

Using Visualization for the Evaluation of Safety and Aesthetics Conflicts in Urban Parks

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1 Introduction

Urban parks are a vital and essential component of our landscape. Nevertheless, in some cases, historical parks are not used to their full potential. The problem of underused public parks is currently associated with the sense of fear and with the question of personal safety of visitors. Thus this research investigates some factors, which affect the user's perception of safety and of aesthetic, on behalf of the visual stimuli that are depicting landscape dynamics in urban parks. The aim of this study is to investigate the relation and the possible conflicts between personal safety and aesthetics for different conditions of "visual impermeability" (JORGENSEN 2002). The 3D visualizations show dynamics over time, in order to consider if these changes influence the evaluation of safety and aesthetics as expressed by the observers. The use of 3D visualization is already widespread for large-scale landscapes, such as forest and agricultural areas, but the present research explores an urban-scale object, the historical park, represented and analyzed at a very detailed scale. It is believed that the value of a park must be related not only to its specific history and character but also to the uses and to the activities that take place in the park itself. In the maintenance of historical urban green areas in particular, a cautious balancing between the use and preservation of the sites is essential. This research does not pretend to offer a radical solution to this problem but rather aims to present a different point of view to evaluate and explore urban parks. The research was developed in conjunction with the EU Greenspace Project.

2 Personal Safety and Aesthetic

2.1 The Safety Demand

The theme of personal safety related to crime, in European cities, is central in recent research fields and projects, due to an increasing demand from citizens for more liveability of open spaces. In the case of urban green spaces such as gardens or public parks, the diffused concept of crime is related mainly to the "predatorial microcriminality". This expression denotes all the crimes happening in public spaces, reaching the citizen as a pedestrian (ACIERNO 2003). The actual interest to the crime prevention is often called "the second generation of designing out crime" (SOOMEREN 2000). Nowadays, cities after some decennials of crises are growing and attracting more inhabitants, with the aim of being agreeable for citizens and visitors. Directly linked to the question of livableness, an increasing demand of safety by citizens is increasing. For example, in the *Carta Urbana Europea* of the Council of Europe presented in Strasbourg in 1992, the theme of safety was

the first point among twenty that was discussed. This theme becomes crucial also because the traditional city had assigned fear specific spaces only to marginal or poor areas but in contemporary cities, the spaces of fear have expanded. The sense of insecurity in fact, is spreading also to the more reached spaces, gaining field in the dense and central areas (ACIERNO 2003).

The current safety demand from the citizens is polyvalent, as the concept of urban safety depends either from the social and objective sphere or from the psychological and subjective sphere. According to psycho-sociology, fear is a fundamental sentiment of the adaptation of humans to the environment, a mechanism deriving from the survival instinct. This research is established on the theory that explains human adaptation in relation to the environmental condition, with reference to the classic authors from DARWIN (1859/1989) and LORENZ (1989), to the studies of KAPLAN (1987) and to the "Prospect and refuge theory" of APPLETON (1996). The work presented here, follows the stream of the psychophysical perception research (WHERRETT 2000; STAMPS 2000), through the application of landscape preference models for simulated urban parks. In particular, people's perception and appraisal of the form of the space is investigated. The analysis is focused on the observation of the characteristics of personal safety and aesthetics. The material of analysis is the urban green, in the form of historical parks and gardens. This type of green, which is full of significance and culture, is often centrally and strategically located but is in some cases underused because of the sense of fear and problems linked to the perception of personal safety.

2.2 The Aesthetics of Urban Green

The composite scenario of the urban green structures, is the result of different sensibilities and subjectivities, expressed by the multiplicity of social experiences and cultural requirements characterizing the urban society. Thus, the investigation to identify the aesthetic significance, the value of the "icons" of the urban parks can be ambiguous. Most of the parks situated in densely populated cities are historical heritages derived from a multiplicity of cultural and perceptive experiences. This research proposes to approach different disciplines, with the aim of creating an interdisciplinary analysis useful for the themes dealing with urban greens and landscapes. The landscape is considered from two different ways: on the one side, the landscape is considered as the environment, the result of physical, ecological and cultural aspects, on the other side, according to a more conservationist tradition, the landscape is evaluated with a specific interest for the visual, physico-morphological and aesthetic aspects.

