Enrico Borgogno-Mondino
Paola Zamperlin (Eds.)

Communications in Computer and Information Science 2463

Geomatics for Green and Digital Transition

27th Italian Conference, ASITA 2024
Padua, Italy, December 9–13, 2024
Proceedings, Part I

Part 1

Springer

Contents – Part II

Cultural Heritage and Landscape Management

A Model Based on Environmental Quality Indicators to Support the Assessment of the Safety Perception of Urban Parks

Emanuela Coppola(✉), Chiara Mastrorilli, Maria Simioli, and Michelangelo Russo

University of Naples Federico II, Naples, Italy
{emanuela.coppola,chiara.mastrorilli,maria.simioli, michelangelo.russo}@unina.it

Abstract. Expectations, needs, and motivations of individuals serve as the backdrop to the complex interaction between mental frameworks and physical data provided by the environment. The research within the SETUP Project "Security Town through Urban Planning" (SeTUP), funded by the PRIN PNRR2022 call, aims to investigate the environmental quality and how the perceived characteristics of the environment generate relationships with the satisfaction and well-being of users for the purpose of evaluating the safety perception.

The model, applied to a public park in the metropolitan city of Naples, is distinguished by its innovative approach, which integrates quantitative indicators derived from sector-specific technical literature and qualitative data collected through surveys administered to a sample of the population living in and using the park. The data examine the morphological-spatial, and perceptual characteristics of both the park and its surroundings (within a proximity radius of 500 m), and highlight its environmental characteristics, accessibility, livability, and safety features by analyzing spatial, human-social, and functional aspects. The data derived from the distribution of questionnaires are intended to systematize the various indicators based on the evaluations of the environments by their users. The organization into a relational geo-database of synthesis has allowed for the identification of critical issues, also through participatory mapping, and, effectively, structure a model to support policies aimed at enhancing the quality and safety of a park area.

Keywords: Perceived safety · urban parks · environmental quality indicators

1 Introduction

In Europe, in the last twenty years, the green has become an essential element of planning both on a metropolitan and municipal scale. While the London Green Infrastructure Plan (2011) was the first European experience, a greater awareness of climate change had already taken place with the United Nations Conference on the human environment (Stockholm 1972), the first conference in history that has as its object the debate concerning the climate system at a global level. Later, it was the Paris Climate Agreements

E. Borgogno-Mondino and P. Zamperlin (Eds.): ASITA 2024, CCIS 2463, pp. 338–353, 2025.
https://doi.org/10.1007/978-3-031-91141-5_23

(2015) that provided that, by 2020, governments should present their National Climate Action Plans, in which they highlight the actions leading to the reduction of greenhouse gas emissions. In Italy, the Ministry of the Environment and Energy Security (MASE), through decree no. 434 of December 21, 2023, approved the national Plan for adaptation to climate changes. In this document, the so-called "green actions" propose nature-based solutions, "consisting in the sustainable use or management of natural services, including ecosystem services, in order to reduce the impacts of climate change"[1].

With a view to combating climate change and the urban heat island, greening policies will have to be increasingly central, and the security of these areas will be part of that "right to the city" [1], "the conquest of which implies a re-appropriation of the times and spaces of urban living through a new configuration of social, political and economic relations, as well as a drastic change in decision-making processes". The issue of urban security is of great importance in this phase of transition towards the creation of sustainable cities and communities.

In criminal literature, there is a correlation between insecurity and economic growth, the explosion of consumption, and urban expansion, which lead to social disintegration and the alteration of values. These changes are linked to the crisis in Western societies, characterized by family weakening, poverty, social exclusion, and drug addiction, resulting in an increase in crime [2].

In the social sciences there is no single definition of "urban violence" [3] but this seems to have constant elements, namely: " they refer to poorly organized actions; they define, as a frequent object of aggression, physical or symbolic public spaces; the gratuitous nature of the acts, which can take different forms, from vandalism to riots; the fact that they have extensive side effects and, frequently, that they are not directed at anyone concretely" [4].

Security represents a more general guarantee of freedom of use of space "overcoming the inconveniences caused by the growing privatization, segregation and conflict of public space in the contemporary city" [5].

The concept of urban security spans various fields of knowledge, from sociology to criminology, psychology, urban geography, and urban planning, giving rise to numerous theoretical research and operational experiments [6].

The complexity of the issue of space security requires an integrated approach, both in the assessment of security conditions and in the definition of appropriate intervention strategies. The effectiveness of these strategies depends on knowledge of the specific context and on a complete analysis of the risk scenario, which can combine and synthesize all the aspects that contribute to the construction of safety conditions, to define a risk model for green spaces in order to guide urban planning choices.

[1] https://www.mase.gov.it/notizie/clima-approvato-il-piano-nazionale-di-adattamento-ai-cambiamenticlimatici.

As part of the Project of National Interest PRIN 2022 PNRR_SeTUP – "Security Town through Urban Planning", research is being developed that aims to build a model that allows the assessment of the perception of security in urban parks, specifically, and of public equipped green areas, in general.

