Haptic perception of wetness

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Introduction

We all know the feeling of being wet, but what is it?

Multiple components:

- Mechanical: stickiness
- Increased thermal conductance
- Heat extraction through evaporation

} cooling (thermal)

Research questions

How well can people perceive (differences in) wetness?
⇒ wetness of fabrics

How does it depend on

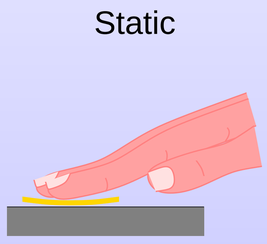
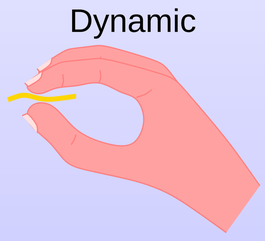
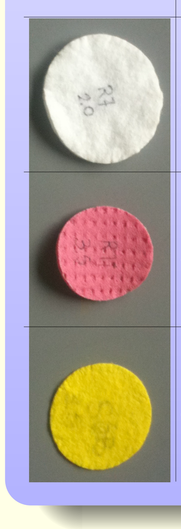
- material?
- way of touching?

Materials

Cotton wool | Thick viscose | Thin viscose

- 50 mm diameter circles (cotton wool: 58 mm)
- tapwater
- 1 reference (6×), 6 tests for each condition
- double set
- 72 samples in total

Conditions

	Static	Dynamic
		
	Ref: 2.0 ml Tests: 0.75–3.25 ml	Ref: 2.0 ml Tests: 1.25–2.75 ml
	Ref: 3.5 ml Tests: 1.0–6.0 ml	Ref: 3.5 ml Tests: 2.25–4.75 ml
	Ref: 2.25 ml Tests: 1.0–3.55 ml	Ref: 2.25 ml Tests: 1.5–3.0 ml

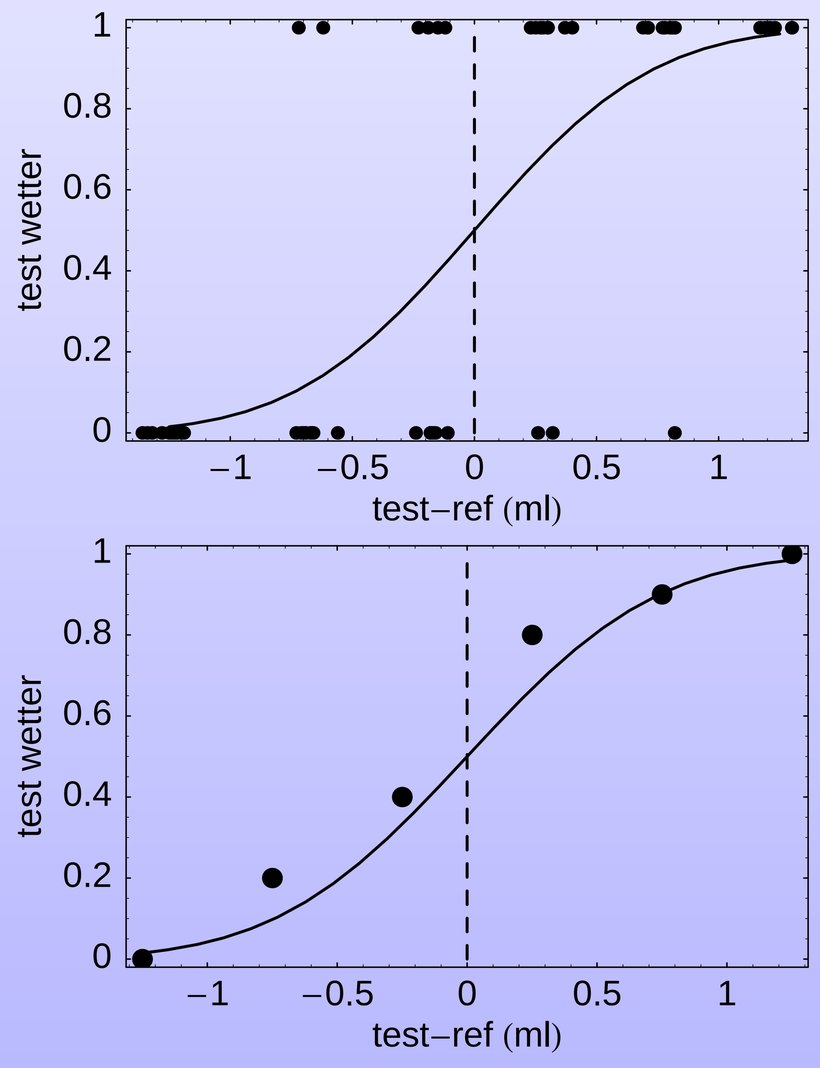
Procedure

- 60 trials/condition
- 9 blindfolded subjects
- Actual weight recorded
- 2AFC procedure: Which is wetter?

