Typing In Mid-Air With Mixed Reality
Erika Mandile, Kelly Harris, Jessyca Derby, Emily Rickel, & Barbara Chaparro
Department of Human Factors and Behavioral Neurobiology

Introduction
The mixed reality HoloLens generation 2 headset has many capabilities that require the use of text entry using a virtual keyboard. This study is currently in the preliminary stages of data collection.

Objectives
- Investigate strengths and weaknesses of using one-hand versus two-hand text input methods while typing on the HoloLens 2 virtual keyboard.
- Compare results to those of a past study conducted on the performance differences between controller and gesture text input methods using the HoloLens generation 1 headset (Derby, Rickel, & Chaparro, 2019).

Method

Participants
- 3 college students, ages 20-24
- 1 of 3 reported previous experience with HoloLens

Measures
- Typing Speed & Accuracy – Words per Minute (WPM), Adjusted WPM (AdjWPM), and Word Error Rate (WER)
- Perceived Exertion – Borg CR10 with a Body Map
- Perceived Workload – NASA TLX-R
- Perceived Eye Strain – Six 5 point Likert-scale questions
- Perceived Usability – System Usability Scale (SUS)

Procedure
1. Participant receives study briefing and demographic questionnaire
2. Participant fits and calibrates the headset
3. Randomly assigned the one-hand or two-hand text input method
5. Participants complete 3 & 4 with the other text input method
6. Participants rate the methods and answer open-ended questions

Results
These results are not final, as we are still in the preliminary stage of data collection.

Typing Speed & Accuracy
- The two-hand text input method is slightly faster ($M = 13.73$ WPM, $M = 13.64$ AdjWPM) than the one-hand method ($M = 12.24$ WPM, $M = 12.24$ AdjWPM)
- Word error rate was low for both methods (1%-2%) due to most participants fixing their phrases before submission

Perceived Usability
- So far, one-handed ($M = 65$) and two-handed text input ($M = 66$) were given an “OK” perceived usability rating

User Preference
- 2 of the 3 participants preferred the two-hand text input method

Discussion
- Although we are in the preliminary stages of data collection, we have identified an increase in typing speed and performance ($M = 12.98$ WPM) when compared to typing speed of the HoloLens generation 1 using gesture ($M = 5.41$ WPM) (Derby, Rickel, & Chaparro, 2019).
- Thus far, participants have an “OK” perceived usability for both methods ($M = 65.5$), whereas the HoloLens 1 had a “Poor” perceived usability ($M = 45.29$).

References