1.1 The Safe City Starting from Public Space

Cities are the scene of a widespread feeling of fear towards the other, the unknown and the unexpected, which has frequently given rise to a specific request for control policies supported by security rhetoric [7]. Safety measures in urban planning focus on two distinct issues: on the one hand, protection against risks associated with major natural events; on the other hand, the prevention of phenomena of illegality, incivility, violence, and petty crime, which are central to the notion of "urban security" [8].

The perspective of interest that this research aims to target is the connection between the physical configuration of spaces, risk perception, and crime. In particular, this study refers to one of the approaches to international security policies [6] – environmental approach – known as "Crime Prevention Through Environmental Design" (CPTED). This approach focuses on the ability of the urban environment to hinder crime [9], and which represents an urban and architectural design practice that organizes physical space and its uses to prevent criminal acts of a spatial nature.

The first studies that investigated the relationship between social behaviour and the characteristics of the physical and cultural environment emerged in the end of the thirties under the guidance of the sociologist Robert Park and other members of the Chicago School. These studies formalized a systematic approach to the study of urban society, highlighting how deviance phenomena are strongly influenced by the environmental context, according to the model known as "Community Crime Prevention" [10].

The first concrete applications of theories on the relationship between urban design and safety were developed in the 1960s through the work and experiments of two prominent American women: Elizabeth Wood and Jane Jacobs. In 1961, Elizabeth Wood formulated a detailed theory, known as "Social Design Theory", which emphasizes the close connection between urban design and the improvement of the quality of life [11]. At the same time, Jane Jacobs criticized the morphological and formal aspects of the city, focusing on elements such as streets, sidewalks, blocks, density, and architectural variety. Jacobs considered these factors essential for creating safe spaces, with the aim of strengthening and promoting the sense of belonging and care for the territory [12]. Their theories provided a solid cultural foundation for future developments and refinements in the field of urban security. A significant experience in this area was that of CPTED, a multidisciplinary approach devised by criminologist Ray Jeffery in the 1970s. The first architect to concretely translate these theories into urban projects was Oscar Newman, author of the concept of "Defensible Space" in 1972. His approach to crime prevention through urban design was based on principles such as territoriality, natural surveillance, urban image, the "milieu" and the safety of neighbouring areas [13]. In the subsequent years, numerous scholars continued to explore the topic of urban security, conducting empirical research on specific environmental contexts. Among them, the "Broken Windows" theory developed in 1982 by James Q. Wilson and George L. Kelling has gained particular notoriety. This theory argues that the cause of degradation and crime does not

lie in social classes, but rather in the neglect and degradation of urban spaces themselves. According to Wilson and Kelling, in order to prevent the environmental deterioration and the onset of criminal behaviour, it is essential to maintain a high level of care and attention to the urban context [14]. The maintenance of open and public spaces, therefore, becomes a central theme in the discussions of urban security, where the presence of well-kept spaces can inspire trust, a sense of belonging and territoriality [15].

The CPTED models, introduced in Europe via the United Kingdom, saw a shift in the approach to security with the founding of the FESU (European Forum for Urban Security) in Barcelona in 1987, emphasising the participation of local communities and interventions in the physical and spatial characteristics of existing public spaces. In Italy, European influences mark the birth of FISU (Italian Forum for Urban Security) in 1996 [16], but, despite this, the Italian urban planning discipline has never explicitly included plans, protocols, or other territorial planning tools oriented towards security that were not interpreted as the implementation of repressive actions. Here urban security policies tend to shape urban spaces that are increasingly exclusive rather than open and inclusive, characterized by physical barriers that quickly transform into conceptual barriers [17]. A security-oriented drift also due in part to the partial failure of welfare policies, which determines new segregative topographies and represents an explicit departure from the principles of sustainable development of a city[2]. Starting from an idea of urban security, no longer understood exclusively as a policy of territorial control and crime repression, but as a "public good - security", for the concrete exercise of everyone's rights to move, access and use basic services, equipment, and public spaces [18], the research focuses on a particular type of public space: urban parks.

The relationship between the presence of urban green spaces and the reduction of crime is still a debated issue, but numerous studies indicate that parks and green areas can significantly contribute to reducing crime, especially violent crime. The redevelopment of marginal or degraded urban spaces, making them more attractive and functional for residents, tends to decrease violence and crime in the surrounding areas, as demonstrated in Chicago [19], New York City [20], Philadelphia, Youngstown, Ohio, and Baltimore. These examples demonstrate how the care and management of urban green spaces can play a crucial role in crime prevention and improving the quality of life in urban communities.

The research focuses on the study of several urban parks in Campania, particularly in the province of Naples, to understand how urban green spaces can improve living conditions and environmental quality in terms of safety, contributing to the definition of "safe urban space" of a city as perceived by citizens, reducing the perception of risk. The research adopts the assumptions developed by the literature of the sector, according to a participatory methodological approach that involves the active engagement of citizens in the co-construction of knowledge about the urban and territorial context. The intangible component, in addition to the physical component of the elements that make up the spatial structure of the park, represents the most significant and innovative aspect of the research, which seeks to focus on this through the identification of safety indicators. In

[2] The SDG 11, "Make cities and human settlements inclusive, safe, resilient and sustainable," among its sub-goals 11.7 aims to "ensure universal access to safe, inclusive, accessible, green, and public spaces".

particular, the paper presents the results of the bottom-up investigation of the first case study examined, the "Parco dei Quartieri Spagnoli" in the Montecalvario district, within the II Municipality of the City of Naples.