Urban green is commonly associated to the image of gardens and parks that the urban transformations, ancient and recent, provide in a variety of figurative expressions of typologies and structures. With the recent evolution in the actual form of the urban park, the traditional distinction between garden and park becomes less obvious. However, the new questions on use and methodologies to represent and to design the urban green cannot ignore the principles and the values that generated the actual form of the urban park. Parks and gardens represent two figurative archetypes, based on two distinct aesthetic ideals. The first being the garden derived from the Medieval Latin word *giardinum*, which stands for a closed and fenced in space. The other is an open spaced garden, bounded and organized with an artificial mark, organized with regular and geometrical schemes. The garden, an allegorical place under the human control, realized with aesthetic ambitions, is often the

surrounding of an architectonic component. The term park derives from the pre-Latin forms of *parra* or *barra* that mean enclosure or border. Indeed the original function of the park was to bind something mobile, such as flocks of animals; this refers back to stock farming or to hunting reserves that are usually located *extra moenia*. The archetype of the modern urban green is the urban park or public park. The function of the urban park, is influenced by the English landscape garden, was to mitigate the effects of the, sometimes, dramatic growth of the industrialized city. In fact, urban parks in European cities engage not only aesthetic, cultural and didactic aims, but also social and hygienic purposes. With the evolution of the concept of urban green in a more functionalistic approach, the traditional typological model of green space was distanced from the aesthetic vision of the nature. The functions of the green space became more important than the coherence to the traditional spatial models. The theme of the urban park was converted more in a social direction and the interest focused on the utilitarian aspect rather than on the aesthetics of the scenic representation of the nature (MIGLIORINI 1992). Thus the theme of the urban green, the conflict between form and use, the question between heritage conservation or new functions, is a very real issue, that can be treated with a new analytical and experimental approach, starting with the understanding of the perceptions and the needs of the potential park users.

3 Methodology

The perception of personal safety is strongly related to the presence of visual enclosure (STAMPS 2005) and to the conditions of "visual impermeability" (JORGENSEN 2002). It is well documented that the presence of dense vegetation in urban parks may induce a sense of fear. In particular, the presence of dense vegetation can contribute to the fear of entrapment, with the presence of barriers of escape, and to the fear of concealment, with the presence of blocked prospects (NASAR & JONES 1997). The research measures and evaluates observers' response to hypothetical design interventions, such as the reduction of the shrub and bush density, which obstruct the observers' visibility. The visual impermeability is obtained with the mutual changes of foreground and background vegetation barriers. (Fig. 1).

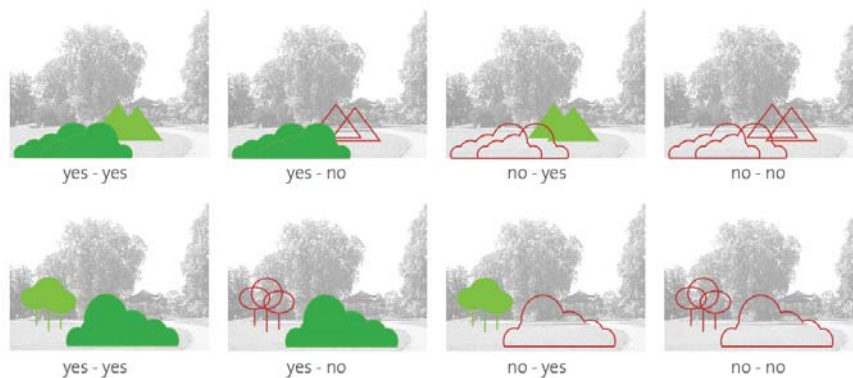


Fig. 1: Visual impermeability: full enclosure (yes - yes), vegetation in foreground (yes - no), vegetation in background (no - yes), no enclosure (no - no)

The interventions are proposed to increase activity in the parks and therefore to improve the sense of personal safety of park visitors. It is also estimated that open design profiles do simplify the orientation in the park and above all reduce potential “hotspots of crime and fear” (NASAR ET AL. 1993) present in the sites. The aim of the research is to analyze preferences for different scenarios of enclosure in Platzspitz and Zürichhorn, two historical parks situated in the centre of Zürich.

