

PERCEPTION OF THE NEW SETTLEMENT AFTER DISASTER

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This study examines the psychological impact of the disaster on the memory of the affected community. The perceptive process of the individuals are determined according to the memory and place attachment concepts and issues. A case study was conducted in a disaster affected area in Turkey. Duzce city was heavily damaged by the earthquakes in 1999. Comparisons between the new and old settlements were made on the basis to the representations of mind and through images of the new and old settlement with the focus to community reconstruction process of the victims. Cognitive maps of the victims primarily are tried to be determined by the description of the formation of the new/old environs. The state of memory and cognitive schemata is carried out from the view point of syntactic and semantic realms of the environment. The representative performance of the new settlement from the view point of victim is determined as well. The results of the comparison of the new and old settlement determine what the extent the community was psychologically effected from the relocation after the disaster.

Key words: Cognitive Mapping, Place Attachment, Community Reconstruction

INTRODUCTION

Natural disasters are of many types and have diverse characteristics. They caused intensive disruptions and losses to the affected communities. The impacts could vary according to the disaster type and they had physical, social, economical and psychological aspects (Disaster Mental Health Response Handbook, 2000). Individuals and communities are affected in ways which prevent their normal functioning. All appropriate actions after the disaster are taken to enable individuals and their communities to return to their normal life as soon as possible both physically, socially and psychologically (EMA, 1996). The pre disaster environments and places are the part of the physical and social milieu which disaster victims had relations and also different kinds of positive or negative bonds. These bonds also are represented in the human minds as cognitive maps. So by defining the cognitive maps of the victims we could find out the cues of the important part of the pre and post disaster environments.

This paper explores how to evolve places as ever-shifting points of meaning that had relations during unexpected and sudden changes in people's lives and the response of peoples to variety of influences especially in a disaster affected site. The relation between the human and environment after such a traumatic event is tried to be determined from the point view of the victim's psycho-social experience as well.

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THEORETICAL BACKGROUND

Cognitive maps are mental models of the relative locations and attributes of phenomena in spatial environments. Understanding how people form cognitive maps of their environments is vital for effective post disaster environment design where the users are in a traumatic case. We form cognitive maps to deal with and process the contained in the surrounding environment (Billingshurst and Weghorst 1995). Cognitive mapping is formally defined as;

".. a process composed of a series of psychological transformations by which an individual acquires, codes, stores, recalls and decodes information about the relative locations and attributes of phenomena in their everyday spatial environment" (Stea and Downs, 1973).

An individual's cognitive map is an active information seeking structure of which spatial imagery is but one aspect (Neisser, 1976). Cognitive maps are also made up of memories of objects and kinesthetic, visual and auditory cues (Henry, 1973). The perception of the environment itself is always guided by some sort of cognitive map, so an inaccurate or incomplete cognitive map leads to disorientation and confusion (Neisser, 1976). Designing post disaster environments through which subjects can navigate and orientate themselves successfully requires an understanding of cognitive map formation in such traumatic conditions.

Mac Eachrean and Kraak (1997) articulate a fundamental shift to a new emphasis on map which shows the difference between exploring unknowns and communicating with known with maps. Cognitive maps are important in understanding the representation of the environment in human's mind. But this term determines the human relationships only by means of mental processes that can not be sufficient to understand the deeper sensational human-environment interactions. Thus, cognitive cartography needs to be strengthened by phenomenological studies which explore the sensational aspects of the human environment interaction.

We know from our everyday experiences that we, across time, evolve bonds towards certain places, e.g. where we were born and brought up, where we live and work. Thus, we make and gain emotional and cognitive conceptions of physical environments that are related to us as individual agents and as members of social groups. This indicates that a place is an extensive concept (Canter, 1977). A variety of theoretical positions and frameworks have been advanced to account for how places become "places"—in other words, how places become meaningful. Most existing frameworks share the idea that a place is a complex concept, given life by people attaching meaning to a physical setting in a variety of ways (Smaldonea et. all., 2005). Place attachment in this sense can be used as a tool to understand the level of sensational relations between the human and environment.

Place attachments are profoundly disrupted when environments change rapidly, such as when floods, earthquakes or other environmental disasters strike (Brown and Perkins, 1992). Place attachments are often related to, but not determined by, changing housing and neighborhood conditions. Yet attachments also change as individuals and house holds develop, environments age, or the processes supported by settings alter (Brown B. et all, 2003). As the disasters strike and change the social, physical and psychological environments the new environment which would be constructed could meet the requirement of the victims including all these factors. But the traumatic case added more environmental stresses to the victims more than their daily routine.

