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Developing a Survey about Factual Knowledge Related to Risks and Adjustments of Student Teachers for Natural Disasters: Its Validity and Reliability

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Abstract: The term "natural disaster" generally stands for "a situation which has the potential to create an event that has a negative effect on people". Human vulnerability, exacerbated by the lack of planning or lack of appropriate emergency management, leads to financial, structural and human loses after a hazardous event. It is impossible to prevent and to predict most of the dangerous natural disasters. Therefore, it is only possible to distinguish clearly between these natural disasters in order to determine necessities to eliminate known risks, to prepare the family disaster plan and to learn risk mitigation protectiveness strategies to decrease physical and emotional damages of natural disasters. For this reason, it is crucial to make people conscious of emotional and psychological coping resources in the event of a disaster. The aim of this study is to develop a survey to assess factual knowledge related to risks and adjustments of student teachers for natural disasters. A survey of 30 items has been developed in this research, which was conducted among 400 student teachers in Gazi University, Faculty of Education. The Cronbach alpha coefficient was 0.83 for overall survey and a factor analysis was conducted to assess the dimensionality of the survey and two dimensions were identified.

Key words: Natural disaster · Disaster adjustments · Factual knowledge related to risks · University students · Development of a survey

INTRODUCTION

The term "natural disaster" generally stands for "a situation which has the potential to create an event that has a negative effect on people". Human vulnerability, exacerbated by the lack of planning or lack of appropriate emergency management, leads to financial, structural and human loses after a hazardous event. It is impossible to prevent and to predict most of the dangerous natural disasters. Therefore, it is only possible to distinguish clearly between these natural disasters in order to determine necessities to eliminate known risks, to prepare the family disaster plan and to learn risk mitigation protectiveness strategies to decrease physical and emotional damages of natural hazards. For this reason, it is crucial to make people conscious of emotional and psychological coping resources in the event of a natural disaster.

It is accepted that an individual's perceptions are simply directed by intuitive judgements about a subject. Over the past three decades, researchers have attempted to clarify the reasons for differences in individual risk perceptions about natural disasters and develop techniques of assessing the complex views that individuals have about risk [1-7]. According to the results of the researches, there are important and subtle variations in perceptions found between individuals and groups. Moreover, an individual's risk perceptions are found to be biased with groups overestimating small probability events and underestimating large ones. It is also determined that generally individuals do not reason about risk by weighing and combining available evidence in a logical way but employ a number of mental strategies which sometimes yield reasonable opinions that lead to severe systematic errors [8, 9].

Numerous researches have attempted to assess associated risk perception factors. According to Lindell [8], factors affecting risk perception are usually interdependent and vary across different disaster types and across different people. Slovic, Fishhoff and Lichtenstein [10], measured 18 characteristics about risk perception and found out that they relate to three factors:

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(1) dread (controllability, fatal or non-fatal consequences, high or low catastrophic potential), (2) familiarity (known or unknown, rapid or delayed manifestations) and (3) exposure (numbers exposed, personel exposure). Lindel [1], suggests risk perceptions as a function of characteristics of the disaster agent (acute and catastrophic versus chronic and low level). According to Lindell, disaster agents affect personal differences in perceptions both physically and psychologically. These personal differences in perceptions are thought to relate to the level control that one has over available physical and emotional-psychological coping resources. Physical resources would include factual knowledge related to preparedness behaviours (knowing what to do and what not to do in the event of a disaster) as well as more performance - based forms of preparedness (emergency plans, practice in a simulated disaster). Emotional-psychological resources would include reduced fear levels prior to disaster as well as confidence in one's available coping resources. According to Perry [11], familiarity and salience of a threat are significant determinants of people's responses to a natural disaster. These factors may be correlated with factors including media exposure (television or movies), catastrophic potential and geographic vulnerability.

How people respond to natural disasters is determined by their individual and community vulnerability and how they perceive and cope with them [12-14]. Lazarus proposes that a person engages in a process of cognitive appraisal when faced with a threatening event [19]. Two concurrent coping efforts then occur: (1) attempts to control the threatening situation (problem-focused coping) and (2) endeavours directed towards regulating emotional reactions to the threatening situation (emotion-focused coping). The current survey aimed to assess elements of problem-focused coping.