3.1 Visualization and survey design

Using 3D modelling techniques, 128 still images based on quantitative information stored within Geographical Information Systems (IMAGIS ©Cirad) and qualitative data of vegetation types (AMAP ©Bionatics) were generated. The controlled simulated scenarios represent changes or dynamics that might be happening over time in the parks.

The design parameters of the visual alternatives for the park were defined by *disaggregating* the park into visible and influential attributes. The hypothetical scenarios were developed using three main attributes: seasons, points of view, and spatial arrangement of vegetation. The parks, depicted with a high level of detail and realism, are represented over the course of a year (seasonal changes) by a sequence of static images rendered from several points of view, positioned along an imaginative walk in the park. The different enclosure effects are realized with the variation in the amount of foreground and background shrubby vegetation. For each attribute of interest, four attribute levels were determined. From the combination of the three attributes and their four levels of variation, a full factorial study design was created. The full factorial design involves 4^3 different profiles, which produces 64 context-setting scenarios for each park. All the 64 profiles were visualized with digital images (Fig. 2). The 64 images/profiles visualized were used in four types of evaluation sets. This paper presents the results from the assessment of the 64 images/profiles, independently from the type of evaluation set. In the survey experiment each image/profile has been depicted and assessed 16 times. For each park, a paper survey with a sample of 128 respondents was conducted. The respondents' sample is composed of four selected groups of 32 interviewees:

citizen in Zürich landscape experts interviewee near the park interviewee in the park.

The respondents were not informed about the identity of the parks, in order to avoid any possible induction that might influence the evaluation behaviour. Respondents were asked to imagine that they were visiting the depicted park for the first time and were then asked to assess the park, by evaluating the images/profiles using a rating scale, which goes from 1 to 7. The expression image/profile is used in order to clarify the occasional misunderstandings in the visual stimuli evaluation exercises that might occur between “picture or place” (SCOTT & CANTER 1997). In this survey, the interviewee evaluated a park, using some images depicting different controlled visual profiles of the existent situation and possible changes or dynamics.

3.2 Results

From the data collected, it is possible to elaborate on the first considerations about the parks presented. The evaluations are based on the mean values, obtained from 1024 observation for each virtual park. In both the virtual parks, the overall patterns of the responses expressed for the personal safety and the aesthetic show a significant variation between the two characteristics, as illustrated in the histogram of Platzspitz park, which represents the ratings means of all the 64 images/profiles (Fig. 5). The ratings variance confirms the existence of conflicts between personal safety and aesthetic in urban parks. This conflict is also proven in considering the images/profiles that obtained the highest and the lowest mean values for personal safety and aesthetic, as in the case of the Platzspitz park, where the opposition reversing the profiles selected is manifested (Fig. 2). In the next step, the role of the visible and influential attributes is investigated. Hence, the 1024 observations were evaluated in relation to the vegetation spatial arrangement (vegetation) and the seasonal changes (seasons) see Fig. 3 and Fig. 4. As supposed, for the characteristic of personal safety in both the parks, the profiles with the full enclosure (yes yes), are considered as less safe, while the profiles without enclosure (no no) obtained the highest mean values for safety. In both the parks, the safest season is winter, while the less safe is summer. These results confirm that not only the vegetation spatial arrangement but also the density of the vegetation barriers might play a role in the perception of personal safety. From the observations of the aesthetic evaluations, it seems that variability of the vegetation is preferred over uniformity of totally open or fully enclosed spaces. In particular, for the Zürichhorn park, the highest aesthetic means were the ones depicting only one vegetation barrier, placed in the foreground or in the background (yes no / no yes). In both the parks, the less aesthetic season evaluated is winter, while the highest evaluated are spring and autumn. The respondents' ratings of the 64 images/profiles in both the study cases showed significant responses to the visual attributes adopted and confirmed the hypothesis that the "visual impermeability" influences the assessment behaviour of potential parks users. In the present research, controlled design visualization experiments for the context of the urban park were developed and some reactions of the respondents were described. The future aim of this research is to learn from the respondents' reactions in order to explicate the assessment behaviours presented in this paper.

