

UNDERSTANDING THE CROWD EFFECT: BEHAVIOURAL AND EEG RESPONSES TO NATURAL AND URBAN DENSITY AND THEIR IMPLICATIONS FOR SOCIAL VULNERABILITY



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INTRODUCTION

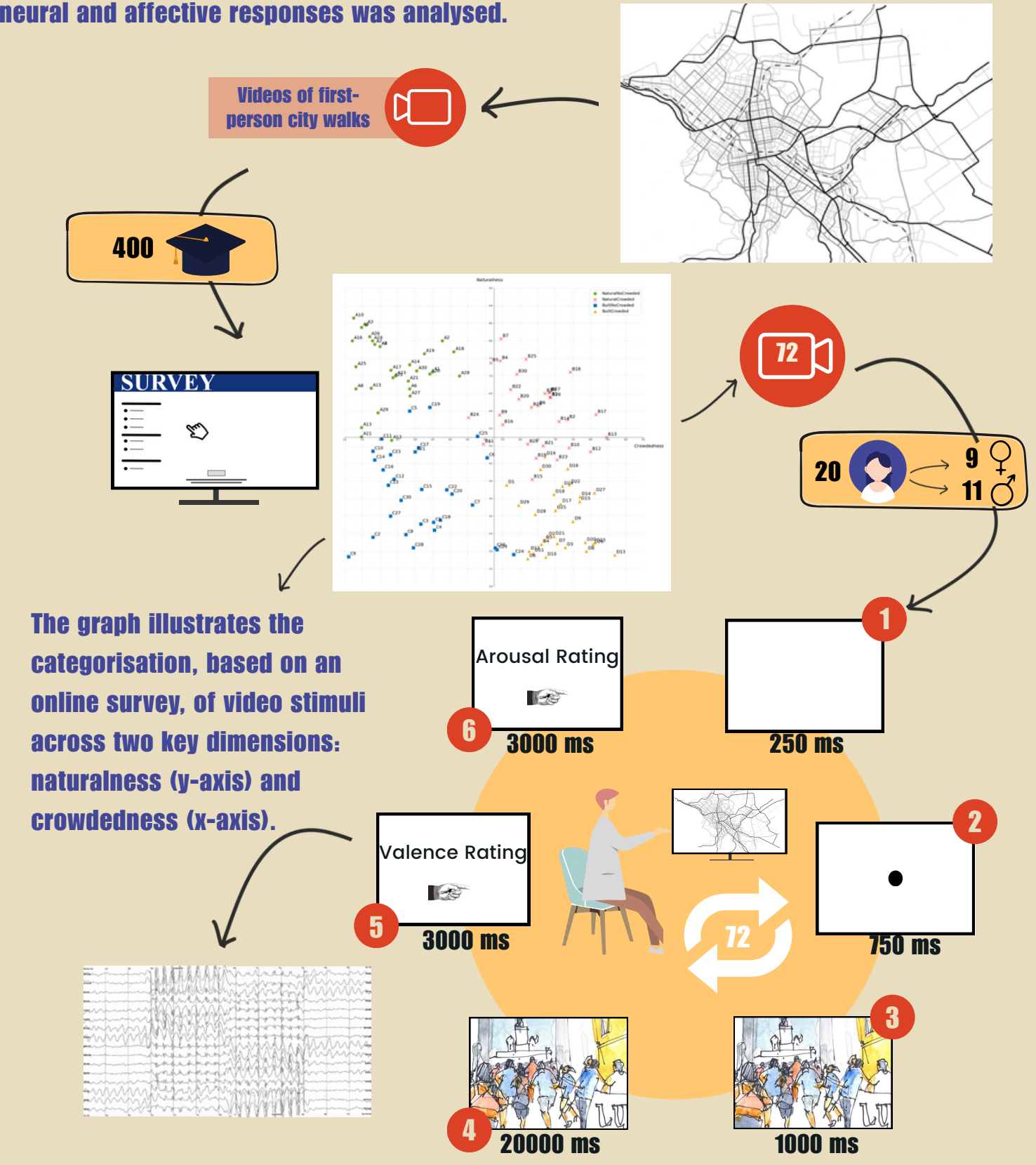
- While urbanisation offers opportunities for economic growth and cultural exchange, it also presents challenges to mental well-being. Crowded urban environments can contribute to stress, anxiety, and even depression, as individuals face limited personal space, higher noise levels, and reduced access to natural areas.
- Understanding these effects is critical for applications ranging from urban planning to mental health, particularly as urban densification continues to intensify. This study investigates the impact of crowdedness on behavioural responses and brain activity, with a focus on comparing natural and urban environments.

OBJECTIVES

- To investigate the impact of varying levels of crowd density (crowdedness) on participants' emotional responses, specifically in terms of valence and arousal.
- To explore the interaction between environmental context (natural vs. built) and crowd density in shaping neural activity.