Temperature logging

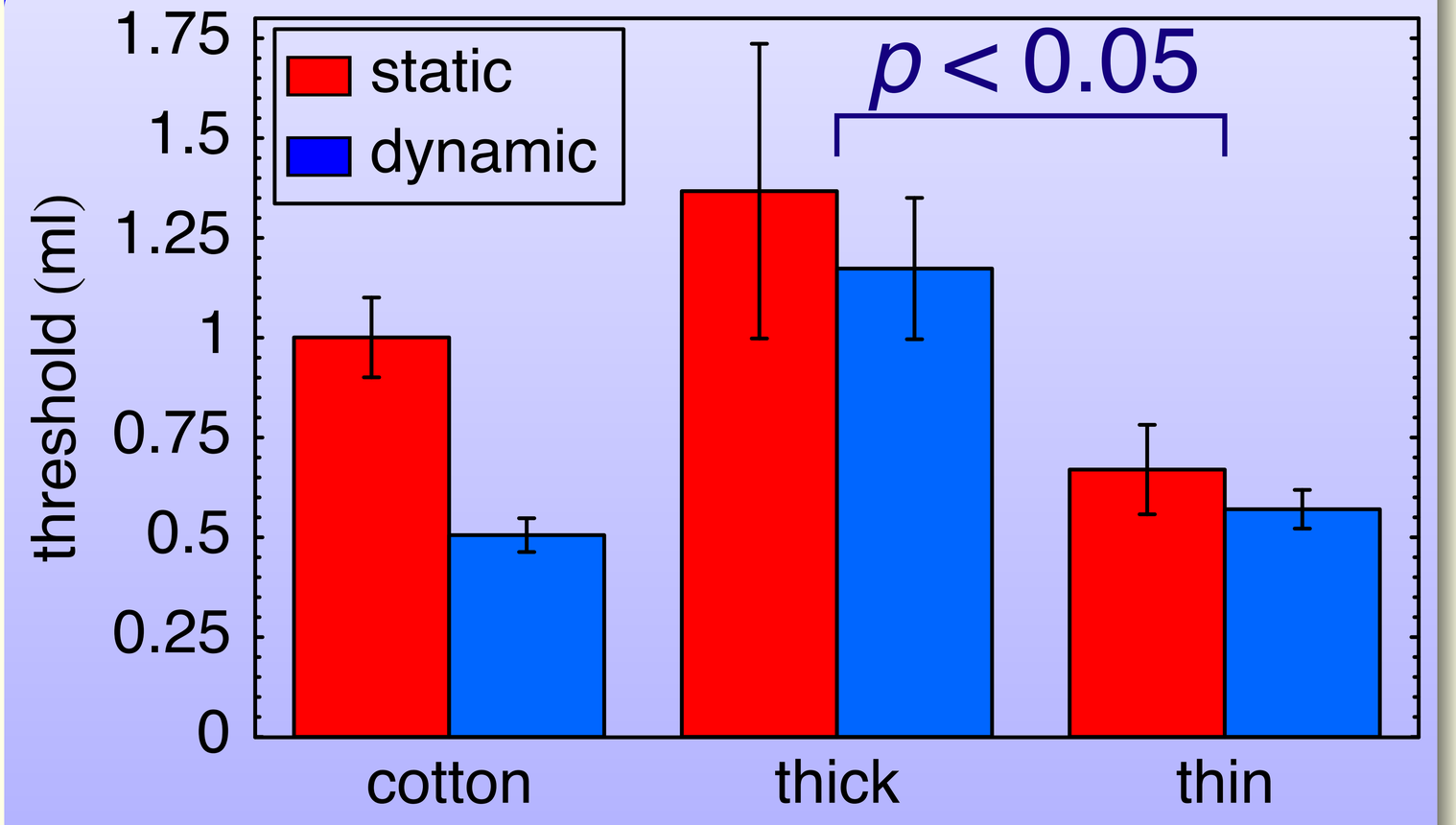
iButton measures hand temperature every minute.

Analysis



- Test wetter ⇒ 1, otherwise 0.
- Fit psychometric curve: $f(x) = \frac{1}{2} + \frac{1}{2}\mathrm{erf}\left(\frac{x}{\sqrt{2}\sigma}\right)$
- 54 curves, 54 thresholds

Results



Conclusions

- No advantage from dynamic touch ⇒ sensation of wetness mostly thermal
- Better discrimination in thinner material
- No correlation with hand temperature