Cognitive theories of posttraumatic stress are developed relatively more than biological, psychodynamic, and learning theories. Moreover, cognitive theories have the greatest explanatory and predictive power about the posttraumatic reactions. According to the

cognitive theories, before the traumatic experience, people have preexisting beliefs and models of the world. Traumatic experience provides new information which is incompatible with the preexisting beliefs. The kind of posttraumatic reactions depends on the success of the effort to integrate new information into preexisting beliefs. If the person can integrate the new information into the preexisting beliefs, successful information processing occurs. However, if the new information can not be assimilated with the preexisting beliefs, pathological posttraumatic reactions occur (Brewin, Dalgleish, Joseph, 1996). PTSD (Post Traumatic Stress Disorder) occurred after the disaster can lead to extremes of retention and forgetting; terrifying experiences may be remembered with extreme vividness, or totally resist integration (Bessel and Kolk, 1998). So, the trauma may cause mental changes that cognitive maps could be impacted. Such changes had a crucial role in the representations of the victims mind and their perception of the disrupted environment. The new environment which will be reconstructed could at least meet the minimum mental and psycho-social needs of the victims such as the important or over valued images of the disrupted old environment. So that this could give the victims to adapt easily and maintain their daily life as soon as possible.

TURKEY-DUZCE AS CASE STUDY

Duzce province is located on the North Anatolian fault line in Duzce plain (Figure 1). As a result of the rapid industrialization between 1980-1998, the migration to the city from the rural areas increased. The housing demand rapidly increased as well. The total area of the city is 2593 km². The population is 307.056 according to 1997 census, the density of 108 people/km² and is more than Turkey's 83 people per km² average. Rapid migration caused unplanned constructions in the city (see Figure 2). Nevertheless, constructors add more floors to the old buildings which were constructed on the weak soil and were over the limits of the municipality laws. New buildings were constructed rapidly with inconvenient labor and material. On the other hand, there were no reliable construction control systems for the building construction processes in Turkey (Duzce Municipality Chairmanship 2000).



Figure 1 North Anatolian Fault Line and Impact of the Earthquake to Duzce (DMC, 2000).



Figure 2 The Duzce City Center Before the Disaster

In 12 November 1999 the devastating earthquake with 7, 2 magnitudes occurred in Duzce province. Approximately 43000 buildings were damaged (see Figure 3). Generally 84 % of the houses and % 16 of the work places were damages. Also 980 people died and 38939e peopl were injured (Duzce Governorship 2002).



Figure 3 Duzce City Center after the Earthquake

8004 housing units were constructed in Duzce by Ministry of Public Works and primarily the ministry gave a grant to the house owners who are willing to buy houses or willing to construct houses in their own properties (see Figure 4). New permanent housing sites were constructed by the Public Works after the occupancy of the temporary houses.

