

Behind every strong man there is a strong background: The effect of natural background textures on facial evaluation

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i Introduction

The emotional context of visual backgrounds significantly affects human evaluation of facial expressions¹.

Natural dynamic textures elicit a wide range of emotional responses, with dominance (strength or conspicuity) as one of their main affective dimensions².

We investigated whether natural static and dynamic background textures affect the perceived expression of neutral male faces.

🧪 Exp 1: Neutrality Check

Aim: Verify the neutrality of 12 selected neutral male faces from the *dominance face dataset*³.

Method: The faces were presented on a neutral (black) background and participants ($N=15$) rated the dominance of their expression on a 9-point scale.



Results: None of the faces resulted in a non-zero dominance score.

Conclusion: The 12 selected faces are indeed perceptually neutral on the dominance scale.

🧪 Exp 2: Static Textures

Aim: Test if static natural background textures affect perceived facial dominance.

Method: Participants ($N=30$) rated the dominance of 12 neutral faces overlaid (opacity 80%) on static frames from 12 dynamic background textures, 6 of which were previously classified as very strong/conspicuous and 6 as very weak/inconspicuous².

Results: Faces are perceived as significantly more dominant on strong/conspicuous static background textures than on a neutral background ($Z=2.414$, $p<.05$). Weak/inconspicuous backgrounds have no significant effect.

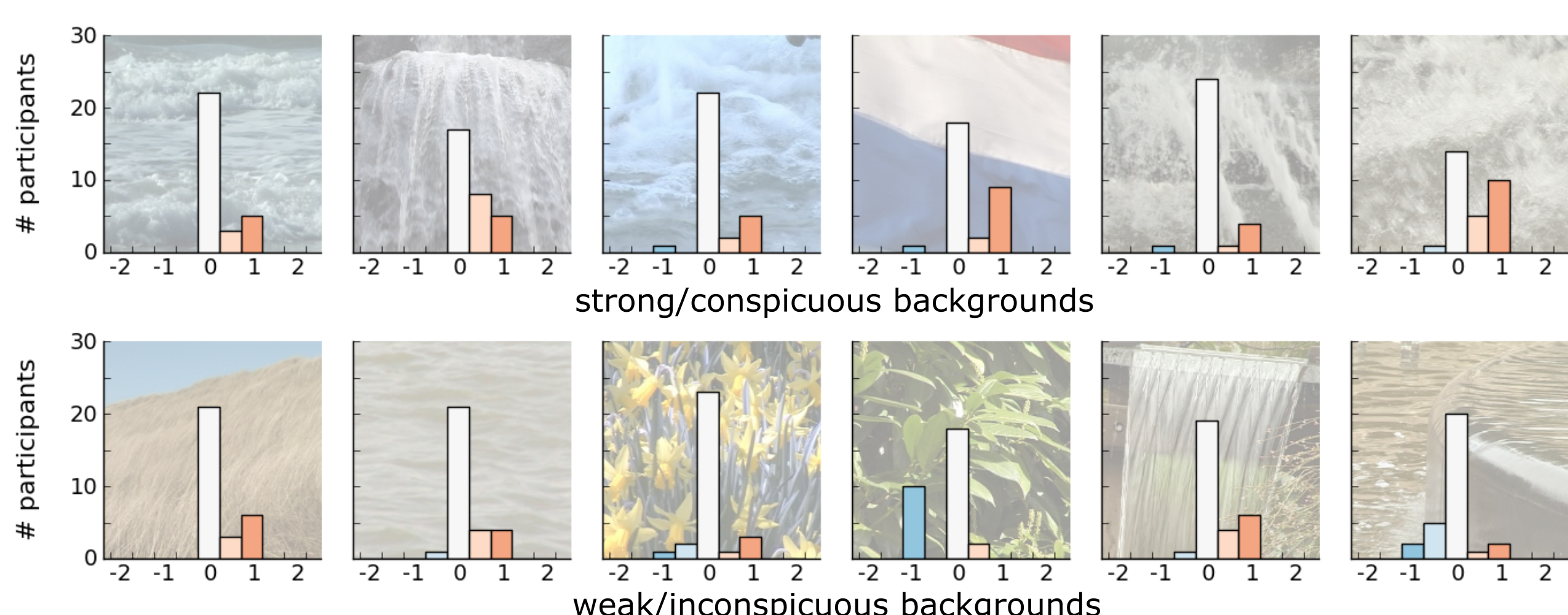
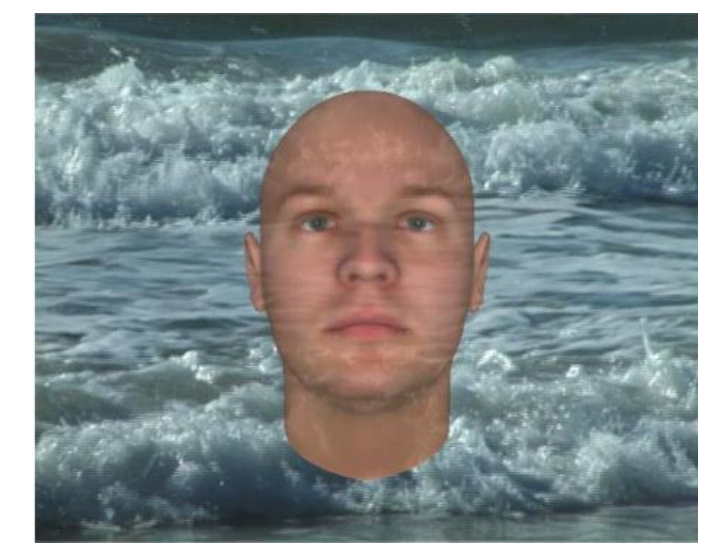


Figure: Experiment dominance scores, from very submissive (-2) to very dominant (2)

Conclusion: Strong/conspicuous static backgrounds increase the perceived dominance of neutral faces, but weak/inconspicuous static backgrounds do not.

