

Why do our fingers wrinkle in water?

Jimmy Tampin*, Georgia Longmoor, Dr Tom Smulders, 110145189,
C100 Biology, j.tampin@ncl.ac.uk



Aims:

To test the hypothesis that wrinkles on fingers act like rain treads on car tyres.

Introduction:

Changizi et al. 2011 hypothesized that the wrinkles on our fingers act in the same way that rain treads do for car tyres. Kareklas et al 2013 showed that wrinkled fingers can grab objects easier in water than unwrinkled fingers can.

This experiment set out to further that research by trying to answer the question: "If the objects getting picked up had markings similar to rain treads, would that take away



Figure 1. An example set up of one of the trials performed. This is a trial with dry conditions and with grooved objects

Method:

24 participants were enlisted to perform the experiment. Each participant was timed on how fast they could

perform 8 trials, each of which consisted of moving 50 objects from a pot to the left of them with their left hand, through a 5x5cm hole into their right hand and then into a pot on their right side (Figure 1).

Each trial was different (Figure 2), with 4 of the trials performed with unwrinkled hands and the other 4 with wrinkled hands. For both of these conditions 2 of the trials were performed with the left pot containing water and the other 2 performed with the left pot containing no water. Finally for both wet and dry conditions there was a trial with unmarked (smooth) objects and a trial with marked (grooved) objects. Wrinkling was achieved by keeping both hands in warm water for 25 minutes. The order of trials performed was counter-balanced across all the participants.

Table 1. The conditions of the 8 trials performed

Wrinkled				Unwrinkled			
Dry		Wet		Dry		Wet	
Smooth	Groove	Smooth	Groove	Smooth	Groove	Smooth	Groove

Results and conclusions:

The time difference between wet and dry conditions was used to compare the effects of the wrinkles. The results showed that there was an almost significant interaction between wrinkle state and object type ($P=0.097$; Figure 3). There was also no significant difference between the time taken to pick up grooved objects with wrinkled hands compared to unwrinkled hands. Therefore when the objects are marked the advantage of the wrinkles on the fingers is lost. However the time it took to pick up smooth objects with wrinkled fingers was considerably lower than the time it took with unwrinkled fingers.

- It was discovered that due to the practise effect there was great variation between participants. No matter what order the trials were attempted in, the participants' times always decreased over the course of the trials. This is because the more times the trials were attempted, the better the participant became at completing them. This is why it was essential the whole experiment was counter-balanced but this was not enough
- Follow up experiments could be performed to repeat this experiment whilst trying to remove the practise effect. This would mean other factors would have a greater effect

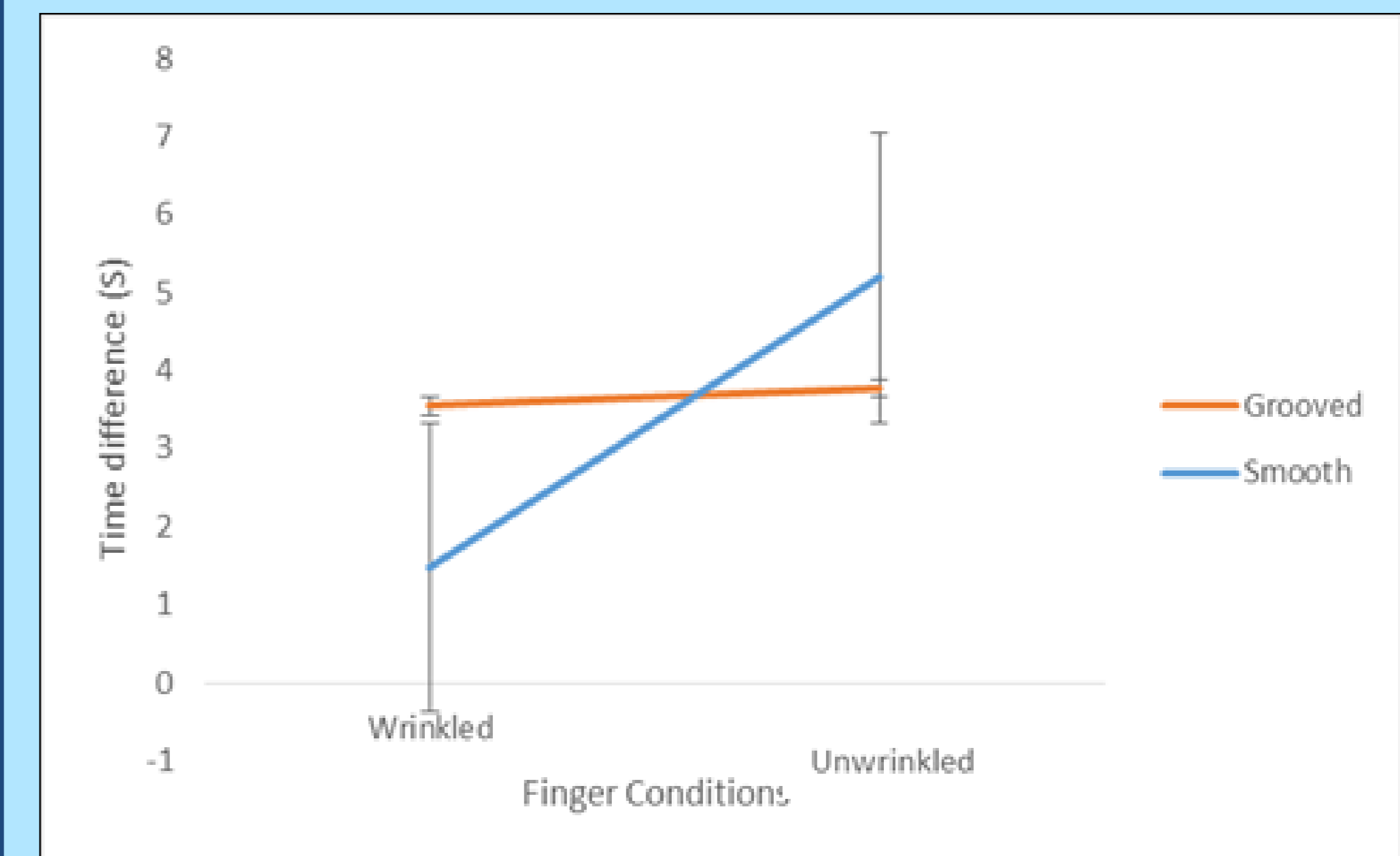


Figure 3. The differences between the mean times taken to perform the trials between wet and dry conditions for smooth objects and groove objects, and with wrinkled fingers and unwrinkled fingers

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All images were created by Jimmy Tampin