2 The Proposed Methodology: Qualitative and Bottom-Up Analysis

The SeTUP research addresses the issue of urban park safety from different points of view. Alongside a top-down analysis of their context, conducted based on quantitative data, that considers environmental risk, related to factors of territorial hazard and vulnerability [21], and criminal risk, directly linked to the anthropogenic component [22], a qualitative investigation is conducted through the study of perceived risk, which is explored in depth particularly in this article.

The proposed study explores the subjective dimension of urban security, which responds to the social perception of it. Unlike the recorded crimes in a given place, which refer to its objective dimension, its intangible aspect, not always tied to material reality, consists of opinions, feelings, perceptions, and attitudes that go beyond the fear of crime. If the latter is understood as a specific form of emotional and physical response caused by exposure to problematic events or a perceived threat [23, 24], the perception of safety refers to a widespread feeling that affects the quality of life and individual and collective well-being [25]. Insecurity limits the use of the environment, affects the cohesion of the inhabitants of a neighbourhood, reduces the sense of community, and increases social disorder [26]. It conditions the use of urban parks, discouraging people from visiting, using, or only recognizing them as places intended for the recreation or leisure of their visitors [27, 28], especially in the presence of conditions perceived as risky, such as overly open spaces, with poor visibility, or isolated areas [29].

If we want to address the issue of the safety of a public space, a fundamental indicator of environmental quality [30–32], it is necessary to adopt multidisciplinary, multimethod, and multi-dimensional approaches in order to overcome the potential divergence between technical and less expert assessments [33]. Therefore, the approach to be used cannot be solely place-based focusing only on the characteristics and potential of the context in which one operates but must also be people-oriented and start from the bottom. The adopted qualitative methodology begins with the identification and selection, based on a review of the relevant literature, of indicators of perceived safety in urban green spaces and their surrounding context. These categories were used to structure the various questions in a questionnaire and to divide the criteria for the perceptual mapping of unsafe areas. The two activities, which were to be presented to the park community under study, form the foundation for conducting an effective perceptual survey of the locations. The tools chosen were applied to the different case studies within the Neapolitan context, with the first being the "Parco dei Quartieri Spagnoli". The analysis of the data obtained from the questionnaires and the organisation of the maps into a relational geo-database allow for the identification of the main issues within the green space and the priority variables that most influence users' perceptions of safety. The aim is to create a more realistic and accurate framework aligned with the experiences of local residents, providing a useful decision-support tool and thus facilitating the definition of policies and interventions that truly address the needs for safety and quality of urban green spaces.

2.1 Perceived Safety Indicators in Urban Parks

Accessibility, Legibility and Orientation. Spatial definition is an important aspect of landscape design that influences preference and perceived security, "thus, indications of the possibility of entering the environment, of acquiring information and of maintaining one's orientation emerge as constantly vital attributes" [34]. The recognition of entry points and escape routes [27, 35], as well as the clarity in identifying pathways and the distinguishability of the functions present, therefore become crucial issues. The feeling of disorientation can lead an individual to fear crime, even in the absence of a potential criminal. Parks equipped with orientation elements, such as clear and sufficient directional signage, will be associated with higher levels of safety [27, 36]. In a legible place, users will find it easy to maintain the ability to orient himself; conversely, a place that is difficult to categorise will arouse a series of negative feelings such as frustration, stress, inadequacy, and rejection [37]. The complexity of form, defined by the lower predictability and the richness of perceptual stimuli of the place, is identified by Jacobs as one of the key characteristics of a highly frequented urban park, a quality that reflects the diverse reasons why people live and use the park. Mystery, another predictor of environmental preference, is clearly distinct from surprise and should never be associated with limited visual access [38]. In fact, the increase in complexity in the spatial configuration, along with an excessive amount of hidden information or mystery, determines a proportional growth in preference and psychophysical activation, up to an optimal level, beyond which there is a progressive decrease in preference indices and an exaltation of the feeling of fear and discomfort [39].

Visibility and Surveillance. A high visual permeability, understood as the degree to which a person can observe the characteristics of an unobstructed environment has a significant effect on perceived safety. The literature, in accordance with the theories of "Eyes on the street" proposed by Jacobs, Newman's "Opportunities for surveillance" and Appleton's "prospect-refuge", emphasises the notions of open vision and visibility: the highest level of fear is often associated with the presence of a low visual openness or perspective, a high level of refuge and a difficult escape [26, 27]; notions related both to the feeling of being seen by others, and to the possibility of seeing around [40, 41]. Natural surveillance can be defined as that generated by individuals who use and frequent urban spaces, as well as that resulting from the morphological dimension of architecture, its orientation, and the openings in the façades of buildings – eyes and ears of the community that allow for both listening and being listened to, seeing and being seen, in a bidirectional relationship that makes the pedestrian an active participant in the events occurring within the spaces of the city [12]. A type of surveillance "permanent in its effects, though discontinuous in its action" [42], whereby the idea of the presence of an observer is as effective as the observer's actual presence [43]. Thus, areas that are overly isolated or hidden within the park are consequently perceived as more dangerous or entirely to be avoided. Below are the subcategories associated with this indicator.

