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Emerging patterns of human behavior in urban green spaces: the potential of behavioral mapping towards responsive human–nature relations

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Public Urban Green Spaces (PUGS) play a vital role in the dense urban fabric as places of people–nature contact but also as socialization spots. Despite some advances in the field, the relationship between the PUGS surroundings and their users' behaviors remains unclear. Therefore, this study examined the patterns of human behavior in four PUGS of the city of Porto, on the north Portuguese coast. The Behavioural Mapping (BM) method was applied in four PUGS between August and November 2020 and observational data regarding 979 users' socio–demographics and behaviors were recorded. BM was administered during the weekday morning/afternoon and weekend morning/afternoon, totaling twelve observation sessions per PUGS. PUGS locations were determined according to the Socioeconomic Deprivation Index. The use patterns during different times of the day were disaggregated across behaviors and users' profiles and their relationship with the surroundings and design elements was assessed with ANOVA, Chi-Square test and Pearson correlation. The users were mostly male adults or elderly, visiting the PUGs in a group (52.5 %). Children and adolescents visited the PUGS less (5.4 %). Main activities observed included talking, eating, and physical exercise, which occurred mainly on sunny days and during the morning. PUGS crowdedness varies significantly ($p < 0.001$) between the sites: PUGS located in low deprivation areas presented a higher crowd–level when compared with those located in high deprivation areas. Also, frequent space alone was more usual in the first. It was also identified variations over time, morning and afternoon, concerning users' behaviors. The use of the physical space of PUGS is influenced by its elements and natural diversity and stimulating level. These findings may pave the way for future research towards responsive human–nature relations to inform design through the effectiveness of the projects proposed, by providing more accurate aligning between the greenspace design language with users' needs.

Keywords: behavioral mapping, urban green spaces, society–nature relations, healthier cities