

# Emotional assessment of urban spaces: the effect of age and crossmodal perception.

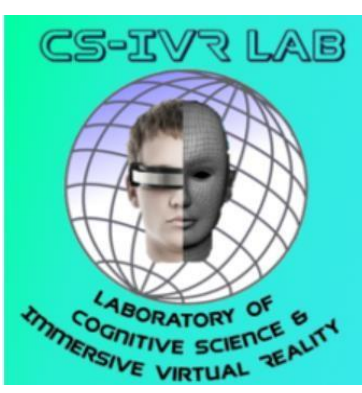
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## 1. BACKGROUND

By 2050, 1 in 6 people in the world will be over 65 years old and almost 1 billion older people will live in cities in developing countries (WPP, United Nations, 2019). This is an important issue, as ageing leads to both physical and cognitive decline [1], as well as emotional problems [2].

Since living environments play an important role in determining our physical, cognitive and emotional abilities throughout life and into old age [3], the WHO has promoted a program for the development of age-friendly environments [4]. In this regard, several studies have shown that the presence of urban parks in cities can contribute to healthy and active ageing [5].

Positive effects are particularly evident when parks feature naturalistic elements (presence of greenery and water) and allow for socialization [6]. However, studies in this area have some limitations:

- 1) they focus mainly on the visual aspects of the environment and neglect the acoustic ones [7];
- 2) they do not consider the effects of ageing on the way different environmental information (e.g., visual and acoustic) is perceived [8].

## 2. AIM

Assessing how **visual and acoustic aspects** influence the **emotional experience of urban parks (green parks and squares)** and the role played by **ageing** and **cross-modal correspondence** (i.e., the ability to associate features of visual and acoustic stimuli) in this process.

## 3. METHOD

**3.1 Participants:** 50 young (20 males) (age M =24.5, SD =3.2); 50 elderly (20 males) (age M =66.2, SD = 4.67)

**3.2 Stimuli:** Visual → pictures of Green Parks vs Squares (Figure 1); Acoustic → five kinds of sounds (Figure 2)

**3.3 Procedure and Tasks:**

**3.3.1 Questionnaire:** All participants were presented with 20 bimodal stimuli (4 images combined with 5 sounds) and 9 unimodal stimuli (images and sounds presented separately). They were asked to evaluate on a 9-point Likert scale (from not at all to extremely) each bimodal and unimodal stimulus according to six adjectives: calm, energetic, happy, pleasant, attractive, stimulating [9].

**3.3.2 Crossmodal Task:** All participants were presented with an arrow pointing up or down and a high or low tone sound. Participants had to indicate when there was congruence between auditory and visual stimulus (i.e., up arrow + high tone; or down arrow + low tone). Mean accuracy was recorded (range: 0-1).

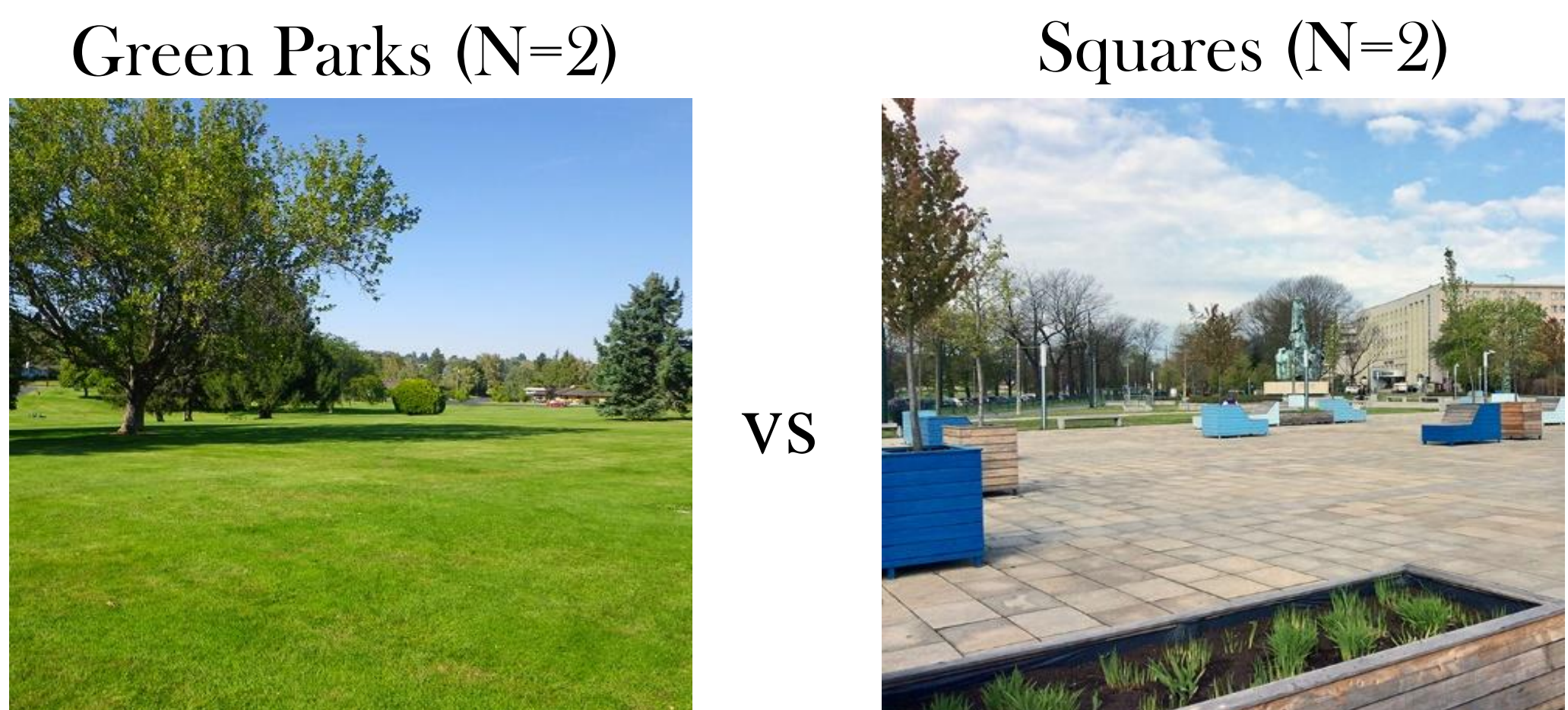


Figure 1. Examples of visual stimuli (2 green parks and 2 squares were used)