Lighting Level. Night-time environments are generally considered more dangerous than daytime ones due to the difference in lighting intensity, which determines the field of vision [44]. Darkness, and the poor visibility associated with it, can provide opportunities to hide for perpetrators of illicit or criminal acts [25, 27, 41, 45]. Homogeneous and

uniform lighting of the park area is a concrete help to make all spaces more monitored [36].

Vegetation. The selection and orderly arrangement of vegetation in a park, as part of a coherent and attractive overall design, influenced users' perception and fear [35]. While the presence of vegetation positively affects the attractiveness and pleasantness of the area [33, 46], the excessive density of it, by reducing visual access and increasing the chances of hiding for potential criminals, tends to increase the fear of crime and the perception of insecurity in the green space [41, 47–49]. It is advisable that plants and shrubs be selected or maintained in a way that does not interrupt the views and allow natural control [35, 36, 45].

Attractiveness of Spaces. Individuals in public spaces also rely on the presence of other people as signals that can increase or decrease the feeling of fear [44, 45]. The presence of others within public parks can encourage safe use [50], making criminal acts more difficult or providing potential rescuers in the event of an assault. When the underutilization of the park is evident, it can indeed become a target for unwanted and illicit people and activities [47]. The provision of different functional areas [51], or the organization of diverse events within a public green area, favours the presence of people of different ages, economic conditions, habits, and modes of transport, thus increasing the attractiveness and liveliness throughout the day and its consequent spontaneous control.

Maintenance and Appearance. Maintenance levels in urban green areas represent an important indicator of perceived safety [13, 35, 49, 52] and is the most significant factor influencing individual daytime perception [44]. The "Broken Windows" theory explores the visible impact that the deterioration and abandonment of a place can have on users' behaviour [14]. Maintenance can configure the perception of the park, making it a place that is not only aesthetically pleasing, but also recognized as a space that receives and deserves attention and protection. Carrying out actions aimed at maintaining or enhancing the value of an environment restores to the community a renewed sense of respect, consideration, and belonging, and the place will, with greater difficulty, be vandalised or perceived as unsafe.

2.2 The Structure of the Questionnaire

To address the perceptual survey of urban parks, it was decided to use the questionnaire tool, which implies a moderate involvement of the participants and allows to systematize the data relating to their evaluations of urban green areas, considering architectural, social, functional, and contextual aspects. The module mostly composed of closed-ended questions, aims to understand how individuals' sense of insecurity in a given public space is associated with the presence or absence of certain physical characteristics, by selecting the safety indicators that can most influence its perception.

The perceiver, the object of perception, and the context are the three groups of factors that influence the impressions and reaction process of users. Individuals face insecurity and fear in different ways depending on their age, gender, lifestyle, social relationships,

neighbourhood attachment, socio-economic and cultural background, and previous personal experiences. Therefore, "an environment cannot elicit pleasant or unpleasant stimuli, attract or repel an individual, except in relation to their past experiences and to the present, momentary or permanent goals of the individual himself" [46].

The personal and social variables are investigated in the initial section of the questionnaire, identifying factors associated with personal vulnerability, social support, emotional part, and behavioural control [49, 53]. Numerous studies confirm that the age variable is inversely related to the security perception scale and that the fear of crime tends to increase with advancing age [29, 48, 53]. In addition, fear of crime is more pronounced among women than men, and at night than during the day [24, 27, 45]. The social attributes related to the perception of safety in urban parks are explored in connection to the use of spaces: the frequency of use of them, being alone or in a group, the reasons for visiting, the number of users encountered in the park, familiarity with them, the presence of social incivilities, such as unruly young people, drug addicts, alcoholics, homeless individuals, or beggars [41, 49, 52].

In the second part of the questionnaire and in the final part of it, attention is given to the physical characteristics of the perceived place and its proximity context [41, 53] investigated through the indicators described. Beforehand, the interviewee is asked to define the park with one of the adjectives in the list, based on the "Circumplex Model" of the affective qualities of places [54] and its Italian version [55], which proposes a circular organization of affective states evoked by an environmental experience, to link emotions and environmental preferences.

2.3 Mapping of Unsafe Areas in the Park and Perceptual Data Processing with QGIS Software

The mapping of the places and the relative description of the critical issues encountered by the population allow to carry out a spatial analysis of the perceived safety conditions of the park, of its immediate context, within a radius of 500 m, and of their main physical characteristics, capable of arousing feelings of insecurity and fear [26]. By providing the sample of users with explanations regarding the categories of selected indicators, which have already been explored in the administered questionnaire, they are asked to locate on the map the significant areas of the park, label them according to the indicators, and describe the issues encountered or the suggestions to be made. For this purpose, paper maps were provided, along with an alternative link to the MyMaps tool, a Google application that allows users to easily create personalized maps by adding locations and related descriptions. Based on Google's satellite map, the perimeter of the park and proximity boundary within a five-minute radius were outlined, calculated through the study of isochrones using the open-source QGIS tool. The generation of a shareable link with the sample of users enables each of them to make their own changes and report particular problem areas in terms of urban security. The collected data were exported in.kml format, which can be converted into the shapefile vector format using QGIS for their subsequent processing.

