

Measuring subjective pain intensity from autonomic nervous system readouts

2020-06/Area: biopsychology/clinical neuroscience/bioengineering

Background

Measuring the subjective intensity of pain is important throughout medicine, and for many applications in human neuroscience. This is usually achieved by asking people for their experience. Clinical populations can be limited in their ability to give such reports (e.g., the very old or very young, persons with cognitive impairment, and those who are minimally conscious). In neuroscience research, frequently asking people about pain experience in quick succession can also pose problems. Researchers have therefore started to identify pain intensity from patterns of fMRI activity¹ or from autonomic nervous system measurements².

In this project, you will validate and improve this model, and make it usable for application in human fear conditioning research. You will record pupillometry, ECG, and skin conductance data, and analyse them with psychophysiological modelling techniques, in order to allow the prediction of subjective pain.

What you can learn

- Model-based analysis of biophysical signals with the Matlab-based software PsPM (bachlab.org/pspm)
- Experimental skills in pain research
- Coding skills

Your profile

Your background is in neuroscience, psychology, biology, or related fields, and you have experience with data analyses (e.g. in Python, R, or MATLAB).

Supervision

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Literature

1. Wager, T.D., *et al.* An fMRI-based neurologic signature of physical pain. *N Engl J Med* **368**, 1388-1397 (2013).
2. Geuter, S., Gamer, M., Onat, S. & Buchel, C. Parametric trial-by-trial prediction of pain by easily available physiological measures. *Pain* **155**, 994-1001 (2014).