The strategies which are effective in the perception of disasters by individuals and communities and in their perceived ability to cope with them have shown that they also affect a variety of earthquake relevant prevention and preparedness actions: for example, a lack of awareness and unrealistic risk perceptions are negatively impact preparedness and reactions to warnings [14-17]. In assessing people's current levels of risk perceptions and preparedness, it is crucial to understand whether people have available factual information [16]. Although there is a clear link between disaster knowledge and the perceived degree of risk, there is often diminished perception of risk even when the disaster is well understood [14,18].

Few researches have attempted to assess factual knowledge related to risks and disaster adjustments. The general findings are that student's reactions to natural disasters are based on a combination of factors that include (1) direct exposure to the hazard combined with the perception of increased physical risk, (2) pre-existing characteristics (e.g., demographic factors including asthma status, age, gender, ethnicity, pre-existing emotional problems), (3) availability of adaptive coping resources, (4) access to social support mechanisms (5) the occurrence of major life stressors (e.g., parental divorce, family death) following the hazard [14]. Most of these researches are designed to provide information concerning various aspects of disaster knowledge, awareness and preparedness of primary and secondary school children.

In this research, to assess factual knowledge related to risks and adjustments of student teachers in Gazi University, Faculty of Education for natural disasters, a survey about mass disasters that impinge on daily lives was developed for teacher students. These mass disasters include earthquakes, fires, flash floods, tsunamis, volcanic eruptions, avalanches, winter storms, thunderstorms, tornadoes and hurricanes. This research in Higher Education that is the continuation of primary and secondary stage will be filled an important gap in this area especially in Turkey that have high disaster risk potential and will provide an important contributes for national and international researches in the future. The current research provides the dimensions of existing insufficient knowledge in Higher Education about factual knowledge related to risks and adjustments for natural disasters. This research is also important because it documents the current level of awareness of disasters of student teachers in Gazi University, Faculty of Education and the effectiveness of disaster education programme at Gazi University.

METHODS

This research was conducted among 400 student teachers attending first and fifth classes in Gazi University, Faculty of Education, Department of Secondary Social Sciences (programmes in Geography Education, History Education, Turkish Education and Philosophy Education), Department of Secondary Science and Mathematics Education (programmes in Mathematics Education, Physics Education, Chemistry Education and Biology Education) and Department of Educational Sciences (programme in Psychological Counseling and

Guidance) during the 2007-2008 school year. Approximately each one of three teachers has graduated from Gazi Faculty of Education in Gazi University in Turkey. Therefore, the sample is selected from Gazi Faculty of Education to reflect general situation of Turkey.

In this research, a survey with 30 items was developed by reviewing the literature [1, 16, 14, 19, 20, 21] to constitute item repository and was used to assess factual knowledge related to risks and adjustments of student teachers for natural disasters. The student teachers (n = 120) were asked to write a composition about disaster adjustments. The responses of participants were categorized considering their mutual characteristics and 30 items were constituted for the survey. The survey consisted of 13 items factual knowledge related to disaster risks (1, 2, 3, 4, 5, 6, 15, 19, 23, 26, 27, 28, 30) and another 17 items factual knowledge related to adjustments for natural disasters (7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 20, 21, 22, 24, 25, 29) (Table 1). For each item, student teachers were instructed to answer "absolutely correct", "it seems correct", "I'm not sure", "it seems incorrect" or "absolutely incorrect". The survey was administered in Turkish. The Turkish equivalent of survey items were presented in Table 2. For data coding; if the statements are positive, e.g., the choices "absolutely correct" were given 5 and the others were given 4, 3, 2, 1 respectively; if the expression is negative, e.g., the choices "absolutely incorrect" were given 5 and the others were given 4, 3, 2, 1 respectively. Instrumentation experts (n = 10) reviewed the survey to establish content and face validity. Some modifications were made according to the recommendations made by these experts. Using the data collected during a pilot administration (n = 120), internal consistency and construct validity were obtained for the survey. The final survey consisted of 30 items.

