

An empirical comparison of online and in-lab data collection using a data-driven method on Pack&Go (VPixx Technologies)

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Context

In recent years, new challenges have emerged in psychological science, and vision research has not been spared. Firstly, many studies reporting significant results are difficult or impossible to replicate, in part because of the small number of participants in the original studies. Secondly, the growing awareness that most of our theories are based on samples that do not reflect diversity – namely, Western, Educated, Rich, and Democratic (WEIRD) samples – stresses the need to reach individuals as diverse as possible for future studies. Last but not least, the COVID-19 has put great constraints on our capacity to bring participants to the lab.

In reaction to these challenges, new technologies have been developed to allow researchers to collect data on the internet. These technologies, however, are often ill adapted to the experimental paradigms we have developed in the field. For instance, they are often not designed to allow modifications of stimuli as a function of participants' responses. Moreover, they are not well adapted to the use of data-driven classification image methods.

Objective

Test a new platform for online experiments: Pack&Go from VPixx Tech. This platform runs Matlab/Psychtoolbox³¹ experiments online with the same experimental code as used in the laboratory. Thus, it allows generating stimuli in real time, providing the same flexibility as in-lab testing.

Method

Task. Expressive or not (ExNex), using the Bubbles technique². The number of bubbles was adjusted using QUEST³ to maintain an accuracy rate of 75% (i.e. midway between a perfect (100%) and random (50%) performance).

