city, we are prepared for an earthquake.	1	2	3	4	5
19. As a whole country, we are prepared for an earthquake.	1	2	3	4	5
20. We're not safe in case of an earthquake.	1	2	3	4	5
21. I'm worried about a possible earthquake.	1	2	3	4	5
22. We're not prepared for an earthquake.	1	2	3	4	5

Sürdürülebilir Deprem Farkındalık Ölçeği (Türkçe)

	Hiç Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen Katılıyorum
1.Fakültedeyken deprem olsa; yapacaklarımız konusunda bilgi sahibiyim.	1	2	3	4	5
2.Tehlike anında okulu (fakülteyi) nasıl tahliye edeceğimi (çıkacağımı) bilirim.	1	2	3	4	5
3.Yaşadığım evin (yurdun)depreme karşı sağlamlığına güvenirim.	1	2	3	4	5
4.Eğitim gördüğüm fakültenin depreme karşı sağlamlığına güvenirim.	1	2	3	4	5

5.Üniversitemizde deprem olasılığına karşı tatbikatlar yapılır.	1	2	3	4	5
6.Kaldığım yurtta deprem olasılığına karşı tatbikatlar yapılır.	1	2	3	4	5
7.Fakülte binamızda acil çıkış yönlendirmeleri yeterlidir.	1	2	3	4	5
8.Ailemle deprem konusunda zaman zaman toplantı yaparız.	1	2	3	4	5
9.Üniversitede deprem konulu eğitim ve toplantılar yapılır.	1	2	3	4	5
10.Kaldığım yurtta deprem konulu eğitim ve toplantılar yapılır.	1	2	3	4	5
11.Deprem konusunda yaptığımız toplantılar yararlı olur.	1	2	3	4	5
12.Evde (kaldığım yurtta) depreme karşı gerekli önlemleri alırız.	1	2	3	4	5
13.Evde (yurtta) deprem çantamız hazırdır.	1	2	3	4	5
14.Evde (yurtta) devrilebilecek eşyalar duvarlara sabitlenmiş durumdadır.	1	2	3	4	5
15.Deprem anında oluşabilecek kargaşada toplanma noktamız bellidir.	1	2	3	4	5
16.Olabilecek bir depreme karşı hazırlıklıyım.	1	2	3	4	5
17.Üniversite olarak olabilecek bir depreme karşı hazırlıklıyız.	1	2	3	4	5
18.Yaşadığımız bu şehir olarak olabilecek bir depreme karşı hazırlıklıyız.	1	2	3	4	5
19.Ülke olarak olabilecek bir depreme karşı hazırlıklıyız.	1	2	3	4	5
20.Depreme karşı güvende değiliz.	1	2	3	4	5
21.Olabilecek bir depreme karşı endişeliyim.	1	2	3	4	5
22.Depreme karşı hazırlıklı değiliz.	1	2	3	4	5