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THE ROLE of GREEN SPACES in POST-DISASTER RECOVERY: AN EXPLORATORY STUDY AMONG MIGRANT SURVIVORS of the 6 FEBRUARY EARTHQUAKES in EDIRNE, TURKIYE

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Abstract

Post-disaster migration detaches individuals not only from their homes but also from their surrounding environments and the social bonds established within these spaces. In this context, green spaces can provide psychosocially restorative contributions during the post-earthquake migration process through their functions that support social and spatial attachment for displaced survivors in their new living environments. This study aims to explore the potential effects of green space experiences on the psychosocial recovery processes of a group of earthquake survivors who migrated to Edirne following the February 6, 2023 Kahramanmaraş earthquakes. Within the scope of the study, an exploratory exploratory survey was conducted with 22 earthquake survivors residing in Edirne to assess their levels of green space experience, place attachment, and social resilience. 77% percent of the participants reported using parks and green areas as reference points for establishing a connection with place and navigating within the city, while 68% stated that they had access to areas in Edirne where they could experience contact with nature. Furthermore, positive and moderate correlations were identified between green space experience and both place attachment (~0.50) and social resilience (~0.54). These findings suggest that green spaces should be considered not only as spatial or ecological assets but also as potential psychosocial resources.

Keywords: Place attachment, social resilience, aftermath of disaster, earthquake, green spaces

AFET SONRASI GÖÇ EDEN BİREYLERİN İYİLEŞME SÜRECİNDE YEŞİL ALANLARIN İŞLEVİ: EDİRNE'DEKİ 6 ŞUBAT DEPREMZEDELERİNE YÖNELİK ÖNCÜ BİR ÇALIŞMA

Özet

Afet sonrası göç, bireyleri yalnızca konutlarından değil, aynı zamanda yaşadıkları çevreden ve bu çevrede kurdukları sosyal bağlardan da koparmaktadır. Bu bağlamda, yeşil alanlar göç eden afetzedelerin yeni yaşam alanlarında sosyal ve mekânsal bağ kurmalarını destekleyen işlevleriyle, deprem sonrasındaki göç sürecinde psikososyal açıdan onarıcı katkılar sağlayabilir. Bu çalışma, 6 Şubat 2023 Kahramanmaraş depremleri sonrasında Edirne'ye göç eden bir grup depremzedenin yeşil alan deneyimlerinin afet sonrası psikososyal toparlanma süreçlerine olası etkilerini incelemeyi amaçlamaktadır. Çalışma kapsamında, Edirne'de ikamet eden 22 depremzede ile gerçekleştirilen keşif amaçlı öncü bir anket uygulaması aracılığıyla, yeşil alan deneyimi, yere bağlılık ve sosyal dirençlilik düzeyleri değerlendirilmiştir. Katılımcıların %77'si, yeşil alanları yerle ilişki kurma ve şehirde yön bulma açısından bir referans noktası olarak kullandığını belirtmiş; %68'i ise Edirne'de doğayla temas kurabildikleri bir alanın bulunduğunu ifade etmiştir. Ayrıca, yeşil alan deneyimi ile yere bağlılık (~0.50) ve sosyal dirençlilik (~0.54) arasında pozitif yönlü, orta düzeyde ilişkiler tespit edilmiştir. Elde edilen bulgular, yeşil alanların yalnızca mekânsal ya da ekolojik değil, aynı zamanda psikososyal destek unsuru olarak değerlendirilmesi gerektiğine dair önemli ipuçları sunmaktadır

Anahtar sözcükler*: Yer bağlılığı, sosyal direnclilik, afet sonrası, deprem, yeşil alanlar*

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1. Introduction

Disasters are not only events that cause physical destruction but also crises that profoundly disrupt individuals' economic, psychological, and social well-being. Their impacts extend far beyond the moment they occur, often requiring long-term social and spatial restructuring. According to the Internal Displacement Monitoring Centre (IDMC, 2023), over 32 million people worldwide were displaced by disasters in 2022 alone, underscoring the scale of forced migration.

Post-disaster relocation compels individuals to leave familiar environments and rebuild their lives in new and often unfamiliar settings. This process challenges survivors not only to recover and heal but also to adapt socially and spatially. These difficulties highlight the importance of social resilience and place attachment as key components of recovery and integration.

Social resilience refers to a community's capacity to resist, recover, and adapt in the face of disruption. It involves elements such as social support, collective efficacy, and learning from adversity, which enable groups to reorganize and sustain social functions after crises (Maguire and Hagan, 2007; Norris et al., 2008). Place attachment, defined as the emotional and cognitive bonds to one's environment, also plays a critical role in adaptation (Scannell and Gifford, 2010). Although displacement often disrupts these bonds (Fried, 1963), it may sometimes lead to new forms of connection and identification with place (Anton and Lawrence, 2014).