Personal safety - Highest rated image/profile



Aesthetic - Highest rated image/profile

Personal safety - Lowest rated image/profile



Aesthetic - Lowest rated image/profile



Fig. 2: Images/profiles of Platzspitz park. Seasonal changes and different conditions of vegetation spatial arrangements

4 Conclusion

This work is based on the assumption that urban parks, and in particular historical green spaces are figurative archetypes that have to be evaluated in an active way, responding to the exigencies of the citizens, with respect for the cultural and historical references (LANGE ET AL. 2004). The actual issue of the urban green space is the collision between the permanence and the integrity of its forms and materials and on the other side the heterogeneity and the instability of the contemporary cities. The livableness of urban open spaces is measurable, with the possibility to discipline their exercises of liberty and autonomy of uses. Nowadays urban parks have become new spaces of incertitude, as demonstrated by the use of preventive measures, such as the fencing of spaces, or the charging of entrance fees or the presence of guards or police officers. This work investigates the perception of safety in urban parks, with the aim of giving an orientation for the composition of the open spaces, respecting the balance between the form and the use. The ambition is to identify and to quantify possible physical characters in urban parks that might generate spontaneous defensive closing behaviour, in the belief that mental barriers limit the uses of the open spaces, contributing to the generation of decadence and the impoverishment of the quality of the spaces. This study is based on the belief that by observing and analyzing the reactions to different landscape visualizations, it is possible to better comprehend people's preferences and also to better preserve, manage and improve the resources of specific sites, in this case, of urban parks.

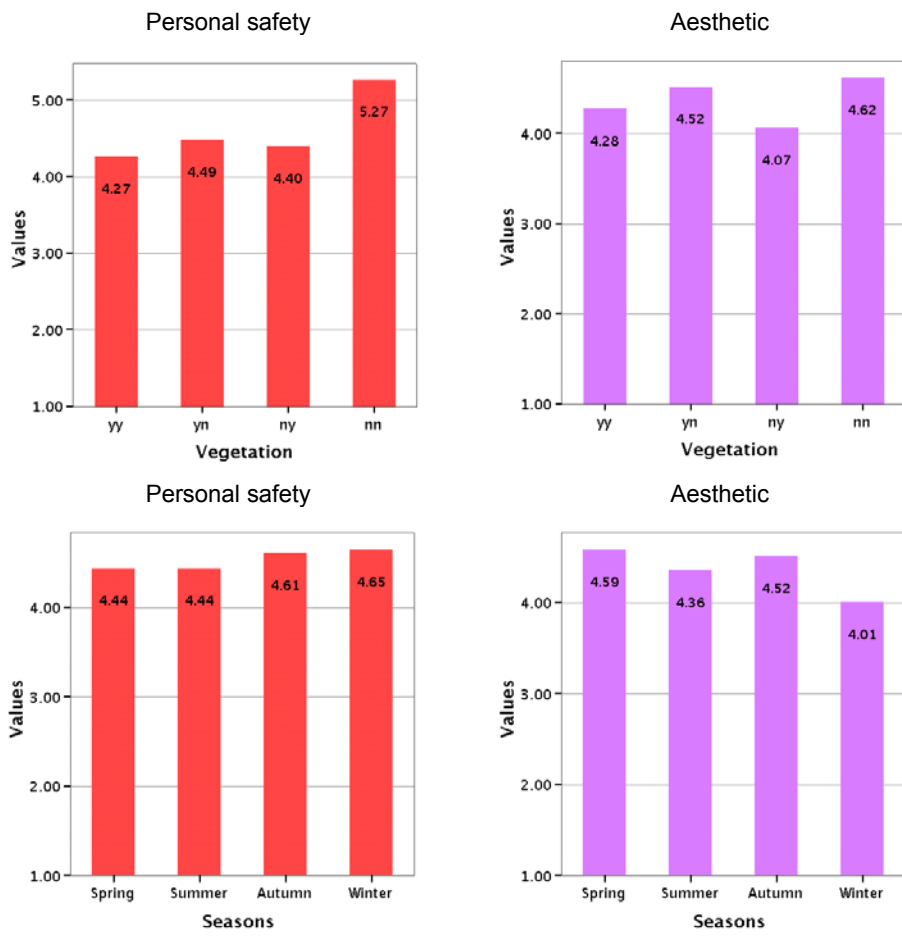


Fig. 3: Platzspitz park: means for influential attributes of vegetation and seasons