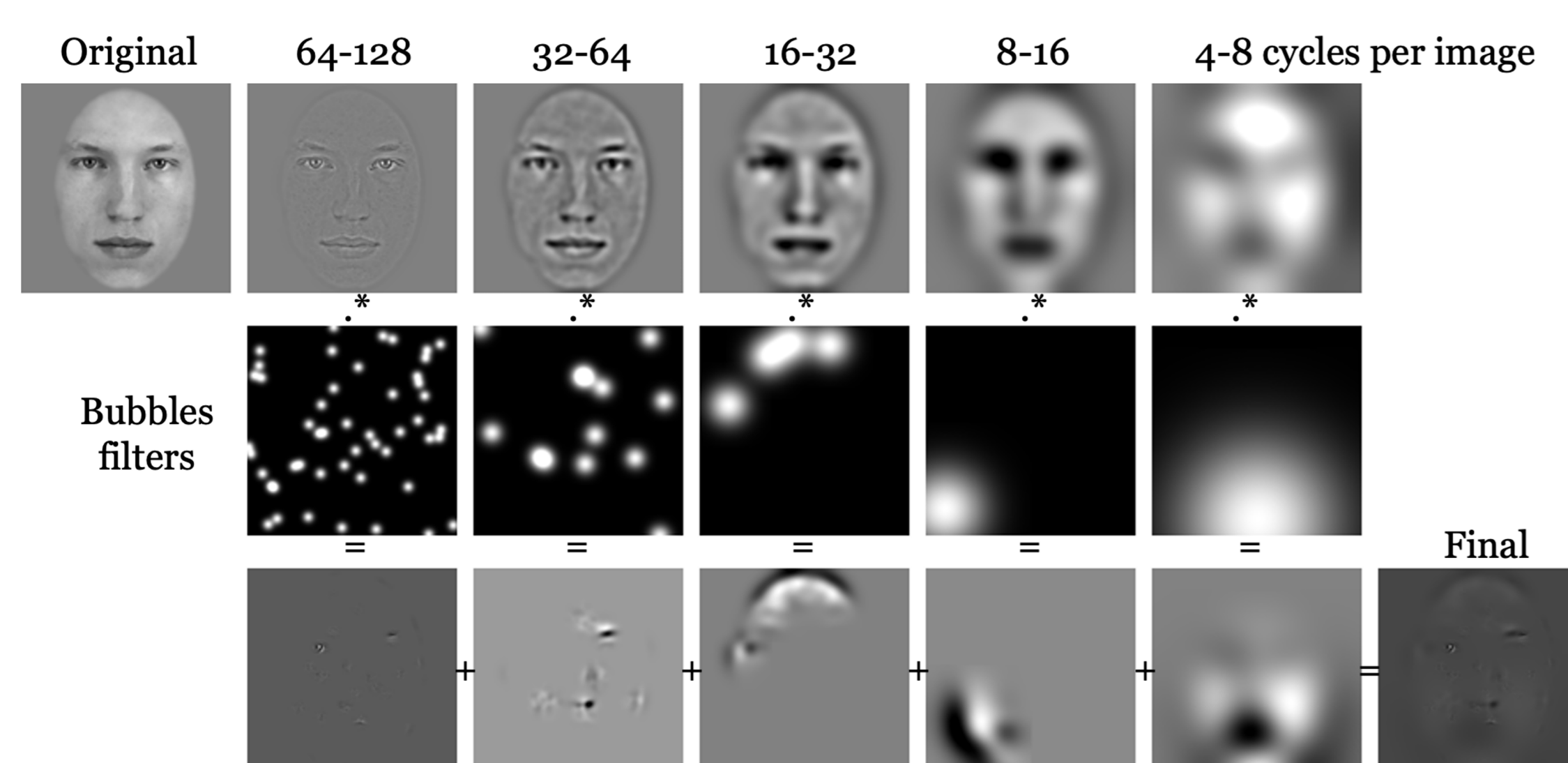


Figure 1. Procedure to create a stimulus with the Bubbles method.

Phase 1 – In the lab

Ten participants were tested in the lab, in three different conditions each comprising 1000 trials:

- 1) The experimental code was run locally. The monitor was calibrated to allow a linear manipulation of luminance. The participants were seated in a dark room and viewing distance was maintained constant with a chinrest.
- 2) The experiment was conducted on the same hardware and the same conditions as in 1) but using Pack&Go
- 3) The experiment was conducted on a different computer using Pack&Go. The room was the same but no chinrest was used.