Figure 2. Acoustic stimuli (from the left: birds, water, piano music, people talking, car noise).

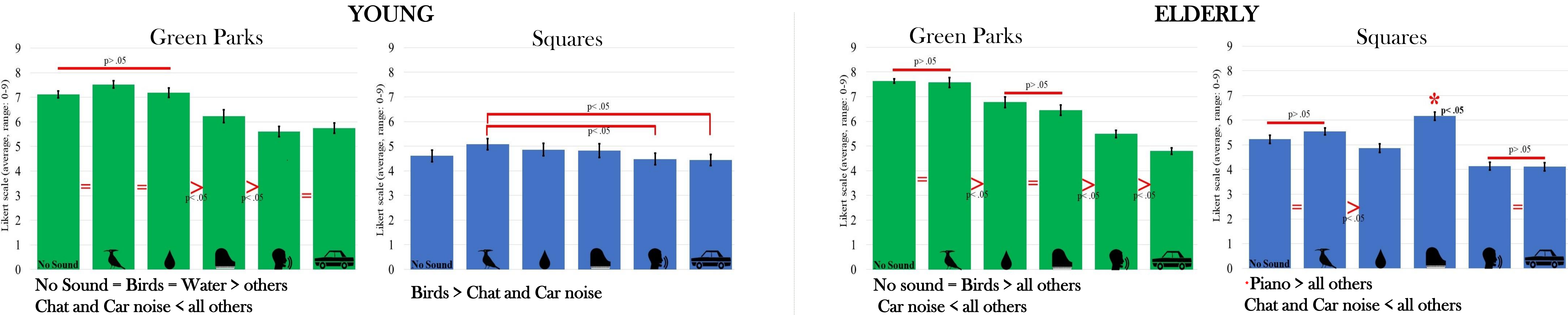
## 4. DATA ANALYSIS

**4.1 mixed ANOVA:** 2 (Age: Young vs Elderly) X 2 (Park Category: Green vs Squares) X 6 (No Sound, Birds, Water, Piano, Chat, Car noise); DV: Average Likert score (mean of the six adjectives) for each park category (mean of two pictures) and sound type;

**4.2 Multiple Regression:** **Criterion** (N=1) → Average Likert score across all bimodal stimuli; **Predictors** (N= 3): Average Likert score on unimodal Visual and Auditory stimuli, accuracy at Crossmodal correspondence task.

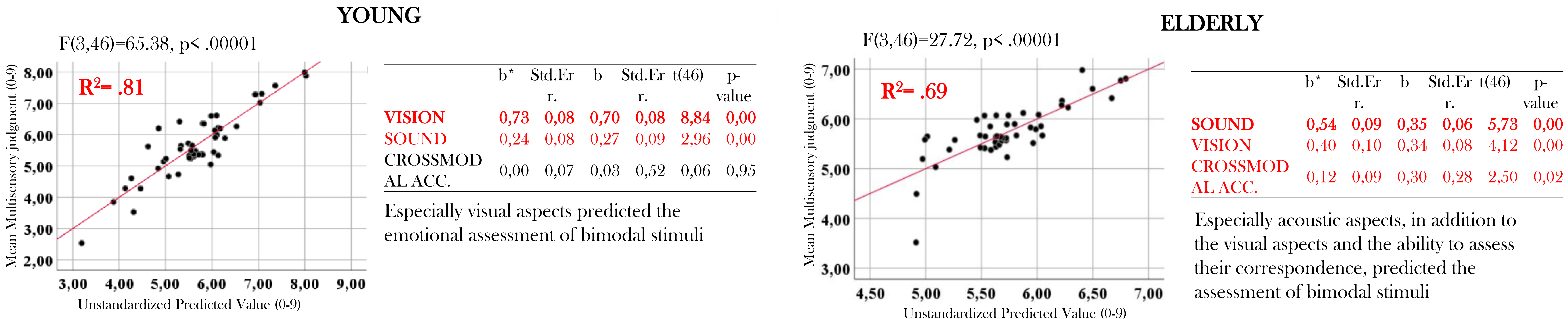
## 5. RESULTS

**ANOVA:** 3 way interaction Age X Park Category X Sounds → F(5,490) = 4.40, p= .0006



**SQUARES + MUSIC → ELDERLY > YOUNG** (only significant diff. between groups)

### Multiple Regression:



## 6. CONCLUSIONS

Both visual and acoustic features influence the emotional evaluation of urban parks: (i) both young and elderly preferred green parks to squares but car noise reduced this positive impact; (ii) music increased the positive impact of squares in the elderly but not in the young; (iii) conversation between people annoyed the young more than the elderly; **Squares, music and people → increased socialization opportunities for the elderly people?**

**Young people →** mainly visual aspects predicted emotional assessment → **Visual dominance hypothesis?** [10]

**Elderly people →** both acoustic and visual aspects and the ability to notice their correspondence predicted emotional assessment → **Enhanced multisensory integration?** [11]

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