METHODOLOGY

For the EEG data acquisition, we use the high-density (256 channels) device (EGI-400 series). The participants watched first-person videos of urban environments, and their individual neural and affective responses was analysed.

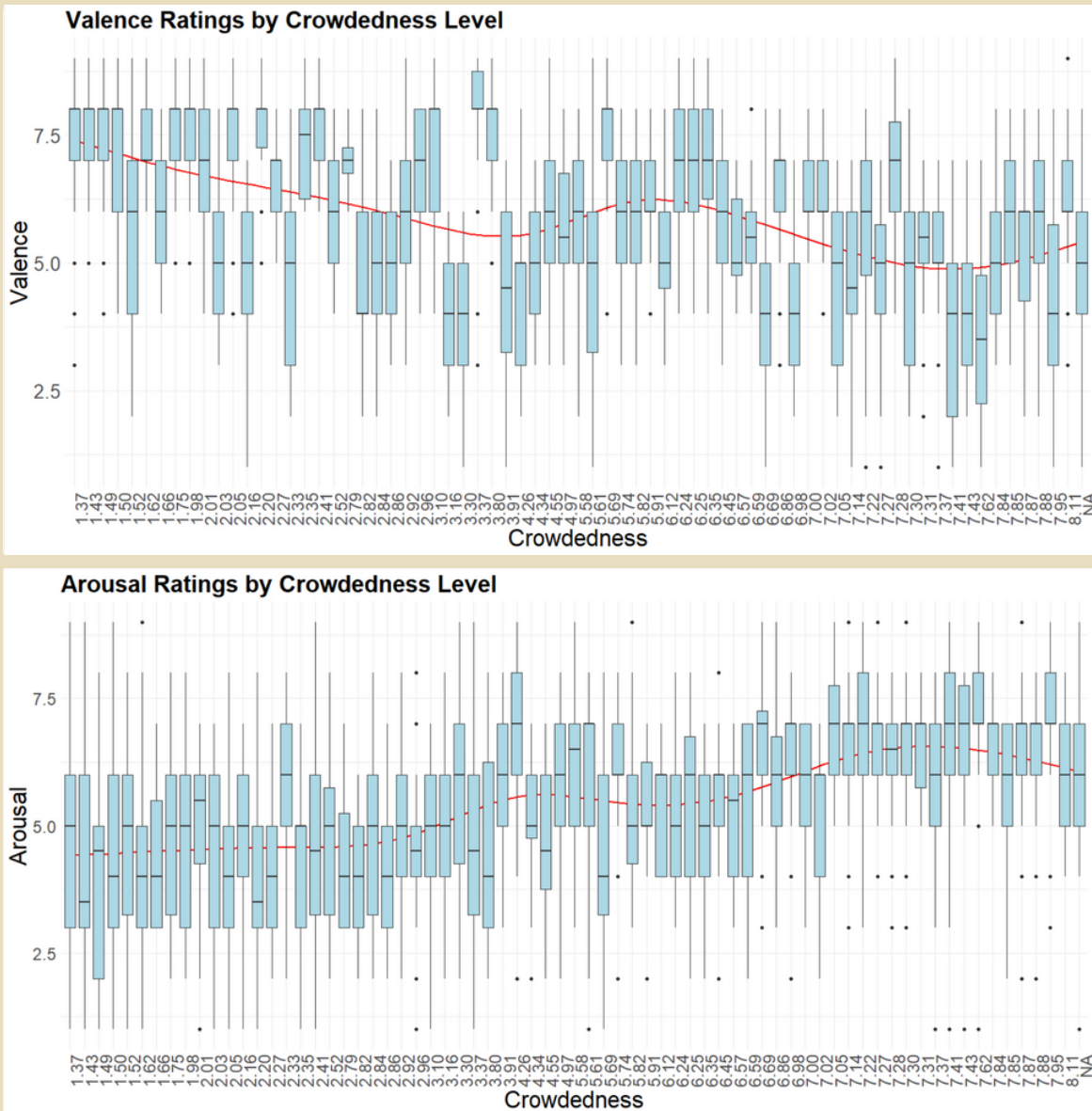


RESULTS AND DISCUSSION

VALENCE AND AROUSAL

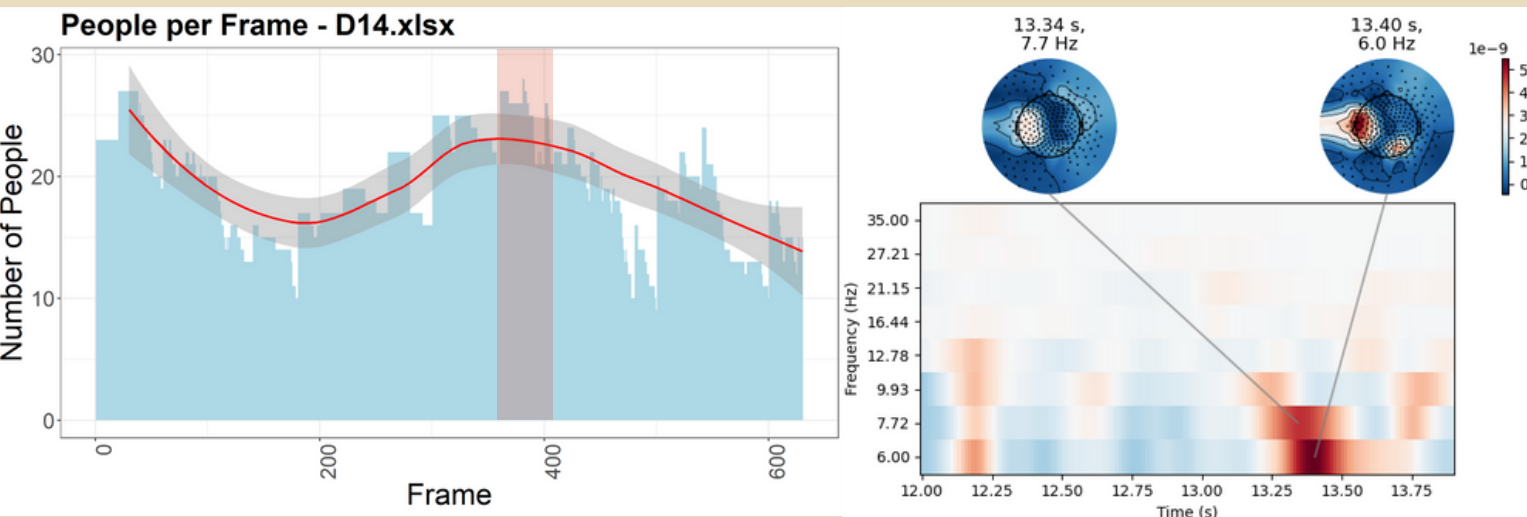
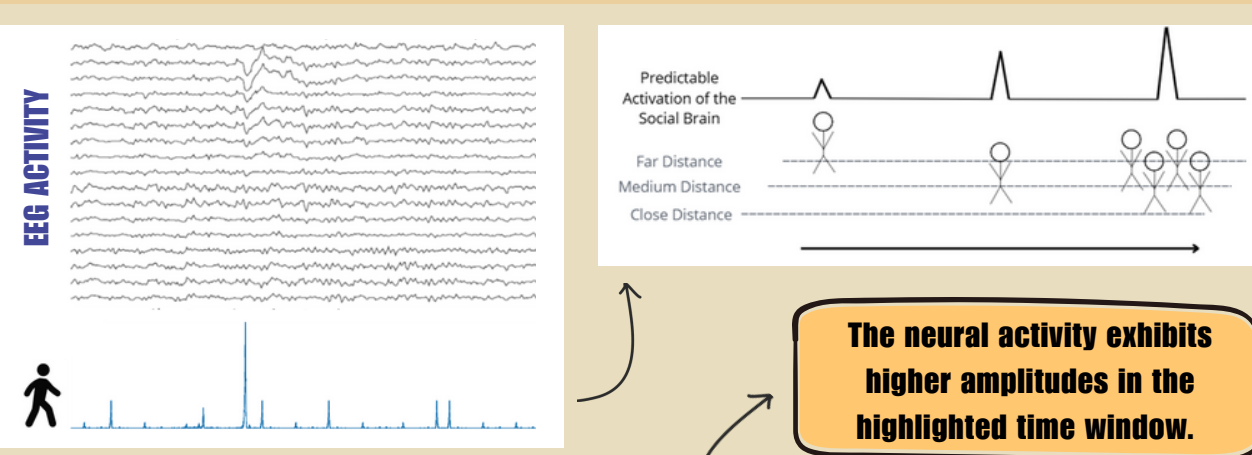
ANOVA		VALENCE			
		F VALUE	PR (>F)	ETA2	95% CI
	CROWDEDNESS	21.75	<2e-16***	0.45	[0.41, 1.00]
		AROUSAL			
		F VALUE	PR (>F)	ETA2	95% CI
	CROWDEDNESS	9.28	<2e-16***	0.26	[0.21, 1.00]

*** 0.001



- The results suggest that crowdedness significantly influences emotional responses. Environments with low crowdedness are perceived as more pleasant, showing higher valence scores, but they elicit lower arousal, indicating a calmer and less stimulating experience.
- Conversely, crowded environments are less enjoyable (lower valence), while arousal rises, pointing to heightened emotional activation or stress.

NEURAL ACTIVITY



- This suggests a stronger neural response in the frontal area to crowded stimuli, potentially reflecting emotional arousal elicited by the complexity and social density of crowded environments. However, a direct statistical comparison is essential to confirm whether the observed differences are robust and consistent across participants.

CONCLUSION

- Crowded environments lead to lower valence, higher arousal, and increased frontal brain activity, suggesting greater emotional and cognitive load. These effects highlight the impact of crowd density on well-being.

REFERENCES

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