Swiping Burger

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Expose

Hypotheses

- Usage of Hamburger Menu navigation requires constant time to travel a path.
- Usage of Swipe navigation results in growing time depending on the distance.
- There is some point of intersection, where the required navigation time of Swipe exceeds the required navigation time of Hamburger Menu.

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Within-, Between-group or Split-plot

- Between group treatment among navigation methods
- Within group design over the length of the navigation paths

$\rightarrow$ Split-plot design.

Independent / Dependent Variables

Independent Variables

- Navigation Method
- Navigation Distance

Dependent Variables

- Time
- User satisfaction (Questionnaires)

Participant Acquisition and where to investigate

Field study

Why? Participants should not get bored. Experiment is not too long.

Where? Mensa: because student's are used to smartphones.

When? Not during meal times to avoid distraction.

Questionnaires

After each distance block

- “ Ich konnte die Aufgaben gut lösen. ”
- “ Die Erreichung des Ziels war mir zu umständlich.”

At the very end

- “Die Umgebung hat mich beim Bearbeiten der Aufgaben gestört”
- “Die Dauer des Experiments war mir zu hoch?”
- “Die Bedienung des mobilen Geräts war intuitiv”
- “Die Art der Navigation hat mir zugesagt”

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Hamburger Menu Navigation over distances d

Consider the normally distributed random variables X_d with $\bar{x}$ and σ_x^2 being the time required for traveling d pages using Hamburger Menu navigation. We hypothize that

$$H_{0,\text{burger}} : \bar{x}_0 = \bar{x}_1 = \cdots = \bar{x}_d$$

Since we can assume equal variances, we evaluate the hypothesis using Repeated Measures ANOVA. In case we do not find significant differences, we can use the overall mean $\bar{x}$ for comparision with the Swipe navigation.

Swipe Menu Navigation over distances d

Consider normally distributed random variables Y_d with means $\bar{y}_d$ and variances $\sigma^2_{y,d}$ as the time required for traveling d pages using Swipe navigation.

$$H_{0,\text{swipe}} : \bar{y}_0 = \bar{y}_1 = \cdots = \bar{y}_d$$

Since we can not assume homogeneity of variance in this case, we evaluate the hypothesis using the Friedmann test.

Swipe Navigation vs Hamburger Navigation

In case we can reject $H_{0,\text{swipe}}$ and can not reject $H_{0,\text{burger}}$, we continue with comparing per-distance means $\bar{y}_d$ of Swipe navigation with overall mean $\bar{x}$ of Hamburger Menu navigation.

$$H_{0,d} : \bar{y}_d = \bar{x} \; \forall d$$

We evaluate these hypotheses using the Welch's t-test, because we can not assume equal variances. In the end we (hopefully) find the distance d, for which the the time required with Swipe navigation exceeds the time required with Hamburger Menu navigation.