Green spaces have been recognized for supporting psychosocial well-being and adaptation. They help people adapt and cope with crises, provide opportunities for stress relief, social interaction, and a renewed sense of belonging (Albers et al., 2021; Stedman, 2003, Mahmoudi et al., 2022). Studies show that contact with natural environments can restore emotional balance and strengthen social ties, particularly in the aftermath of trauma (Charles-Rodriguez et al., 2023; Tidball et al., 2010).

On February 6, 2023, the Kahramanmaraş earthquakes displaced approximately 3.5 million people across Türkiye. Many survivors settled in cities such as Edirne, which differ significantly from the affected regions in cultural and environmental characteristics. Despite growing research on disasters, green spaces, place attachment, and resilience in Türkiye (e.g., Baylan et al., 2018; Arslan and Unlu, 2011, İnâl-Çekiç et al., 2023), empirical studies focusing on disaster survivors' place attachment, social adaptation, and the role of green spaces in fostering resilience within host communities remain limited—particularly in small to medium-sized cities that exhibit both urban and rural characteristics.

Based on these considerations, this study adopts an exploratory approach to examine the potential role of green spaces in supporting adaptation among earthquake survivors who migrated to Edirne. Rather than seeking to establish definitive causal relationships, it aims to generate preliminary insights into how interactions with these environments may relate to psychosocial recovery, place attachment, and social resilience in a post-disaster context.

Accordingly, the study addresses the following guiding research questions:

- What is the scope and nature of survivors' experiences with green and open spaces in Edirne, and in what ways do these experiences appear to have contributed to their recovery processes?
- How do green spaces potentially influence survivors' perceptions of attachment and belonging within the host community?
- What indications, if any, suggest that green spaces play a role in supporting elements of social resilience among displaced individuals?

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2. Literature Background

The contribution of green spaces to psychosocial well-being has been well documented in environmental psychology and disaster studies. Kaplan and Kaplan (1989) demonstrated that contact with nature reduces stress and improves mood, while Ulrich (1984) showed that visual exposure to greenery can accelerate psychological recovery. Bell et al. (2014) highlighted that green space research could usefully consider how well-being priorities change over time. Additionally, Fei et al. (2020) proposes a comprehensive methodological framework for organizing, planning, and managing the functions that different types of urban green spaces can assume during disasters, and recommends that future research further examine the feasibility of transforming spatial configurations and infrastructure to create new models of urban green space systems. Collectively, these foundational studies illustrate how natural environments function as restorative resources during periods of disruption.

Displacement often disrupts daily routines, social networks, and individuals' sense of place. Brown and Perkins (1992) described forced migration as a rupture of place attachment, which can intensify feelings of loss and disorientation. Place attachment- encompassing emotional, cognitive, and behavioral bonds to physical environments- is widely recognized as an important factor supporting recovery (Scannell and Gifford, 2010). Baylan et al. (2018) referred that "place attachment," which constitutes the affective dimension of sense of place, is defined as a positive emotional bond that develops as a result of the interaction between the physical and social characteristics of a place and individuals' lived experiences. Some research suggests that adversity can also foster renewed attachments and stronger identification with new places (Anton and Lawrence, 2014; Twigger-Ross and Uzzell, 1996).

Social resilience has emerged as a key concept in disaster recovery, referring to the capacity of communities to adapt and maintain social ties amid disruption (Magis, 2010; Kwok et al., 2016). Maguire and Hagan (2007) describe social resilience as involving resistance, recovery, and creativity, while Norris et al. (2008) emphasize dynamic capacities such as social support, collective efficacy, and community networks. These capacities help individuals cope with uncertainty, sustain well-being, and rebuild social systems after crises. Green spaces can facilitate these processes by providing inclusive environments where people form connections, exchange support, and cultivate shared meanings that contribute to adaptation and long-term recovery (Tidball et al., 2010).

Empirical studies have showed that the perceived quality of residential environments, including access to green spaces, is associated with higher levels of neighborhood attachment and well-being (Albers et al., 2021). Other research emphasizes that natural settings help reduce feelings of isolation, foster a sense of security, and encourage participation in community life following displacement (Charles-Rodriguez et al., 2023). Douglas et al. (2017) further highlight that urban green spaces are valued not only for their recreational functions but also as environments that support psychological recovery, social cohesion, and place-based belonging.