DUZCE PROVINCE EXISTING LAND USE

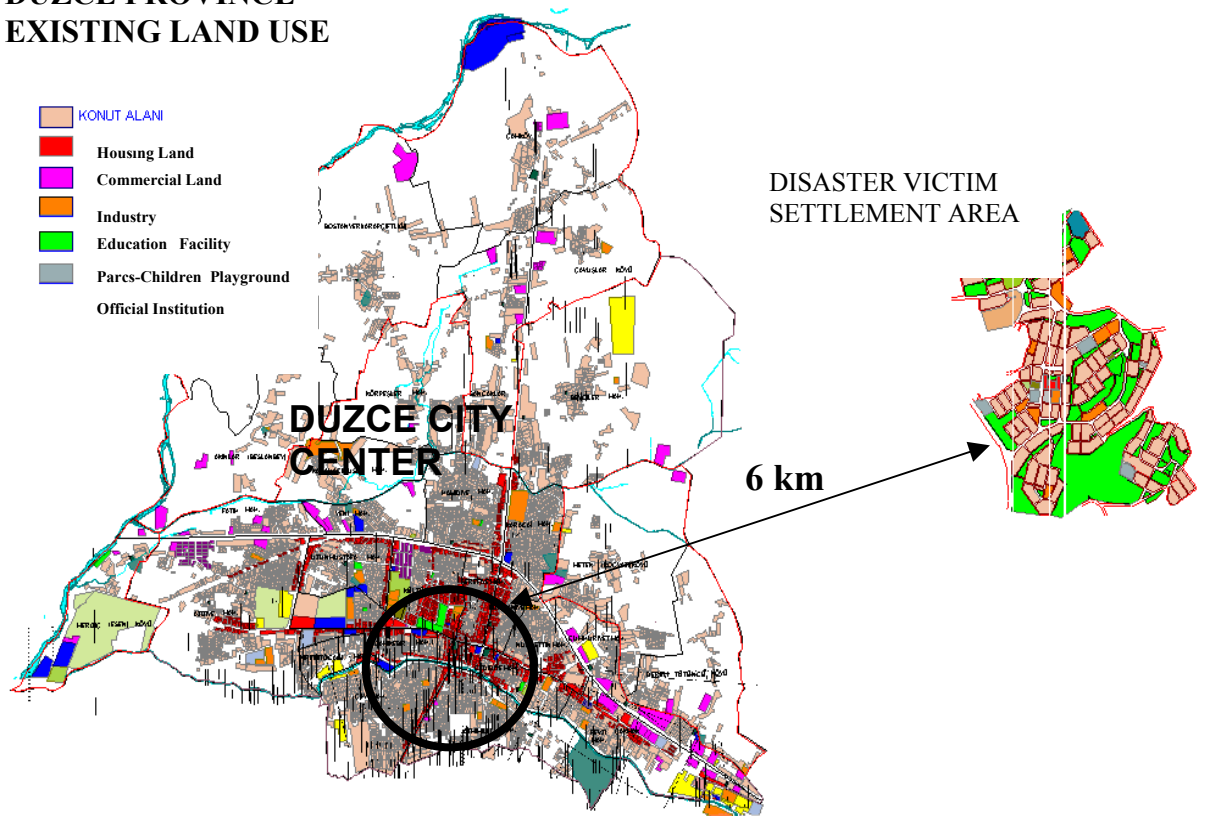


Figure 4 Duzce Province Post Disaster Land Use

The new settlement was located in the northeast of Duzce between Kazıkoglu, Sallar and Nalbantoglu villages (Ministry of Public Works, 2000). The permanent housing site was located outskirts of the Duzce Municipality boundaries and its size is approximately 350 hectares. The disaster victims relocated and begin to live in the new environment which was 6 km far away from the city center.

METHODOLOGY

Two different methodologies were used in order to find out the cognitive changes and place attachments levels of the victims to the old and new city center. Before the implementation to the focus group, the important landmarks of the new and old settlements were determined by the help of the municipality officials in order to found out the exact place of the old (see Figure 4) and new city landmarks (see Figure 5). This study presents the results of Duzce case study which was conducted among the selected sample of a total of 30 disaster victims between 18–60 ages.

The case study was implemented in two stages. In the primary stage, the new and old city center maps were determined in order to find out the cognitive maps of the victims. We asked them to mark or/and draw buildings, recreational parc areas, landmarks, etc. of the old city (Figure 4) and new city based on three phases corresponding time intervals. The disaster victims marked the old city buildings respectively in 1, 3 and 5 minutes. In order to distinguish the durations they were asked to use red pencil in first 60 seconds, blue pencil in the next 120 seconds and green pencil at the last 120 seconds. During the marking or/and drawing process, verbal or written explanations were avoided and victims drew or marked the images which they remembered firstly from the old city center, secondarily from the new city center.

In the second stage, “a fill in questionnaire” was designed in order to determine the characteristics e.g. gender, age, vocation, education, duration of residence in the city, etc. , attachment to the old city and environment, adaptation level, the impact of the new city environment and the relocation period of the focus group.

The variables in the case study were selected in relation to the subject-object orientation. On the subjective side, the variables were gender, age, education, vocation, life period in the city, life period in the house, tenure ownership, disaster loss and relocation. The objective characteristic were selected generally spatial characteristics of the new and old environment such as number of landmarks, locality, quality of the landmarks and images, perception of the new environment and adaptation level of the victims.

During the data analysis, marks and drawings were analyzed according to quality, type and number of landmarks and time durations. These characteristic define the percepton of the new and old city and the impact of the disaster on the cognitive maps of the victims. The concept of “locality” is related to the landmarks in the circle with the radius of 100 m from the city center point. At the end of the marking and drawing sessions, the results were organized at different time leves for the new and old environment. Our observations were not only oriented to the number of landmarks, but also to what type of landmarks are common, what is the extend the victims mark the landmarks and which landmarks were missed, or remembered or caused to confusion. The sum of marks and drawings with reference to selected qualities in each level and duration was converted to tabulations. The data was analyzed due to statistical programmes and pearson chi-square was implemented to evaluate significant association between variables.

