



HAL
open science

Investigating how humans perceive differences between drops of water

Léonard Samain-Aupic, Mariama Dione, Jean-Marc Aimonetti, Roger Holmes Watkins, Rochelle Ackerley

► **To cite this version:**

Léonard Samain-Aupic, Mariama Dione, Jean-Marc Aimonetti, Roger Holmes Watkins, Rochelle Ackerley. Investigating how humans perceive differences between drops of water. NeuroFrance, May 2021, Online, France. , 2021, Société des neurosciences. hal-03406922

HAL Id: hal-03406922

<https://hal.science/hal-03406922v1>

Submitted on 28 Oct 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Introduction We have receptors in our skin that allow us to sense and interact with liquids in our environment, *e.g.* to determine if it's raining or to adapt our grip force on a wet object so that it does not slip. As humans do not have hygroreceptors, wetness perception relies on the integration of tactile information conveyed by low-threshold mechanoreceptors and/or temperature information conveyed by thermoreceptors (Filingeri & Ackerley, 2017). We aimed to investigate how participants perceive drops of water at room temperature, by modulating the height and the mass of a drop and we hypothesized that participants would readily be able to quantify these differences.

Methods on the palm of the hand

Experiment 1

5 masses
(10, 20, 25, 40, 50mg)

12 drops of water per mass

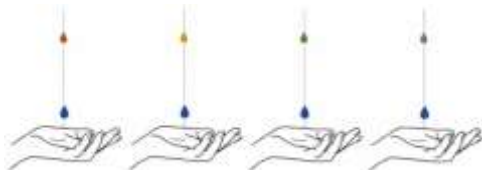
Experiment 2

4 heights
(6, 12, 18, 24cm)

12 drops of water per height

Participant had to rate on unbounded scale the intensity of the feeling

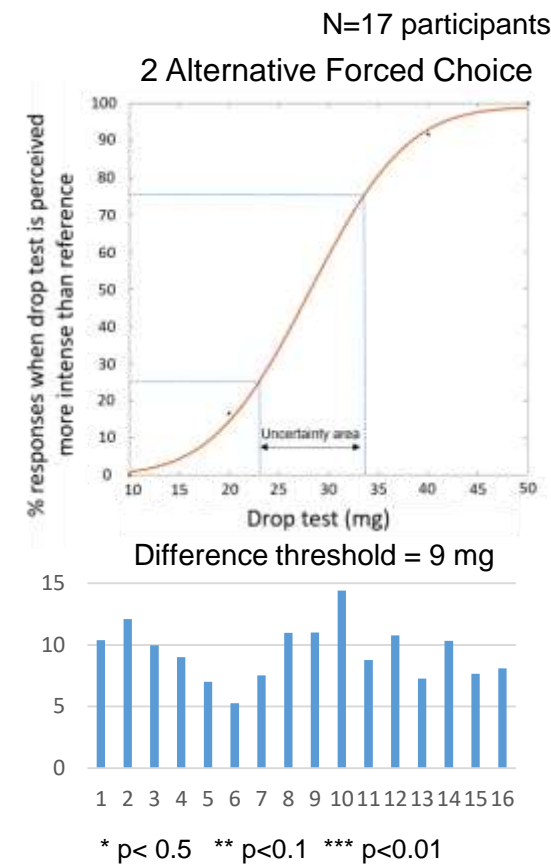
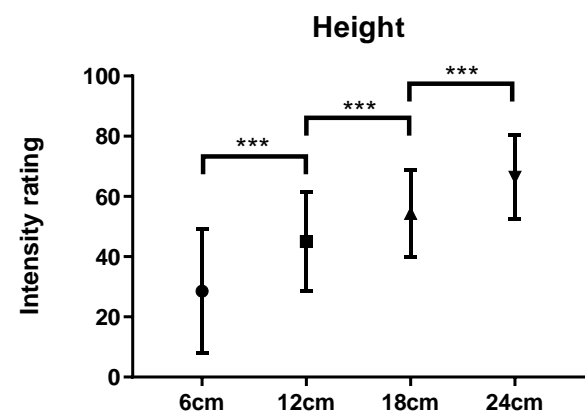
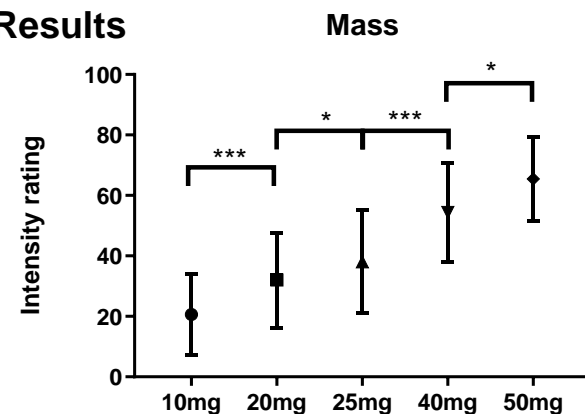
Experiment 3



1 reference mass vs. 4 test masses
(25mg) (10, 20, 40, 50mg)
12 drops of water for each pair, total 48 pairs

➔ 2-AFC: Which drop of water is more intense?

Results



Conclusion

- Participants needed a drop mass between 5-10 mg to perceive a difference.
- The minimum amount for perceiving a difference psychophysically is 9 mg.
- Drop intensity increased linearly with height.
- There exists very little in the literature concerning the perception of wetness and we show that humans are able to discriminate well between different intensities of sensation by changing the properties of small drops of water.
- Microneurography will be performed to explore responses of mechanoreceptors in humans to drops of water.

Funded by an European Research Council (ERC) Consolidator grant under the European Union's Horizon 2020 programme (grant agreement No. 772242 "ARTTOUCH" to R. Ackerley)