However, studies focusing specifically on small and medium-sized host cities and interactions among place experiences, green spaces, and social resilience remain limited. Edirne represents one such city facing this research gap. While not unique in this respect, Edirne offers a distinctive case due to its considerable distance from the earthquake zone, its border location, and its markedly different socio-cultural and demographic profile compared to the affected regions. These research gaps and geographical features make

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it a valuable context for exploring how green spaces may support post-disaster social integration and resilience through facilitating psychosocial recovery and place attachment among displaced populations in host communities. Such work can inform planning strategies that recognize green spaces not only as aesthetic amenities but also as resources for social and emotional healing.

3. Material and Methods

3.1. Material

This study adopts an exploratory and quantitative research design. Its primary objective is to analyze emerging trends, thematic patterns, and relationships between variables within a defined sample group. The main data source consists of survey responses collected from individuals who migrated to Edirne following the February 6, 2023, Kahramanmaraş earthquakes. The questionnaire form, developed in line with the research objectives, is structured into four main sections designed to assess participants' (i) demographic characteristics; (ii) experiences with green spaces; (iii) levels of place attachment, and (iv) potential for social resilience.

Survey Instrument and Structure

The survey instrument is not based on a single, statistically validated standard scale. Instead, it was developed by adapting items and expressions from various established scales and empirical studies in the relevant literature. The questionnaire consists primarily of close-ended, 5-point Likert-type items, which were categorized into three thematic dimensions:

Green Space Experience (6 items): This dimension explores participants' access to and frequency of use of green and open spaces in the post-disaster environment; the role of these spaces in psychological and spatial adaptation; subjective contact with nature (e.g., "feeling immersed in nature"); participation in social or cultural activities in green areas; and the use of green spaces as cognitive map elements (e.g., "using a park as a reference point for directions").

Place Attachment (7 items): Based on conceptualizations from Stedman (2003), Scannell & Gifford (2010), and Mihaylov and Perkins (2014), this dimension examines aspects of place identity, place dependence, and emotional bonds with the environment. Social Resilience (16 items): This dimension assesses individuals' perceived coping capacity during and after crises, their access to social support, trust and safety perceptions, availability of resources and facilities, skills and adaptability, community participation, and shared values. Items were adapted from works such as Magis (2010), Khalili et al. (2015), Kwok et al. (2016), and Alizadeh and Sharifi (2022).

In addition to Likert-type items, the questionnaire also included binary (yes/no) and open-ended questions designed to explore in greater depth participants' perceptions of and, interactions with their post-disaster living environments. The internal consistency of the full questionnaire, calculated with all respondents and items, was high (Cronbach's alpha = 0.81). This comprehensive structure allows for both quantitative analysis and qualitative interpretation, supporting a multidimensional assessment of participant experiences.

3. 2. Methods

Conducted with a limited and non-homogeneous sample, this study does not aim to produce generalizable results. Rather, it adopts a descriptive and exploratory approach, focusing on quantitative comparisons and the examination of potential relationships between thematic patterns and variables. Although approximately 3,605 individuals were residing in Edirne after the disaster, the sample size was limited to 30 invitations and 22 valid responses due to constraints in reaching out the disaster victims in the Edirne city center, acceptance to voluntary participation in the survey and resources. This limitation is acknowledged, and

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the findings should not be generalized beyond the studied sample. The study is therefore presented as an exploratory research.

In this context, the data were scored based on three distinct thematic (experiential) dimensions, derived through content analysis, and the following analyses were conducted based on these scores:

- Descriptive Statistics: Arithmetic mean and standard deviation values were calculated to reveal general trends in participants' experiences.
- Pearson Correlation Analysis: This was employed to examine the relationships between participants' green space usage scores and their levels of place attachment and social resilience.

The survey was administered to participants selected through purposive sampling from among individuals who migrated to the province of Edirne following the February 6, 2023 Kahramanmaraş centered earthquakes. The questionnaire was distributed to a total of 30 individuals, and complete and valid data were obtained from 22 participants. Among the participants, 8 were male and 14 were female; their ages ranged from 19 to 60, and the majority (n=17) were university graduates. The data collection process was carried out in 2024 via online platforms, based on voluntary participation.

With its limited respondent number, this methodological framework provides an exploratory approach and a preliminary study to examine the role of green spaces in post-disaster living environments on earthquake survivors' psychological recovery, reconnection with their new environment, and development of social resilience. The purpose of using this method is not to produce generalizable quantitative results, but rather to identify meaningful patterns, spatial experience tendencies, and inter-variable relationships, thereby laying a conceptual foundation for more comprehensive future studies in this field. In line with existing recommendations on pilot and exploratory studies, the sample size in this research is considered acceptable for preliminary investigation purposes. Johanson and Brooks (2010) highlighted that "samples with N's between 10 and 30 have many practical advantages," particularly when the purpose is to test instrument clarity, feasibility, and initial reliability rather than to produce generalizable results. Accordingly, the sample size of 22 participants falls within this recommended range for exploratory studies.