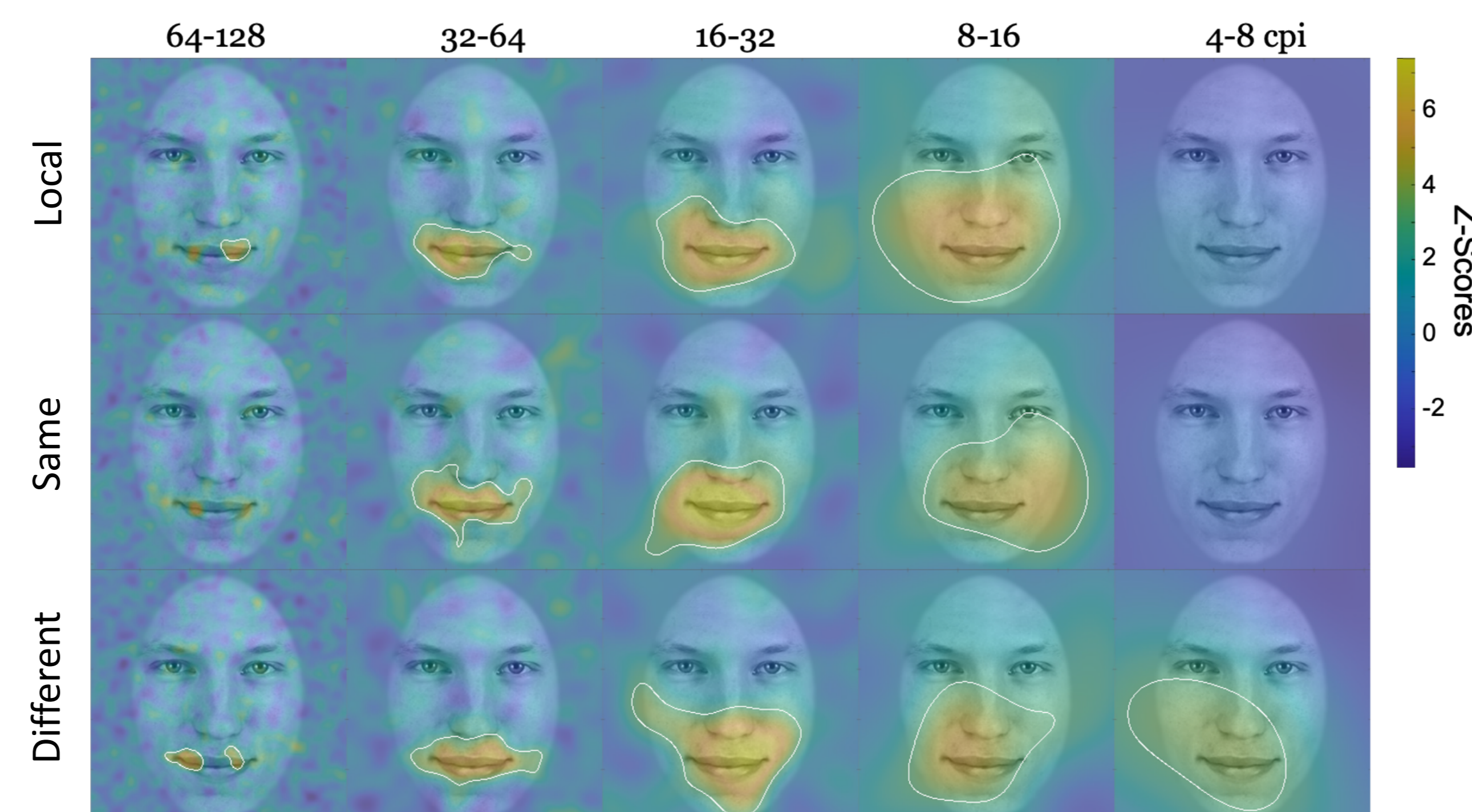


Figure 2. Classification images were produced by calculating a weighted sum of the bubbles mask, using the trial-by-trial accuracy transformed into z-scores as weights. A cluster test from the Stat4CI⁴ toolbox was performed to find the statistical threshold (significant areas delimited in white).

Phase 2 – Online

Thirty-three participants were recruited using a panel provider (Prolifics) and tested from their home using Pack&Go. Each participant completed 500 trials of the ExNex task. All participants who completed the experiment are presented here.

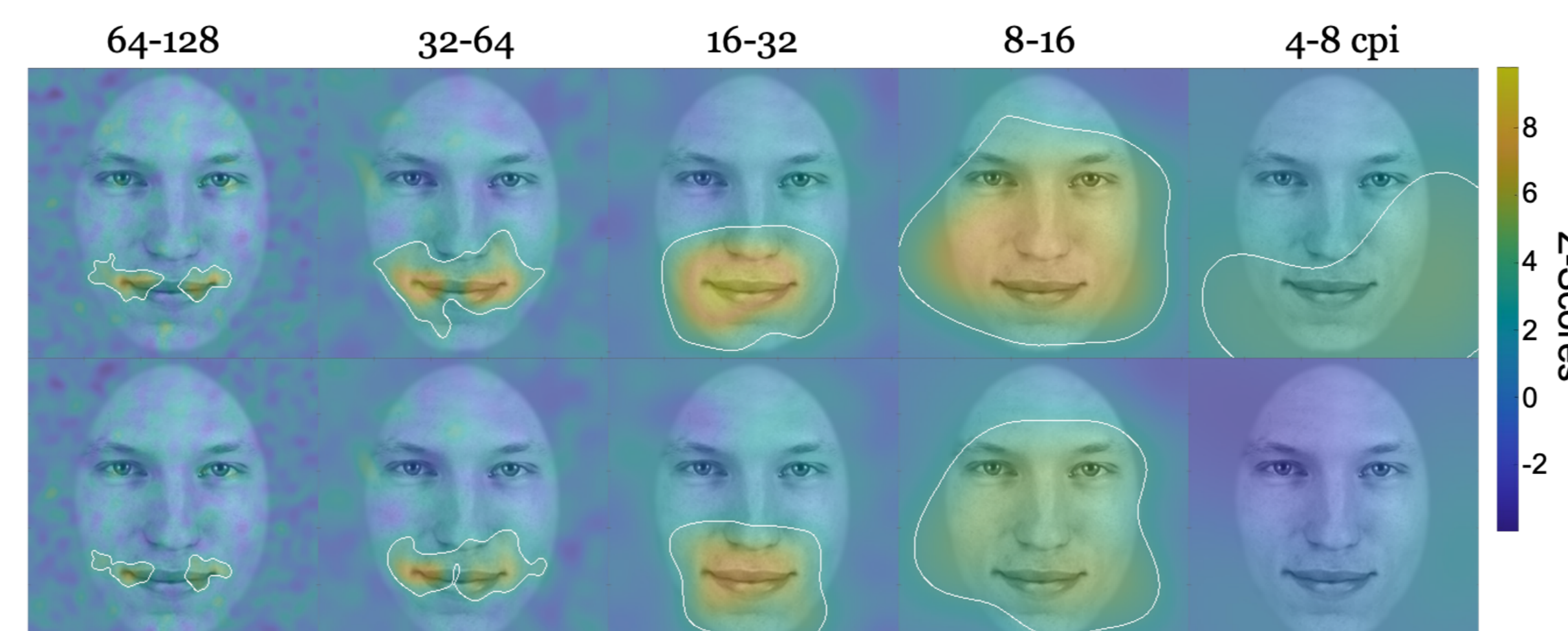


Figure 3. Classification images were produced by calculating a weighted sum of the bubbles mask, using the trial-by-trial accuracy transformed into z-scores as weights. A cluster test from the Stat4CI⁴ toolbox was performed to find the statistical threshold (significant areas delimited in white).