It was decided to conduct the mapping process directly in the field, as responses to a simple site plan could evoke memories or mental images that do not accurately reflect the real feelings of fear in response to the actual site features [25]. Compared to

evaluation through photographic images, which are unable to capture the dynamics of a real environment [44], the assessment made by a person actually present in the field allows for the collection of additional information to simple images, including noises and smells [47] which, together with their mutual combinations with sight, represent essential environmental signals capable of triggering a wide range of emotions and different associations [44].

The collection of perceptual data, their georeferencing and systematization through the QGIS software aims to synthesize the key contradictions identified, organizing them into very precise categories, site specific indicators of park insecurity, for which future strategies for the promotion and development of urban security can be implemented. The organization in a synthetic relational geo-database makes it possible to map critical issues and actually structure a model to support policies aimed at increasing the quality and safety of a park area.

3 Case Study and Workshop: The "Parco dei Quartieri Spagnoli"

The first case study addressed within the PRIN SeTUP project is the "Parco dei Quartieri Spagnoli", a green lung in the centre of Naples, a coastal city in southern Italy renowned for its immense historical and cultural wealth. It forms a small part of the larger seventeenth-century complex of the "Santissima Trinità delle Monache", better known for its nineteenth-century destination, as a former Military Hospital, one of the largest abbey complexes in Naples, a monumental site of great historical, architectural, and artistic value. The complex is situated in the Montecalvario district, in the II Municipality of the city of Naples, extending along the slopes of the San Martino hill, just a few steps from the historic city centre, the beating heart of urban life and the main destination of tourist flows. Since the 1990s, the park has been left in complete abandonment, though it represents a significant opportunity for urban regeneration and the reuse of green spaces in a densely populated area lacking in public services [56]. The complex, covering an area of about 25,000 m^2, of which around 16,000 m^2 are occupied by gardens, internal courtyards, and other open spaces, is characterized by a planimetric articulation on several levels with some areas reopened to the public and others still unusable due to ongoing Urbact works.

A series of site visits, workshops, and practical activities have been organised at the park, involving young people, students of the master's degree programme in Architecture 5UE of the University Federico II of Naples, and members of the Community of the "Parco dei Quartieri Spagnoli". In alignment with the Faro Convention, this community is united in the protection, enhancement, and social reuse of the green area, aiming to transform it into an open and collective place, to be cared for, restored, and ultimately returned to the public. The goal was to work on-site and engage both regular visitors and others in the construction of a word cloud, in the compilation of the questionnaire and in the subsequent mapping of the critical places. Following the analysis of the collected data, a visit to the park was proposed through virtual and augmented reality, offering an immersive experience to compare with "real perception" in a research-action approach, thanks to the establishment of a three-dimensional model by researchers from the University of Salerno.

The mapping activity and administration of the questionnaires will be submitted to park users even in phases subsequent to the first, in order to carry out a complete monitoring of the evolution of the spaces and the impact of recreational, social, and cultural events scheduled in the green area, which will certainly clarify the users' experience in the park, included during the evening visiting, currently excluded from the opening hours according to existing regulations (Fig. 1).

Fig. 1. Site visit and perceptual workshops organised at the "Parco dei Quartieri Spagnoli" with students from the Faculty of Architecture at the University Federico II of Naples and the park community. Photographs by the authors.

3.1 Results

The first activity organised at the "Parco dei Quartieri Spagnoli" involves describing the green area using adjectives, from which a real-time word cloud is obtained using the Mentimeter generator (Fig. 2). Analysis of the responses from participants reveals a prevalence of negative issues: the difficulty of access to the site is the most felt concern by the community, together with the lack of maintenance, signage, and its low attendance. In this case, the theme of in/security does not directly emerge, but it can be inferred from the associated variables. Despite its negative aspects, park users appreciate it for its relaxing, quiet, and peaceful character, for its panoramic view and for its impressive endowment of greenery.

The subsequent activity involved the administration of the questionnaire previously described, which received 73 responses, primarily from women (68.5%), with most respondents aged between 18–25 years (79.5%) and 41–60 years (12.3%).

61.5% of the sample perceives the park's context as 'peaceful' due to the absence of vulnerable or criminal individuals, while 70.5% of users associate the perception of insecurity, both inside and outside the park, with its isolation and low levels of foot traffic in these areas. All participants agree that the park is unattractive, primarily due to the absence of adequate facilities (playgrounds, sports areas, drinking fountains) and services (toilets, refreshment areas, socio-cultural activities), so as to affect the low attendance of the areas and the relative absence of natural surveillance.

Fig. 2. Word cloud created from the participants' responses. Processing by the authors using the Mentimeter platform.

The presence of social incivility, as well as illegal or criminal acts, does not represent a real or main park criticality associated with its safety. This confirms the importance of conducting a bottom-up survey to address the possible discrepancy between an exclusively objective assessment of security, investigated on the basis of recorded crimes and criminal risk, and the social perception of it.