4. Findings

4.1.Migration background and place experiences

The primary reasons for participants' relocation to another city following the earthquake were the severe structural damage or total destruction of their homes (n=16) and the inability to sustain economic activities, including loss of employment or significant financial hardship (n=12). Key factors influencing participants' decision to migrate specifically to Edirne included the availability of education and healthcare services (n=12), the city's low seismic risk (n=9), and the presence of family members or acquaintances residing in the area (n=6). When asked about the most favorable aspects of Edirne, participants frequently cited the city's natural environment, religious structures, landscape characteristics, and its small-scale, accessible urban form. The most frequently visited green spaces among earthquake survivors included 15 Temmuz Park, Gölet and Peace Park, and the Özgür Çocuklar Park. These spaces were primarily preferred due to their suitability for spending time with children, providing opportunities for social interaction, being easily accessible, and their proximity to residential areas. A substantial proportion of participants reported visiting these spaces once or twice per week.

In terms of usage patterns, participants most commonly reported using green spaces for purposes such as resting, socializing, and

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walking. Many also indicated that these areas provided opportunities to connect with other earthquake survivors, suggesting that green spaces serve not only as physical environments but also as socially restorative settings. Descriptive statistical analysis of participants' responses regarding their green space experiences revealed the following:

A significant majority (77.27%) reported using parks or green areas as spatial reference points in their daily routines. Responses to questions about interaction with nature in Edirne indicated that approximately 68% of participants acknowledged the presence of a place where they could experience contact with nature. A relatively high mean score (M = 4.05) was recorded for the statement: "Spending time in parks, gardens, and natural or historical areas in Edirne helped me adapt to the city." This suggests a strong contribution of green spaces to post-disaster urban adaptation.

The item "I participate in events organized in green, natural, or cultural areas in my living environment" received an average score of M = 3.27, indicating a limited level of participation. The relatively high standard deviation (SD = 1.12) reflects considerable variation in participation levels among individuals. The perceived contribution of time spent in parks and natural areas to post-disaster psychological recovery and adjustment yielded a moderate average score (M = 3.32; SD = 0.99). This implies that the restorative effects of natural and cultural landscapes in and around Edirne varied significantly across participants. While many participants (M = 3.50) reported having green spaces they appreciated in their living environment, the high standard deviation (SD = 1.19) suggests the existence of spatial disparities or variations in individual experiences with these areas.

The overall mean score for responses to six Likert-type items measuring the level of engagement with green spaces was calculated as M = 3.53 (on a 5-point scale). This indicates that earthquake victims in Edirne had a moderately high level of interaction with green spaces. However, the elevated standard deviation suggests notable inter-individual differences in these experiences. This variation likely reflects the influence of factors such as spatial accessibility, personal preferences, and socio-cultural context. In other words, a significant portion of participants experience varied and differentiated interactions with green and open spaces in terms of access and usage.

Concerning social resilience, the most prominent component was found to be social integration, support, and participation (M= 23.9). This was followed by access to resources and facilities (M=14.2), skills and self-sufficiency (M=10.8), and social networks and sense of community (M=10.5). The overall mean score for the social resilience experience (M=3.5) was above average, suggesting that participants had developed a certain level of adaptive capacity in the aftermath of the disaster. Nevertheless, the high standard deviation indicates heterogeneity among individuals, with some demonstrating strong resilience while others may remain socially vulnerable.

The mean score for place attachment was M = 3.05, indicating a moderate level of attachment. The high standard deviation observed implies that while some participants had developed a strong sense of belonging, others continued to experience feelings of alienation in Edirne. This divergence may be associated with factors such as personal history, level of social integration, or variations in green space experiences. Table 1 provides a summary of earthquake survivors' level of engagement with green spaces in the city and surroundings, levels of social resilience, and sense of place (place attachment) level following their migration to Edirne after the Kahramanmaraş earthquakes. These descriptive findings offer a general overview of participants' post-disaster urban adaptation experiences in Edirne

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Table 1. Arithmetic Means and Standard Deviations of Earthquake Survivors' Green Space Experience, Social Resilience, and Sense of Place in Edirne

	N	Mean (M)	Standart Deviation (Sd)
Green Space Experience	22	3.53	1.05
Social resilience	22	3.50	1.07
Place attachment	22	3.05	1.27

4.2.Relationships between earthquake survivors' green space experience, sense of place, and social resilience

Table 2 presents the Pearson correlation coefficients among green space experience, social resilience, and place attachment. As shown, survey participants' green space experience is moderately and positively correlated with both social resilience (r = 0.54) and place attachment (r = 0.50). Similarly, social resilience shows a positive relationship with place attachment (r = 0.40). These findings suggest that individuals with more positive green space experiences tend to report higher levels of social resilience and stronger attachment to place.