🧪 Exp 3: Dynamic Textures

Aim: Test if dynamic background textures affect facial dominance.



Method: Participants ($N=30$) rated the dominance of 12 neutral faces overlaid (opacity 80%) on 12 dynamic background textures, 6 of which were previously classified as very strong/conspicuous and 6 as very weak/inconspicuous².



strong/conspicuous backgrounds

weak/inconspicuous backgrounds

Results: Faces are perceived as significantly more dominant on strong/conspicuous backgrounds than on both weak/inconspicuous backgrounds ($Z=3.033$, $p<.01$) and a neutral background ($Z=3.305$, $p<.01$). Weak/inconspicuous backgrounds have no significant effect.

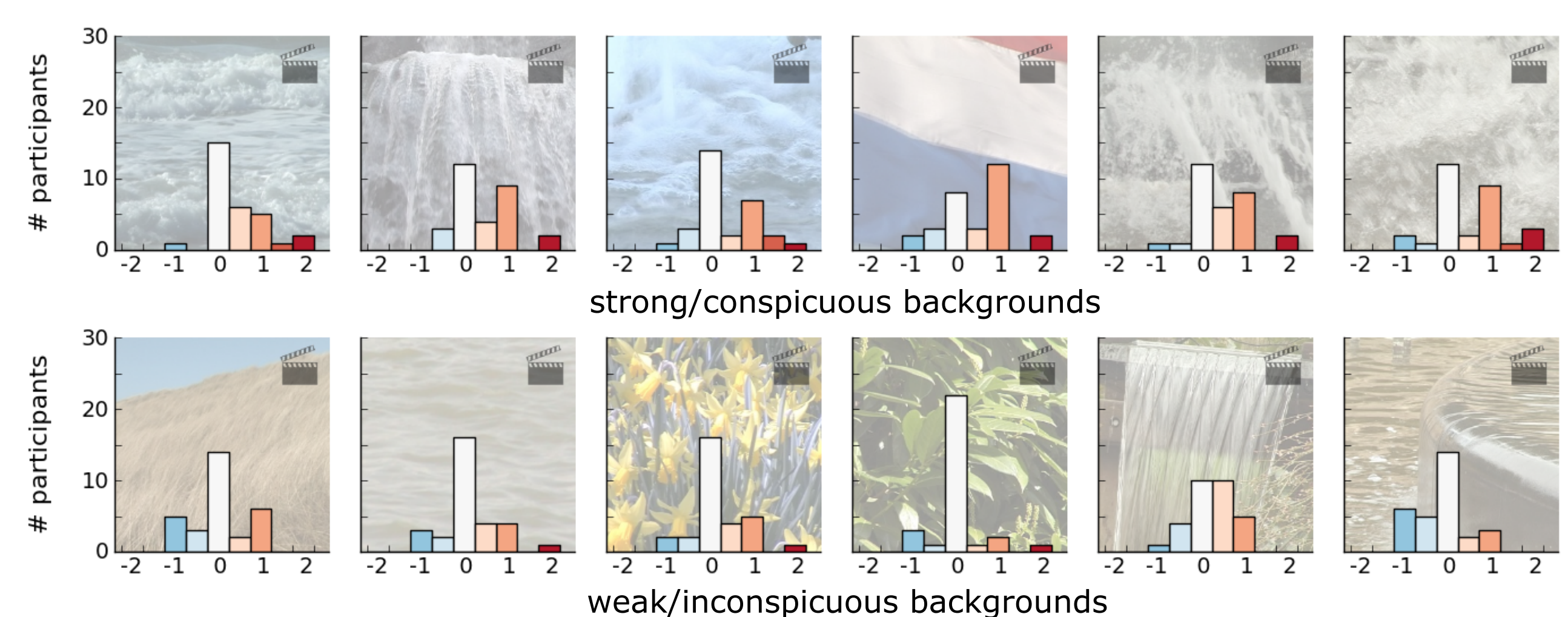


Figure: Experiment dominance scores, from very submissive (-2) to very dominant (2)

Conclusion: Strong/conspicuous dynamic backgrounds increase the perceived dominance of neutral faces, but weak/inconspicuous dynamic backgrounds do not.

🔍 Dynamic vs Static Textures

Strong/conspicuous backgrounds have a larger effect when they are dynamic (effect size $r=.60$) than when they are static ($r=.44$).

There is a weak, but significant difference between dynamic and static backgrounds ($X^2(1)=4.593$, $p<.05$).

! Conclusion

Neutral faces are perceived as significantly more dominant on strong/conspicuous backgrounds than on neutral backgrounds. This effect is strongest when the backgrounds are dynamic. We conclude that natural backgrounds (typically not considered as emotional) can affect the evaluation of facial expressions.

References

- 1 Koji and Fernandes, Can. J. Exp. Psychol., 2010, 64(2), 107-116
- 2 Toet, Henselmans, Lucassen and Gevers, i-Perception, 2012, 2(9), 969-991
- 3 Oosterhof and Todorov, 2008, Proc. Nat. Acad. Sc. U.S., 105, 11087-11092