The Park is recognized by the entire sample as a place easily accessible on foot, due to its proximity to public transport, or by bicycle, and more difficulty by car, due to the lack of parking in the area. The entire sample recognizes the potential and complete permeability of the complex on three sides, except on the northern area due to the presence of the Montesanto-Morghen funicular, noting the existence of several entrances, though currently closed. The active and accessible entrances to the park are, therefore, currently not easily identifiable and insufficient. A problem identified by 72.6% of respondents is the evident presence of architectural barriers, caused by the malfunctioning of the lifts (escalators and elevators) needed to overcome the level changes to access the park and reach its various terraces. During the site visit, users did not identify any particular complexity in the park's layout that would influence the perception of safety. The sense of disorientation does not only concern the internal surface of the park but is already felt along its access roads due to the lack of any type of indication signalling its presence. Upon entering, even here, there is no appropriate signage that declares the total configuration of the park and its articulation into several levels, which indicates all the functions and activities available within, in addition to the fact that most of the present buildings are inaccessible and in disuse.

A portion of the interviewees believe that there are areas within the park that are too isolated or hidden, which can negatively affect the perception of safety. 82.3% of users detected an insufficient presence of lighting fixtures and a consequent poor visibility in the dark hours. 54.8% of respondents consider the current state of abandonment and degradation of existing green areas, due to the total absence of maintenance, as a

negative aspect in terms of perceived safety. In addition to the presence of overgrown vegetation, the poor maintenance and deteriorating condition of the buildings within the complex arouse a feeling of neglect and abandonment in the participants and limit its use. Even street furniture, building walls, and other public surfaces (lamp posts, rubbish bins, etc.) are covered with posters, spray writings, and similar markings, leading 87.5% of respondents to rate the level of urban decorum as medium-low.

The same indicators of perceived safety were adapted and reused to conduct a study of the park's surrounding context. Several locations near the "Parco dei Quartieri Spagnoli" were identified as unsafe: vico Trinità delle Monache, Montesanto steps, via Pasquale Scura, and part of Corso Vittorio Emanuele. The most frequently reported reasons are the presence of steep roads, designed only for vehicles and unsuitable for pedestrians due to the absence of sidewalks, intense and fast traffic, poor maintenance and signage, presence of litter, graffiti, homeless people and uncivilized subjects, poorly lit road sections, and poorly frequented areas at certain times. Unlike the internal areas of the park, considered safe places to stay for 67.5% of the sample, its immediate context was rated negatively by 78.4% of them. These problematic areas, along with those preferred by users, were subsequently marked during the final collaborative mapping exercise, carried out using paper maps of the park and its surrounding context (Fig. 3). In the proximity of the park, no 'heart places' were mapped; however, within the park, all the green areas of the upper garden and the middle level, including the "Bosco dei Tigli" and the multifunctional sports pitch, were repeatedly reported as both a favourite place and a problematic and unsafe space due to its constant need for care and maintenance. The presence of a caretaker and the fence on all sides, which allows children to play freely and away from cars, positively affects the community's perception of safety.

The mapping activity conducted by the younger participants using the MyMaps tool involved categorising the indicators of perceived insecurity into three main categories based on the environmental factors present: lighting, maintenance, and disorientation. The visual representation of these three categories enables the immediate identification of the park's most problematic areas through the georeferencing of the collected data in a summary relational geo-database created using GIS tools.

User suggestions highlight the need to reduce existing architectural barriers, including the refurbishment of mechanical lifts, and to enhance lighting, signage, seating, and maintenance of the green spaces and buildings. According to young people, priority should be given to introducing new functions within the park, which implement the field of use and the duration of attendance: dog areas, spaces for the children's play, study zones, refreshment areas, info-points, as well as frequent social and cultural events, festivals, and local fairs, and the extension of the park's opening hours, especially during the summer.

Fig. 3. Collaborative mapping of unsafe areas and heartlands inside and outside the park. Photographs by the authors.

4 Conclusions

The safety of public spaces, particularly urban green spaces, is a complex issue that requires an integrated methodological approach. This process must include an accurate assessment of the existing safety conditions, combining environmental, social, and urban elements, as well as the definition of targeted intervention strategies. The effectiveness of these strategies depends on a thorough understanding of the specific context and an evaluation of the risk scenario.

The SeTUP research aims to develop a model based on environmental quality indicators, with the goal of supporting the assessment of perceived safety in urban parks and contributing to the formulation of policies to improve their quality and safety. The model, applied to public parks in Naples, stands out for its innovative approach that combines quantitative indicators, derived from technical literature, with qualitative data collected through collaborative mapping and questionnaires administered to the community. The workshops conducted demonstrate that involving the population in a structured analytical process fosters collaboration between researchers and users, aiming to identify safety issues and discuss potential improvements and innovative solutions, in a participatory and "maieutic" process [57]. The data collected allows for the analysis of the morphological, spatial, and perceptual characteristics of the park and its surrounding

area, highlighting aspects of accessibility, livability, and safety. The results obtained, particularly for the "Parco dei Quartieri Spagnoli", confirm the reliability of the selected indicators, providing insights into the priority issues related to the theme of perceived safety. The research is ongoing, and the methodology presented can be expanded in future studies, considering additional variables such as residential satisfaction, social cohesion, and urban identity, which are closely linked to the perception of safety [53].