Table 2. Pearson Correlation Analysis of Green Space Experience, Place Attachment, and Social Resilience

	Green space experience	Social resilience	Place attachment
Green space experience	1.00	.54**	.50**
Social resilience	.54**	1.00	.40*
Place attachment	.50**	.40*	1.00

Note: All coefficients are Pearson's r values. Approximate values (~) have been rounded to two decimal points for clarity. p < .05 (*), p < .01 (**)

5. Discussion and Conclusion

The findings of this study indicate that individuals who settled in Edirne following the February 6 earthquakes developed a moderately high level of interaction with urban green spaces in their post-disaster environments, and that this interaction showed a moderate positive relationship with social resilience, highlighting the importance of nature-based environments in post-disaster recovery processes. Green spaces are not only physically restorative elements but can also function as "social buffer zones" that help individuals cope with feelings of loneliness, uncertainty, and loss (Kaplan & Kaplan, 1989; Ulrich, 1984). In their study, Mahmoudi et al. (2022) similarly demonstrated that the park's contributions to social resilience were perceived primarily through different aspects such as enhanced spiritual understanding, social connections, and human and religious values. At the same time, the results of the present study indicate that participants reported moderate levels of place attachment and social resilience overall.

Additionally, the moderate positive relationship identified between green space experience and place attachment provides further insight into how these environments may support individuals' adaptation, sense of belonging, and recovery processes after displacement. In this regard, Baylan et al. (2018), in their research on post-disaster housing environments, emphasized that such environments should have the architectural, spatial, infrastructural, and landscape qualities necessary to help different groups of residents feel at home and perceive their surroundings as

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appropriate places to live. Furthermore, Yalcin and Oguz (2015), in their study focusing on university campuses, found that landscape characteristics associated with naturalness and green space were positively correlated factors contributing to sense of place, supporting the idea that green environments play a role, albeit to varying degrees, in fostering place attachment.

However, the high standard deviation observed in participants' responses indicates notable variability in individual experiences for the green experience social resilience and place attachment. It should also be noted that the relatively high standard deviations observed in this study may partly reflect sampling variability inherent to small exploratory samples rather than solely genuine heterogeneity (Hertzog, 2008).

This study aimed to explore the possible role of green spaces in post-disaster recovery, adaptation, and social resilience among individuals displaced to Edirne following the February 6 earthquakes. The findings point to the possibility that urban green spaces contributed meaningfully to adaptation processes in the new settlement environment. Participants demonstrated a measurable degree of interaction with green spaces in their post-disaster lives, suggesting that these environments are not only ecological infrastructures but also function as emotional and social interfaces. The study also revealed substantial differences in green space engagement across individuals, which are likely shaped by spatial access, personal preferences, social ties, and previous trauma exposure. These findings call for inclusive, user-sensitive planning strategies.

The results demonstrate that green spaces serve functions beyond rest, recreation, or emergency shelter. They also play active roles in fostering social support, meaning-making, and place-belonging. This multi-layered functionality positions green spaces as not only physical but also emotional and social healing environments in post-disaster contexts. Therefore, their consideration as psychosocial resources within spatial planning frameworks is critical.

Moreover, the positive correlations found between green space experience and both social resilience and place attachment reinforce the idea that nature-based interactions contribute to more than just physical recovery—they support the reconstruction of social bonds and community identity. This insight emphasizes the strategic importance of green spaces in recovery-oriented urban design.

Future research should expand sample sizes and include more diverse socio-demographic groups to better understand variations in green space engagement. Such efforts would support the development of more flexible, responsive, and user-centered spatial strategies to strengthen resilience in post-disaster urban environments.

Ethical Statement

Prior to administration, the questionnaire has been approved by the Trakya University Ethics Committee with the document number, dated on 07/06/ 2024.

Note: This study is an extended and revised version of the paper presentation titled "*Place Attachment and Social Integration of Earthquake Survivors Displaced After the 2023 Kahramanmaraş Earthquakes*", originally presented at the 48th World Urbanism Day Colloquium held on November 7–9, 2024, under the theme "Destruction–Life–Urbanism".

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