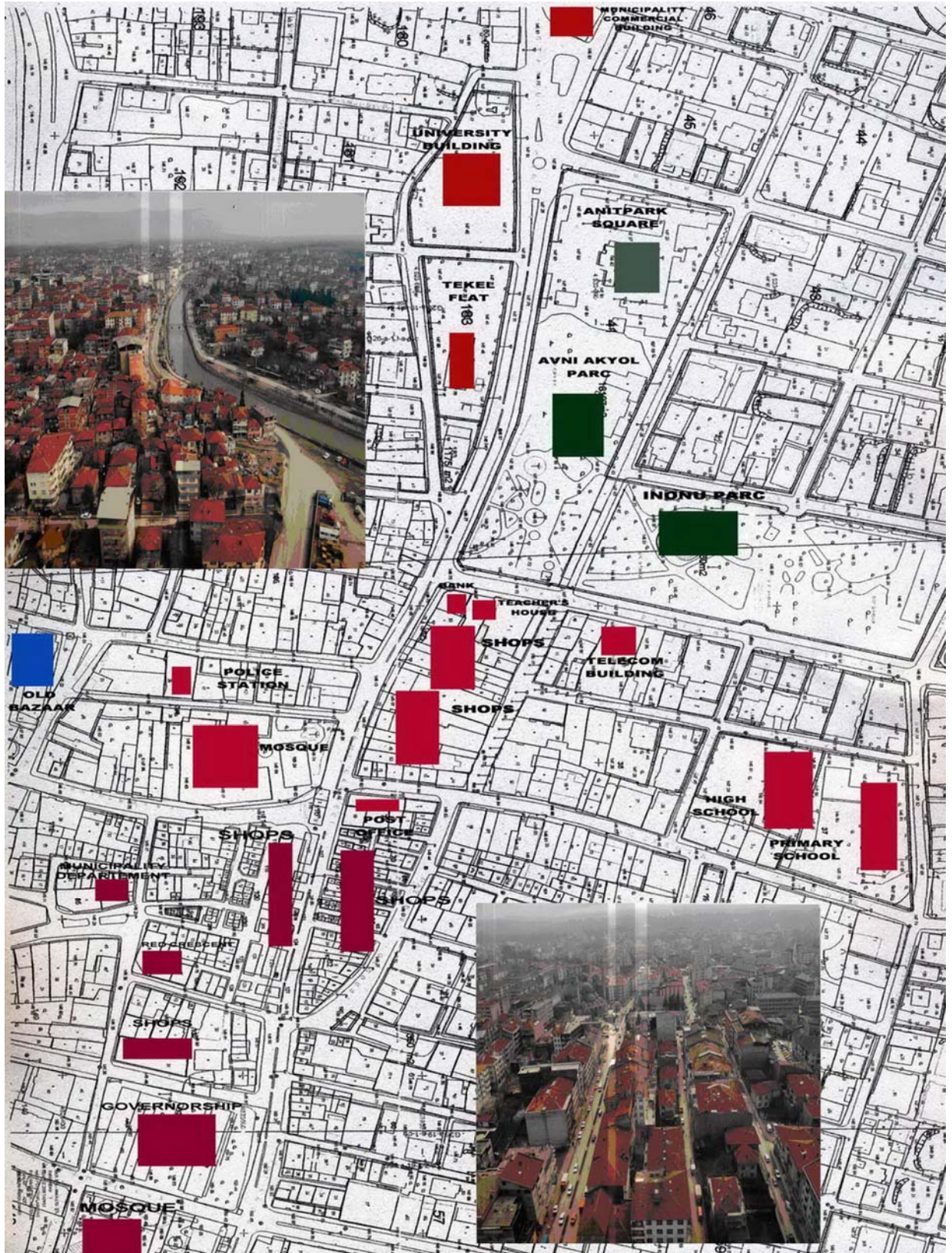


Figure 4 The Old City Center and Important Buildings



Figure 5 The New City Center

DISCUSSION

If we examine the data, it states that 63,3 % of victims live in a new environment after the disaster. The 63,4 % of the victims live more than 20 years in the city so that they had much experiences in the old city environment. Nearly, 50 % of the sample had losses after the disaster so that the disaster had caused high stress to these victims. Hence, the adaptation problems were less than 18,2 % which may show the strong social ties and support of the other community members.