Comparison between the conditions

- The correlation between each pair of conditions was calculated.
- The number of bubbles, an index of performance⁵, was calculated in each condition

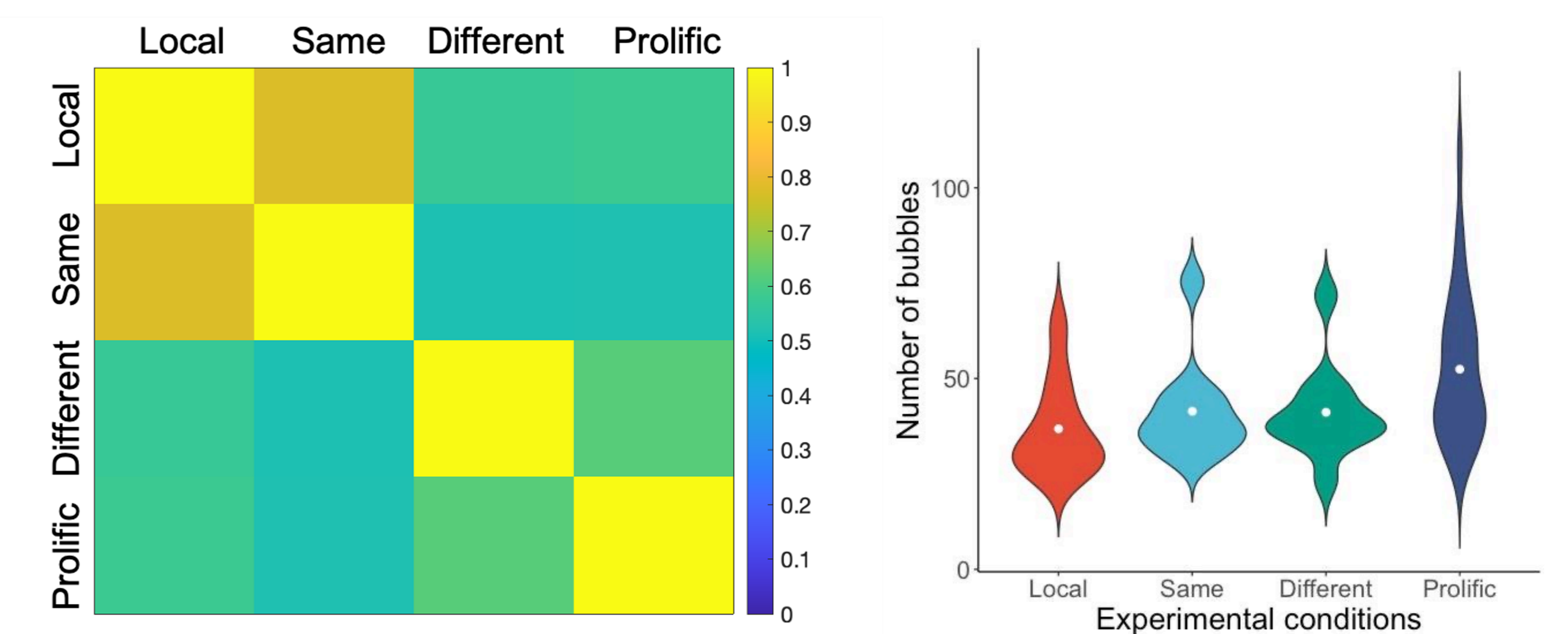


Figure 4. Left panel: Matrix of Pearson correlations between each pair of condition. Right panel: Distribution of the number of bubbles across participants in each condition.

Discussion and Conclusion

- The same experimental code was used for in-lab and online testing. Thousands of stimuli were generated in real time, allowing to randomly sample the visual information in faces on a trial-by-trial basis.
- The results obtained when the experimental code was run locally, under controlled conditions, were highly similar to the ones obtained using Pack&Go (minimum $r=0.51$).
- The number of bubbles was slightly higher on Prolifics ($M=52$) than in the other conditions ($M=37, 41$ and 41 , respectively), but the difference was not significant (smallest $p=.07$, between the local and Prolific conditions).
- The Pack&Go platform allows to move your experimental codes online very easily and obtain high quality results. The potential for increasing sample sizes as well as improving the diversity of participants included in our studies is very promising.

References

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