

## Faces as a smooth surface we have expertise in - Montreal, 2021 (#70699)

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### 1) Have any data been collected for this study already?

No, no data have been collected for this study yet.

### 2) What's the main question being asked or hypothesis being tested in this study?

We hypothesize that the 3D smoothness of surfaces is a cortical organizational principle. Therefore, it would follow that faces are a smooth surface we have expertise in. Our specific aims are to test face recognition performance through manipulations including adaptation effects, smoothness sensitivity thresholds, and interference effects using appropriate controls.

### 3) Describe the key dependent variable(s) specifying how they will be measured.

Experiment 1: Learning rate or amount of trials needed for each participant to achieve 100% correctness. Hit rates and false alarm rates (signal detection theory).

Experiment 2: Smoothness perception thresholds. Hit and false alarm rates for face identification.

Experiment 3: Reaction times. Hit and false alarm rates for face identification.

### 4) How many and which conditions will participants be assigned to?

Experiment 1: 2 conditions: learning smooth shapes vs. learning spiky shapes (control) prior to learning faces.

Experiment 2: Participants will be divided into two groups after the experiment based on their thresholds, low versus high threshold to smoothness groups.

Experiment 3: 3 conditions: Adapting to smooth shapes vs. adapting to curvy textures (control 1) vs. adapting to sharp/spiky shapes prior to recognizing a face.

### 5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.

Two-sided t-tests and ANOVAs will be conducted to assess mean differences and interactions in learning rates across conditions (exp. 1), mean face recognition performance rates across conditions (low vs. high smoothness-threshold participants for exp. 2), and mean differences in reaction time and face identification performance across conditions (adapt to texture vs. adapt to smoothies vs. adapt to spikies). A sensitivity index will be used for the tasks that involve hit rates and false alarm rates.

### 6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.

We will exclude participants who are not compliant or that do not send a complete task. Exclusion criteria based on compliance include: finishing the task in less than 15 minutes, provide unreliable data--data that fails an internal consistency test, and failure to follow study guidelines.

### 7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

Psychophysical face adaptation studies with similar effect sizes typically recruit 10-20 participants while two-alternative forced-choice tasks usually recruit in the order of 100 participants. Considering the lack of a controlled environment in online testing, we will recruit 200 participants for the first two experiments and 50 for the third, totalling 450 participants.

### 8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)