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# Pedestrian preferences of urban design features in city squares of Athens, Greece

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**Abstract** Public open spaces improve the quality of life in cities and form places for community gatherings and outdoor activities. This study examines the preference of pedestrians for the design features of urban squares. Field surveys on the perception of environmental stimuli were conducted in five squares in Athens, Greece in three seasons (summer, autumn and winter), while a mobile station monitored environmental conditions at the moment of the interview. The questionnaire included an item on the preference for improvement of urban design features (i.e., vegetation, water elements, view, and sport spaces) at the monitoring sites. Overall, 1,858 pedestrians participated in the survey. Of these, 84.4% reported a preference for the monitoring site to be improved for urban design. More vegetation (60.7%) and adding water elements (28.9%) were the most popular suggestions. The preference for increasing vegetation was prevalent in all three seasons (summer, 63.8%; autumn, 61.5%; winter, 57.3%; p=0.05). The preference for water elements was more prevalent in summer (39.6%) than autumn (31.5%) and winter (17.3%; p<0.001). The results show that most participants would prefer the monitoring sites to be improved for urban design reporting vegetation as the main element for improvement.

**Keywords:** urban design, design preference, field surveys, pedestrian

## 1. Introduction

Well-designed public spaces such as squares and streets are attractive, vibrant and improve the quality of life in cities. They promote healthy living as they support physical activity and active modes of transportation, diminish the exposure to excessive heat, air pollutants and noise, and enhance psychological relaxation, reducing stress and stimulating social cohesion (WHO 2016). The effect of public spaces on well-being extends to addressing important policy objectives such as decreasing criminal activities, energy dependency and consumption, and combating morbidity and mortality in city residents.

The attractive public spaces are comfortable and enjoyable. They satisfy pedestrians' needs and preferences. A common preference is the presence of vegetation that was found to be associated with higher walking activity on sidewalks (Kasraian et al. 2020).

The aim of the present study is to examine the preference of pedestrians for specific design features of urban squares in the greater Athens area, Greece.

## 2. Materials and Methods

Field surveys were conducted in the context of UBiPlan project (Urban Biometeorology and Planning) in Athens, Greece in three seasons (summer and autumn 2019 and winter 2020). They were carried out for 15 days in five squares (Fig. 1): Ampelokipoi (metro station), Dafni (metro station), Keratsini (Laou square), Chalandri (Chalandri square), Egaleo (Eleftherios Venizelos square). The surveys aimed to capture pedestrians' perception and preference of environmental stimuli. A mobile station monitored environmental conditions on the site when pedestrians were interviewed using a structured questionnaire. The questionnaire included an item on urban design feature preference. The participants reported whether they would like the monitoring site to be improved for vegetation, water elements, view, and sport spaces. They were allowed to report more than one feature as well as additional features through an open-ended response.

The five squares selected are important for everyday life. Their functionality is multiple including transport squares (Ampelokipoi, Dafni and Egaleo), commercial (Chalandri, Egaleo, Dafni), residential (Keratsini, Chalandri, Egaleo, Dafni), office (Ampelokipoi) and recreational squares (Chalandri, Keratsini). Most of the

plants in the squares were evergreens. A water element (fountain) was present in Chalandri square.


**Figure 1.** Monitoring squares at (a) Ampelokipoi, (b) Chalandri, (c) Dafni, (d) Egaleo, (e) Keratsini, and (f) the Metropolitan area of Athens, Greece.

Statistical analysis included descriptive statistics and chi-squared tests in order to examine the effect of season on preference of urban design elements.

## 3. Results

There were 1,858 survey participants (males: 53.9%, n=1001) with age from less than 12 years (1.1%, n=20) to over 65 (11.6%, n=216). The meteorological conditions monitored on site during the surveys are presented in Table 1.

**Table 1.** Air temperature (Tair, $^{o}$C), relative humidity (RH, %) and wind speed (WS, m/s) monitored on site in the field surveys.

| | | Mean | Median | Std Dev | Min | Max |
|---|---|---|---|---|---|---|
| Summer | Tair | 31.5 | 31.6 | 1.5 | 27.9 | 35.7 |
| | RH | 32 | 31 | 7 | 22 | 50 |
| | WS | 0.9 | 0.9 | 0.4 | 0.2 | 2.1 |
| Autumn | Tair | 21.9 | 22.3 | 2.1 | 16.8 | 25.0 |
| | RH | 55 | 55 | 8 | 36 | 73 |
| | WS | 0.8 | 0.7 | 0.4 | 0.2 | 2.3 |
| Winter | Tair | 11.9 | 12.9 | 2.9 | 6.9 | 16.6 |
| | RH | 46 | 48 | 10 | 23 | 66 |
| | WS | 0.9 | 0.7 | 0.6 | 0.2 | 3.5 |

Most participants (84.4%, n=1,569) reported that the monitoring site should be improved for urban design. The most popular preference was the increase of vegetation (60.7%, n=1,128) for both males (58.5%, n=586) and females (63.2%, n=522). Adding water elements was suggested by 28.9% (n=537) of the participants, an open view by 15.4% (n=286) and space for sports by 5.9% (n=110) of the participants. Further reported desirable features were sitting benches (2.3%, n=42), cleaner conditions (1.7%, n=32), protection from the traffic sound or view of vehicles (1.6%, n=29), and protection from the sun (i.e., more shaded spots in the square; 1%, n=19).

More participants reported that they would like the monitoring site to be improved in summer (89.6%, n=528) than autumn (84.6%, n=505) or winter (79.8%, n=536; $p<0.001$). The preference for increasing vegetation was independent of the season (summer, 63.8% n=376; autumn, 61.5% n=367; winter, 57.3% n=385; $p=0.05$). The preference for water elements was more prevalent in summer (39.6%, n=233) than autumn (31.5%, n=188) and winter (17.3%, n=116; $p<0.001$).

The analysis by monitoring site showed that the participants reported less often that they would like an improvement in the design of Chalandri square (68%, n=282; Fig. 2) compared to Ampeokipoi, Dagni, Egaleo or Keratsini. The participants reported most frequently that the vegetation should be increased in Dafni (72%, n=249) and Ampelokipoi (64.3%, n=286) and that water elements should be present in Keratsini (42.8%, n=121).

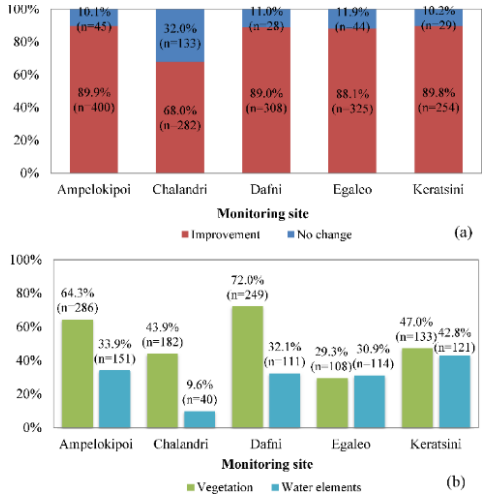


**Figure 2.** Urban design feature preference of participants in the surveys. The participants reported whether they would like the monitoring site to be improved (a) overall and (b) for vegetation or water elements.

## 4. Conclusions

This study shows that most participants would prefer the monitoring sites to be improved for urban design and provides evidence on pedestrians' preference in vegetation and water elements. Vegetation was the dominant element for improvement in all seasons and monitoring sites, even in Chalandri square where vegetation covers a great part of the square. The findings can contribute to the design of attractive communal places.

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