The participants were asked a question to prefer which sources they used most to find out about natural disasters; television, radio, printed media, disasters education programmes, parents, friends or disasters

Table 1: Item-to-total correlation values and factor loadings of survey items

Items	Item-to-total correlation values	Factor loadings 1	Factor loadings 2
7.Tsunami walls may have succeeded in slowing down and moderating the height of the tsunami, but it did not prevent major destruction and loss of life.	0.46**	0.49	
8.A tsunami can not be prevented or precisely predicted.	0.45**	0.40	
9.El Nino conditions last for many months, more extensive ocean warming occurs and its economic impact to local fishing for an international market can be serious.	0.45**	0.55	
10.The high winds are the most damaging results of a hurricane.	0.51**	0.57	
11.Because of the porch is the most vulnerable part of a house during a thunderstorm, people should not use this section.	0.46**	0.36	
12.Tornado is the most damaging result of thunderstorms.	0.33**	0.37	
13.Hurricane is a moderate intense storm originating in mountainous areas.	0.44**	0.37	
14.Survial time for an avalanche victim ranges between 30-60 minutes.	0.45**	0.38	
16.The signs of hypothermia are that the body heat decreases gradually and fingers,toes and earlobes turn pale.	0.41**	0.39	
17.Lava flow is the deadliest volcano disaster.	0.46**	0.64	
18.If we are inside a building when the shaking from an earthquake begins, we should run out immediately.	0.45**	0.39	
20.After a seismic activity, household members should use radio and television to obtain information.	0.32**	0.28	
21.If it is impossible to take shelter from a thunderstorm in a building, one should run away from the area.	0.50**	0.58	
22.If an earthquake has generated a tsunami wave, marine vehicles should be transported from the open sea to inshore.	0.51**	0.45	
24.People should not take shelter in a sturdy car during a thunderstorm for protection.	0.48**	0.47	
25.An automobile is the safest place to be in during a winter storm.	0.43**	0.37	
29.Family disaster plan should be revised every six months.	0.48**	0.46	
1.An earthquake is caused by tectonic plates getting stuck and putting a strain on the ground and the sudden release of stored energy in the Earth's crust that creates seismic waves.	0.40**		0.41
2.East Anatolian Fault Zone has been Turkey's most active earthquake region over the past century.	0.33**		0.27
3.Recent researches estimate that an earthquake larger than a magnitude of 7.4 will occur in Marmara region and it will probably be between 60% and 90%.	0.30**		0.40

Table 1: Continued

Items	Item-to-total correlation values	Factor loadings 1	2
4.Alternate freezing-thawing processes allow the force gravity to overcome the resistance of earth material to landslide.	0.32**		0.47
5.Landslides are a serious disaster to Middle and Eastern Black Sea regions of Turkey.	0.30**		0.37
6.Scientist predict that contributing to strengthened greenhouse effect may result in greater events of heavy rainfall in urban areas.	0.39**		0.42
15.A slope that is flat enough to hold snow but step enough to ski has the potential to generate an avalanche, regardless of the angle factor.	0.44**		0.32
19.Earthquake warning systems include high-speed communications systems and computers which collect the sensor readings based on P-waves and the computers are programmed to detect the likely strength and progression of the seismic event.	0.34**		0.51
23.If a tornado is heard or seen coming, people should go upstairs.	0.39**		0.34
26.If the clothes catch fire in the event of a fire, people should drop to the ground, cover their face and roll back and forth until the flames go out.	0.36**		0.46
27.If the forces available to resist movement are greater than the forces driving movement, the slope is considered stable.	0.44**		0.52
28.It is possible to avoid the impact of disasters resulting from notable avalanches by forming small scale avalanches using various methods such as explosive charges.	0.40**		
30.Family disaster plan should include risk evaluation of disaster, physical coping resources and first aid supplies.	0.33**		0.45

**Correlation is significant at the 0.01 level (two-tailed)

Table 2: The Turkish equivalent of survey items.