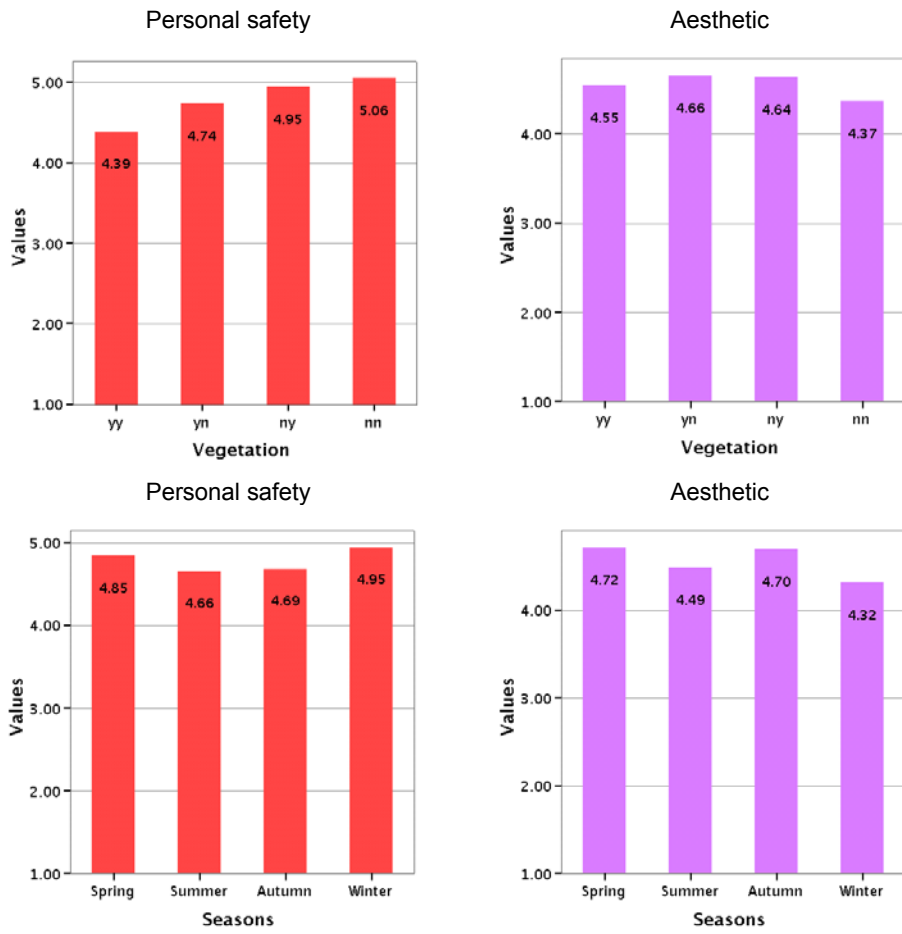


Fig. 4: Zürichhorn park: means for influential attributes of vegetation and seasons

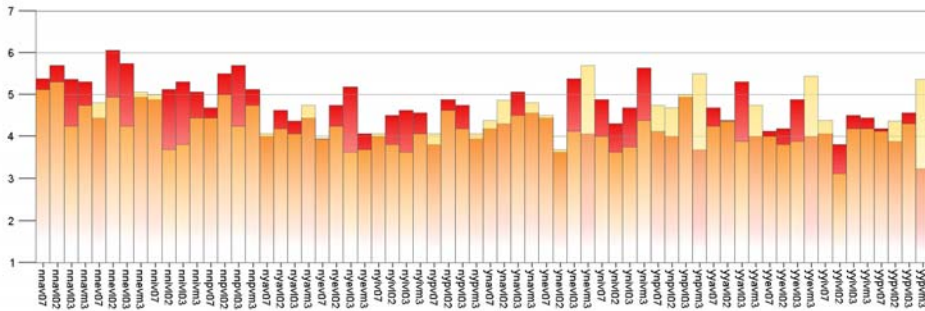


Fig. 5: Platzspitz park: histogram of means for personal safety (red; in original) and aesthetic (yellow; in original)

5 References

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