References

1. Lefebvre H.: Le Droit à la ville. Paris, Anthro¬pos, trad. it. 1970, Il diritto alla città. Marsilio, Padova (1968)
2. Coppola E.: Laboratorio Bagnoli. Edicampus Edizioni (2020). ISBN 978-88-7603-145-8. http://www.edicampus-edizioni.it/images/ebook/laboratorio-bagnoli.pdf
3. Lepoutre D.: Cœur Banlieue. Codes, rites et langages. Odile Jacob, Paris (2001)
4. Lourenco, N.: Città, violenza urbana e sentimento di insicurezza. Rivista di Criminologia, Vittimologia e Sicurezza, VI **3**, 149–165 (2012)
5. Acierno, A.: Tra sicurezza virtuale e città reale. TRIA **4**, 243–250 (2009)
6. Cardia C., Bottigelli C.: Progettare la città sicura. Pianificazione, disegno urbano, gestione degli spazi pubblici. Hoepli, Milano (2011)
7. Secchi, B.: La città dei ricchi e la città dei poveri. Carocci editori, Bari-Roma (2013)
8. Selmini, R.: La sicurezza urbana. Il mulino, Bologna (2004)
9. Jeffery, C.R.: Crime Prevention through Environmental Design. Sage Publications, Beverly Hills (1971)
10. Mastronardi V., Ciappi S.: Urbanistica e criminalità (I Parte). Alle origini di un rapporto. Urbe et Ius. Revista de estudio de Criminologia y ciencias penales, 1–17 (2020)
11. Wood, E.: Housing Design: A Social Theory. New York: Citizens' Housing and Planning Counsel, New York (1961)
12. Jacobs J.: Vita e morte delle grandi città americane. Einaudi, Torino (1969); trad. it. di The Death and Life of Great American Cities. Prima edizione 1961, Harmondsworth, Penguin Books, 1977
13. Newman, O.: Defensible Space - Crime Prevention Through Urban Design. Macmillan, New York (1972)
14. Kelling, G.L., Wilson, J.Q.: Broken windows: the policy and neighbourhood safety. Atlantic **249**, 29–39 (1982)
15. Musarra G.: La città "si...cura". Pianificare la sicurezza urbana. Life Saf. Secur. **4**(4), 79–82 (2016)
16. Acierno, A.: Urbanistica securitaria: modelli, limiti e prospettive di ricerca. TRIA **5**, 153–66 (2010)
17. Karrer, F., Santangelo, S.: Pianificazione urbana e sicurezza. Cittalia, Per una città sicura dalle ordinanze agli strumenti di pianificazione e regolamentazione della convivenza cittadina, 71–82 (2012)
18. Bolici R., Gambaro M.: La sicurezza urbana per la qualità dello spazio pubblico. TECHNE **19**, 104–113 (2020)
19. Kuo, M., Sullivan, W.: Environment and crime in the inner city: does vegetation reduce crime? Environ. Behav. **33**, 343–367 (2001). https://doi.org/10.1177/00139160121973025
20. NYRP, New York Restoration Project, Annual-Report (2018)
21. Pinna, S.: Rischi ambientali e difesa del territorio. FrancoAngeli, Milano (2002)
22. Coppola, F.: Un modello risk-based per la prevenzione ambientale del rischio da criminalità. Tesi di dottorato in Urbanistica e sicurezza, Università degli studi di Salerno, Dipartimento di Ingegneria civile (2021)