Maddeler

1.Litosferi oluşturan tektonik plakaların hareketleri sonucu oluşan sürtünmenin yarattığı enerji birikiminin açığa çıkması depremle sonuçlanmaktadır.
2.Türkiye'de son yüzyılın en büyük depremleri Doğu Anadolu Fay Hattı (DAF) üzerinde gerçekleşmiştir.
3.Son olasılık çalışmalarına göre, önümüzdeki 30 yılda, Marmara'da büyüklüğü 7.4'ün üzerinde bir depremin herhangi bir günde gerçekleşme olasılığının, %60 ile %90 arasında bulunduğu öngörülmektedir.
4.Heyelanın meydana gelmesinde, toprak materyalinin direncinin yerçekimi kuvvetine yenilmesine neden olan faktörlerden biri, donma-çözülme süreçleridir.
5.Heyelanlar Türkiye'de Karadeniz Bölgesi'nin Orta ve Doğu Karadeniz bölümleri için ciddi boyutta doğal afet tehlikesi içermektedir.
6.Bilim insanları, atmosfere salınan zararlı gazların yarattığı kuvvetlenmiş sera etkisinden doğan küresel ısınma sonucunda, günümüzde gözlenmekte olan ani şehir sellerinde artışlar kaydedileceğini öngörmektedirler.
7.Tsunami duvarları ile, tsunami dalgalarının hızını kesmek ve yüksekliğini azaltmak mümkün olsa da, büyük yıkımların ve hayat kayıplarının önüne geçilememektedir.
8.Tsunami dalgalarını durdurma gücü yoktur ve oluşumunun kesin olarak tahmin edilmesi mümkün değildir.
9.El Nino koşullarının etkisi aylarca sürebilmekte, okyanus yüzey sıcaklığının aşırı artışına bağlı olarak, yerel balıkçılık sektöründe ciddi ekonomik güçlükler yaşanmaktadır.
10.Bir tropikal fırtınanın en zarar verici etkisi, şiddetli rüzgarlardır.
11.Bir evin yıldırım düşme tehlikesine en fazla açık olan bölümü giriş bölümü olduğundan dolayı; şimşekli, gök gürültülü ve sağanak yağışlı havalarda bu bölüm kullanılmamalıdır.
12.Orajların en tehlikeli yönü, tornado (hortum) ile sonuçlanmasıdır.
13.Kasırga, dağlık alanlarda oluşan orta derecede şiddetli bir fırtınadır.
14.Çığ altında bir saat kalan bir kazazedenin hayatta kalma süresi, yalnızca 30-60 dakikadır.
15.Karın toplanmasına imkan verecek biçimde düz olmakla birlikte, kayak yapmaya imkan verecek dikliğe sahip bir yamaç, eğim açısı dikkate alınmaksızın, potansiyel çığ alanıdır.
16.Vücut ısısının normalin altına düşmesi ile ortaya çıkan; burun, el ve ayak parmakları, kulak memesinin uyuşması ve renginin atması, hipotermi belirtileri arasındadır.
17.Lav akıntıları, volkanik püskürmeler sırasında açığa çıkan en ölümcül materyallerdir.
18.Iç mekanlarda deprem sarsıntıları hissedilmeye başladığında, vakit geçirmeksizin dışarıya çıkılmalıdır.
19. Erken uyarı sistemleri, birincil (primer) deprem dalgaları bilgisine dayanarak, daha tehlikeli ikincil (sekonder) deprem dalgalarının sarsacağı noktanın birkaç saniye önce uyarılmasını sağlamaktadır.
20.Deprem sonrasında bilgi edinmek amacıyla, radyo ve televizyon kullanılmalıdır.
21.Bir oraj sırasında, iç mekanlara sığınma imkanı bulunmuyorsa, orajın meydana geldiği sahadan mümkün olduğunca hızlı bir şekilde uzaklaşılmalıdır.
22.Tsunami alarmı durumunda, açık denizdeki taşıtlar, kıyıya taşınmalıdır.
23.Tornadodan (hortum) korunmanın en iyi yolu, binaların en üst katına sığınmaktır.
24.Şimşekli ve gök gürültülü havalarda, araç içine sığınmak iyi bir korunma değildir.
25.Tipi (kar fırtınası) sırasında sığınılacak en güvenli yer, otomobillerdir.
26.Yangın sırasında, giysiler ateş alıp yanmaya başlamışsa; yere yatıp yüz kapatılarak, ileriye ve geriye doğru yuvarlanılmalıdır.
27.Yamaç stabilitesini bozan durumların ortadan kaldırılması, kütle hareketi riskini ve olumsuz sonuçlarını azaltacaktır.
28.Çeşitli yöntemlerle küçük çığlar oluşturularak, daha büyük çığların oluşumunu önlemek mümkündür.
29.Aile afete hazırlık planı her altı ayda bir gözden geçirilmelidir.
30.Aile afete hazırlık planı, afete ilişkin risk değerlendirmesi, fiziksel korunma önlemleri ve ilk müdahale kaynaklarını içermelidir.