The post office building in the old city center is highly significant to the victims that nearly 70 % of the sample marked or drew it in their maps. This is an important fact that the post office seen as place of meeting. The most marked old official institution is the municipality and governorship buildings with nearly 27 % of the sample. Despite bulky appearance of the municipality commerce center it is missed in cognitive mapping that could not be remembered by the victims.

The important buildings which were marked and drew in the new city center were respectively 39,8 % the Mosque, 39,8 % recreational areas, 26,5 % the municipality and 23,2 % the university building whereas 6,6 % hospital and 3,3 % governorship buildings were marked or drew. The mosque is important because of residences' religious bonds and the selection of recreational areas show the high need of socialization of the victims after the disaster's trauma. The perception of the victim about the official institutions in the new city had negative impacts on them because the buildings are scattered and can not be perceived easily. Also the social facilities were evaluated as insufficient by the victims and they had negative impacts on social reconstruction process.

The first finding is people having more losses during the disaster marked and drew more images compare to people having of no losses in the disaster, this finding is determined in 120 seconds of the mapping process. This shows that, the attachment of these victims to the city is significantly high and they had strong bonds with the old environment in spite of the disaster situation. These people are relocated from their old environment and easily adapted to their new environment and neighbors ($\chi^2=8,3$, $df=1$, $p=.04$). In gender-marked image relation 70 % of the woman marked or drew more images when compared to the 30 % of the men in the new environment and old environment. These results show that the woman had more experiences in the city and they construct more linkages with the city.

The second finding is 25 % of the residents over 20 years passed the average number of total images of the old city comparatively to 3,3 % of the residents of 10–20 year and to 10 % of residents between 0–10 year. The images determined in the new city center gives closer results compared to the old ones; 40 % of the residents over 20 years marked or drew over the total images of the new city comparatively to 10 % of the 0–20 year residents. This shows that long time residents over 20 years had very strong bonds and attachments either about the old or the new city center.

The third finding is 3 % the victims between 46–65 years age could only remember over the average number of total images and they had a tendency to forget the images of the old city center comparatively to 36,3 % of the 18–45 years age. The image determined in the new city give closer results compared to the olds ones; 6,6 % of the 46–65 years age drew or marked images over the average of the total images comparatively to 36,6 % of the 18–45 years age. This shows the elderly people over 46 had a tendency to forget some of the images of the old and new city center. The impact of the trauma on elderly victims' cognitive schemata is higher than the others and the elderly victims more attached to the city from certain and/or general images that had small ratio (approxiametely 10 %) of the total number of images.

The last finding is that 27 % of the relocated people determine over the average number of total images in the old city center comparatively 10 % to the others. Also the findings in the new city center support this. The 35 % relocated victim determine over the average number of total images in the new city comparatively 10 % of the others. In spite of the traumatic conditions victims had create more sensitive bonds compare to the people having no losses in the disaster and this situation pushes their attachment to the high levels.

RESULTS

This case study presents that there is an impact of the disaster on cognitive maps of the victims. Although there is tremendous changes in the city forms, but the construction of the new buildings; the old and new city images in the cognitive maps of the victims are represented in high levels. This is possibly derived from the victims' long time duration of residence, relatively limited change in the old city roads and the small size of the city center. The most of the old buildings (mosques, municipality) were constructed in its previous location so this might be another cause for remembrance.

The perception of the new city and environment shows that the physical reconstruction needs should be strengthened with social reconstruction process during the post disaster situation. Because the people need socialization and more social places in their daily routines. Women's images are generally focused on shops and large stores, so they evaluate the new city from their perspective. However, they mostly evaluate the shopping facilities in the new city insufficient because of shopping is vital form of socialization, and it may overcome the social trauma.

The results of the study clearly show that the impact of disaster on human being especially in visual cartography and cognitive mappings. The residences try to reduce their stresses by means of socialization (boosting social bonds, following traditional occasions, etc.). So, The physical environment should be planned and designed in this point of view to reduce the environmental stress and to boost the reconstruction activities overcoming existing trauma.

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M. Arch. Hakan Arslan studied architecture at Faculty of Architecture, Trakya University (TU) between 1994–1998 and completed her master's degree program in architecture Gebze Institute of High Technology (GIHT) in 2004. He still works as research assistant at Istanbul Technical University. His major areas of interest are Post-Disaster Reconstruction, Place Attachment, Temporary and Permanent Housing Issues and Life Cycle Assesment. He is now studying about socio spatial aspects of post disaster reconstruction for his Ph. D. Degree in I.T.U.

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