23. Innes, M.: Signal crimes and signal disorders: notes on deviance as communicative action. Br. J. Sociol. **55**(3), 335–355 (2004). https://doi.org/10.1111/j.1468-4446.2004.00023.x
24. Perez Tejera, F., Anguera, M.T., Guàrdia, J., Dalmau-Bueno, A., Valera, S.: Examining perceived safety and park use in public open spaces: The case of Barcelona. J. Environ. Psychol. **81** (2022). https://doi.org/10.1016/j.jenvp.2022.101823
25. Nasar, J.L., Fisher, B.: 'Hot spots' of fear and crime: a multi-method investigation. J. Environ. Psychol. **13**(3), 187–206 (1993)
26. Nasar, J.L., Fisher, B., Grannis, M.: Proximate physical cues to fear of crime. Landsc. Urban Plann. **26**(1–4), 161–178 (1993). https://doi.org/10.1016/0169-2046(93)90014-5
27. Fisher, B., Nasar, J.: Fear of crime in relation to three exterior site features: prospect, refuge, and escape. Environ. Behav. **24**, 35–65 (1992). https://doi.org/10.1177/0013916592241002
28. Thani, S.K.S.O., Hashim, N.H.M., Ismail, W.H.W.: Surveillance by design: assessment using principles of crime prevention through environmental design (CPTED) in urban parks. Procedia Soc. Behav. Sci. **234**, 506–514 (2016). https://doi.org/10.1016/j.sbspro.2016.10.269
29. Madge, C.: Public parks and the geography of fear. Tijdschr. Econ. Soc. Geogr. **88**(3), 237–250 (1997). https://doi.org/10.1111/j.1467-9663.1997.tb01601.x
30. Carmona, M., de Magalhães, C.: Local Environmental Quality. A New View on Measurement, Department for Communities and Local Government, London (2007)
31. Mehta, V.: Evaluating public space. J. Urban Des. **19**(1) (2014)
32. Clemente, M.: Re-design dello spazio pubblico. Franco Angeli, Milano (2017)
33. Bonnes, M., Uzzell, D., Carrus, G., Kelay, T.: Inhabitants' and experts' assessments of environmental quality for urban sustainability. J. Soc. Issues **63**(1), 59–78 (2007). https://doi.org/10.1111/j.1540-4560.2007.00496.x
34. Kaplan, R.: The analysis of perception via preference: a strategy for studying how the environment is experienced. Landsc. Plann. **12**, 161–176 (1985)
35. Anderson L, Stokes G.: Planting in parking lots to improve perceived attractivness and security. Arboric. Urban For. (AUF) **15**(1), 7–10 (1989). https://doi.org/10.48044/jauf.1989.002
36. Comune di Forlì, Servizio Urbanistica e Edilizia Privata, Unità Strumenti attuativi e urbanizzazioni, Linee guida sulle buone pratiche di sicurezza urbana, approvato con Delibera G.C. n. 92 del 23/04/2013 e s.m.i
37. Kaplan, R., Kaplan, S.: The experience of nature: A psychological perspective. Cambridge University Press, Cambridge, UK (1989)
38. Herzog, T., Bryce, A.: Mystery and preference in within-forest settings. Environ. Behav. **39**, 779–796 (2007). https://doi.org/10.1177/0013916506298796
39. Berlyne, D.E.: Aesthetics and Psychobiology. Appleton-Century-Crofts, New York (1971)
40. Appleton, J.: The Experience of Landscape. Wiley, Londra (1975)
41. Mahrous, A.M., Moustafa, Y.M., Abou El-Ela, M.A.: Physical characteristics and perceived security in urban parks: investigation in the Egyptian context. Ain Shams Eng. J. **9**(4), 3055–3066 (2018). https://doi.org/10.1016/j.asej.2018.07.003
42. Foucault, M.: Sorvegliare e punire: la nascita della prigione. Einaudi, Torino (2005)
43. Bentham, J.: El panóptico. Quadrata, Ciudad Autónoma de Buenos Aires (2016)
44. Zhao, J., Huang, Y.: Physical characteristics of urban green spaces in relation to perceived safety. J. Urban Plann. Dev. **147**(4) (2021). https://doi.org/10.1061/(ASCE)UP.1943-5444.0000742
45. Jorgensen, L., Ellis, G.D., Ruddell, E.: Fear perceptions in public parks interactions of environmental concealment, the presence of people recreating, and gender. Environ. Behav. **45**, 803–820 (2013). https://doi.org/10.1177/0013916512446334
46. Baroni, M.R.: Psicologia ambientale. Il Mulino, Bologna (1998)
47. Schroeder, H., Anderson, L.: Perception of personal safety in urban recreation sites. Leisure Res. **16**, 178–194 (1983). https://doi.org/10.1080/00222216.1984.11969584

48. Jorgensen, A., Hitchmough, J., Dunnett, N.: Woodland as a setting for housing-appreciation and fear and the contribution to residential satisfaction and place identity in Warrington New Town, UK. Landsc. Urban Plann. **79**(3–4), 273–287 (2007). https://doi.org/10.1016/j.landurbplan.2006.02.015
49. Sezavar, N., Pazhouhanfar, M., Van Dongen, R.P., Grahn, P.: The importance of designing the spatial distribution and density of vegetation in urban parks for increased experience of safety. J. Cleaner Prod. **403** (2023). https://doi.org/10.1016/j.jclepro.2023.136768
50. Whyte, W.H.: The Social Life of Small Urban Spaces. The Conservation Foundation, Washington DC (1980)
51. Project for public spaces: Placemaking: What if We Built Our Cities Around Places (2022)
52. Mak, B.K.L., Jim, C.Y.: Examining fear-evoking factors in urban parks in Hong Kong. Landsc. Urban Plan. **171**, 42–56 (2018). https://doi.org/10.1016/j.landurbplan.2017.11.012
53. Carro, D., Valera, S., Vidal, T.: Perceived insecurity in the public space: personal, social and environmental variables. Qual. Quant. **44**(2), 303–314 (2010). https://doi.org/10.1007/s11135-008-9200-0
54. Russell, J.A., Pratt, G.: A description of the affective quality attributed to environments. J. Pers. Soc. Psychol. **38**, 311–322 (1980)
55. Perugini, M., Bonnes, M., Aiello, A., Ercolani, A.P.: Il modello circonflesso delle qualità affettive dei luoghi. Sviluppo di uno strumento valutativo italiano. TPM Testing Psychometrics Methodol. **9**(4), 131–152 (2002)
56. Comune di Napoli, Assessorato al diritto alla città, ai beni comuni e all'urbanistica, Unità di Progetto Interdirezionale "Coordinamento progetti URBACT e Reti per lo Sviluppo di Politiche Urbane Integrate", Strategia di riattivazione del complesso della SS Trinità delle monache; ex ospedale militare, Piano di Azione locale della città di Napoli- 2nd chance, Aprile 2018
57. Dolci D.: L'educazione. Edizioni Comunità, Roma (2020)