Table 3: Sample profile

Characteristics	
Gender	38% female; 62% male
Class	51% 1; 49% 5
Departments	40% social sciences; 40% science and maths; 20% educational sciences
Settlement type	45% city; 44% metropol; 6% town; 5% village
Education status (mother)	57% primary school; 22%high school; 11% secondary school 10%faculty of a university
Education status (father)	32% faculty of a university; 28%high school; 27% primary school; 13%secondary school
Source of information	43%printed media; 32%hazards education programmes; 11%television/radio; 10%family members/friends; 4%hazards education seminars
Exposure to disasters	65%no; 35%yes
Family disaster plan	87%no; 13%yes

education seminars. Moreover, in the last section of the survey some personal details were recorded such gender, settlement, department, class, previous exposure to disasters and education status of parents. Details of the sample characteristics are presented in Table 3.

RESULTS AND DISCUSSION

In this section, findings and interpretations about the study of validity and reliability of the survey were assessed.

Findings about the Study of Reliability of the Survey: Item analysis was used for item reduction and internal consistency [22]. Item analysis consisted of the adjusted item-to-total correlation. Analysis of results for item-to-total correlation values is presented in Table 1.

Using the 400 participants of the research, the internal consistency assessment yielded the coefficient alpha value: 0.83.

Findings about the Study of Validity of the Survey: For study of validity of the survey, a factor analysis was used to check the variety of the survey about factual knowledge related to risks and adjustments of student teachers for natural disasters and two sub dimension was determined. A factor analysis and a varimax rotation method were performed on the data for the 30 items. As a result, 30 items with factor loading greater than 0.30 were found. Analysis of the items extracted two component with eigenvalues greater than 1.0; total variance explained was 57 %. The 17 items corresponded to the "disaster adjustments" dimension (the first sub dimension) and the 13 items corresponded to the "disaster risks" dimension (the second sub dimension) . Factor loadings range from 0.30 to 0.64 and item-to-total correlation values ranged from 0.32 to 0.51.

The coefficients correlation values among sub dimensions are presented in Table 4. Table 4 indicated the

Table 4: The coefficients correlation values among sub dimensions.

		sub1	sub2
sub1	Pearson Correlation	1	.566**
	Sig. (2-tailed)		.000
	N	400	400
sub2	Pearson Correlation	.566**	1
	Sig. (2-tailed)	.000	
	N	400	400

**Correlation is significant at the 0.01 level (2-tailed)

significant correlation between first and second sub dimensions. A factor analysis was conducted to assess the dimensionality of the survey and two dimensions were identified. The internal consistency assessment yielded the coefficients alpha values of first dimension was 0.79 and second dimension was 0.66.

CONCLUSIONS

The purpose of this research was to develop a survey to assess factual knowledge related to risks and adjustments of student teachers for natural disasters. The primary goals of this survey was to gather information concerning student teachers' current levels of awareness of disasters and to document the effectiveness of current disaster education lessons at Gazi University. The sample included 400 student teachers from first and fifth classes of the Faculty of Education in Gazi University. The survey consisted of 13 items factual knowledge related to disaster risks (1, 2, 3, 4, 5, 6, 15, 19, 23, 26, 27, 28, 30) and another 17 items factual knowledge related to adjustments for natural disasters (7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 20, 21, 22, 24, 25, 29) . For each item, students were instructed to answer "absolutely correct", "it seems correct", "I'm undecided", "it seems incorrect" or "absolutely incorrect". Instrumentation experts reviewed the survey to establish content and face validity. Some modifications were made according to the recommendations made by these experts. Using data collected during a pilot administration (n = 120), internal consistency and construct validity were obtained for the survey. The final survey consisted of

30 items. Using the 400 participants of the research, we found out the internal consistency assessment yielded the coefficient alpha value: 0.83. In the study of validity of the survey, a factor analysis has been used to check the variety of the survey and two sub dimension has been determined. Data analysis indicated that the survey developed in this study has satisfactory validity and reliability measures.

Using the simple quantitative survey approach, the following topics will be assessed in more detail in supplementary research by using the survey developed in this study: Determining the risk awareness of natural disasters of student teachers; establishing dimensions of existing knowledge of risk mitigation protectiveness strategies and the need to solve these problems; and pointing out the roles of media and education in raising disaster awareness of student teachers.

New survey development researches will be conducted to establish different samples of disaster awareness, perceptions and preparedness and they will be applied to university students from different branches to compare them in terms of their disaster-related protective behaviours.

REFERENCES

1. Lindell, M.K., 1994. Perceived Characteristics of Environmental Hazards. IntL. J. Mass Emergencies Disasters, 12: 303-326.
2. Lindell, M.K. and R.W. Perry, 2000. Household adjustment to earthquake hazard: A review of research. Environ. Behav., 32: 590-630.
3. Lindell, M.K., C.S. Prater and R.W. Perry, 2006. Fundamentals of Emergency Management. Emmitsburg MD: Federal Emergency Management Agency Emergency Management Institute. www.training.fema.gov/EMIWeb/edu/fem.asp
4. Lindell, M.K. and C.S. Prater, 2002. Risk area residents' perceptions and adoption of seismic hazard adjustments. J. Applied Soc. Psychol., 32: 2377-2392.
5. Lindell, M.K. and C.S. Prater, 2000. Household adoption of seismic hazard adjustments: A comparison of residents in two states. International J. Mass Emergencies Disasters, 18: 317-338. www.ijmed.org
6. Lindell, M.K. and D.J. Whitney, 2000. Correlates of seismic hazard adjustment adoption. Risk Analysis, 20: 13-25.
7. Macaulay, J. and J. Logie, 1996. Natural hazards education in New Zealand. In: International perspectives on teaching about hazards and disasters. Lidstone, J. (Ed.). Philadelphia: Channel View Publications.
8. Higgins, E.T. and J.A. Bargh, 1987. Social cognition and social perception. Ann. Rev. Psychol., 38: 369-425.
9. Kahnemen and Tversky, 1973. On the psychology of prediction. Psychol. Rev., 80: 237-251.
10. Slovic, P., B. Fishhoff and S. Lichtenstein, 1981. Perceived risk: Psychological factors and social implications. Proceed. Royal Soc. London, A376: 17-34.
11. Perry, R.W., 1985. Comprehensive Emergency Management. Greenwich CT: JAI Press.
12. Lazarus, R.S., 1966. Psychological Stress and the Coping Process. New york: McGraw-Hill.
13. Lazarus, R.S. and S. Folkman, 1984. Stres, Appraisal and Coping. New york: Springer-Verlag.
14. Ronan, K.R., D.M. Johnston, M. Daly and R. Fairley, 2001. School children's risk perceptions and preparedness: A hazards education survey. Australasian J. Disaster Trauma Studies. http://www.massey.ac.nz/~trauma
15. Lindell, M.K. and R.W. Perry, 1992. Behavioral Foundations of Community Emergency Planning. New York: Hemisphere Publishing Company.
16. Mileti, D.S. and C. Fitzpatrick, 1993. The great earthquake experiment: Risk communication and public action. Westview Press: San Francisco, U.S.A.
17. Mileti and O'Brien, 1993. Public response to aftershock warnings. U.S. geological Survey Professional Paper, 1553-B: 31-42.
18. Burger, J.M. and M.I. Palmer, 1992. Changes in and generalization of unrealistic optimism following experiences with stressful events: Reactions to the 1989 California earthquake. J. Personality Soc. Psychol., 18 (1): 39-43.
19. Şahin, C., H. Doğanay and N.A. Özcan, 2005. Türkiye Coğrafyası (Fiziki-Beşeri-Ekonomik-Jeopolitik). (Üçüncü Baskı). Ankara: Gündüz Eğitim ve Yayıncılık.
20. Şahin, C. and S. Sipahioğlu, 2003. Doğal Afetler ve Türkiye. (Ikinci Baskı). Ankara: Gündüz Eğitim ve Yayıncılık.
21. Yılmaz, C., 2005. Temel ve Güncel Klimatoloji. Samsun: Eser Ofset Ltd. Şti.
22. Büyüköztürk, Ş., 2005. Sosyal Bilimler Için Veri Analizi El Kitabı. (Beşinci Baskı). Ankara: Pegem A Yayıncılık.