

INF 385T - Descriptive Stats, Comparing UI Designs, and Anova

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Project Goals

Goal: Analyze user data for relationship between behaviours and attributes

- User Behaviors
 - Task Duration
 - Fixation Count
 - Fixation Duration
- Factors
 - Task Complexity - Easy or difficult
 - Interface - A or B
 - Individual Attributes - Memory Span, Verbal Closure, Flexibility of Closure, Gender



Initial Analysis (P1)

Method

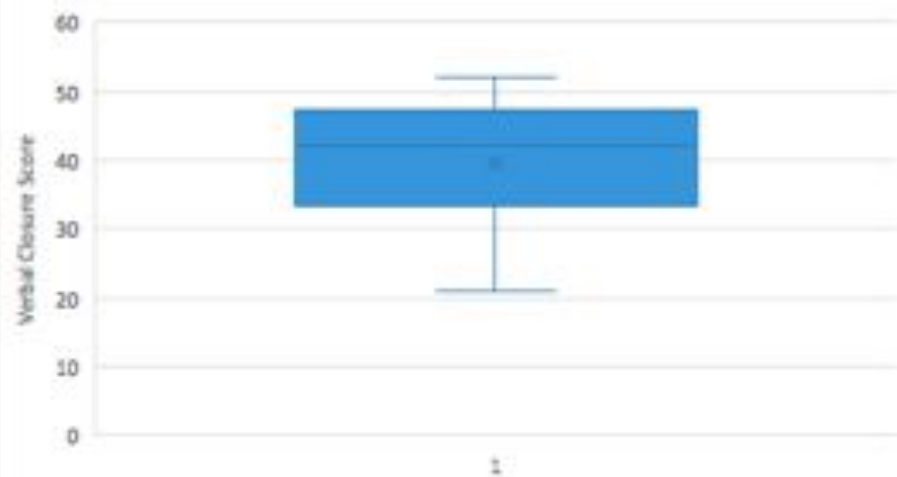
First, we looked at descriptive statistics for a number of participant attributes and how some of those affected task duration:

- Gender
- Verbal Closure
- Flexibility of Closure
- Memory Span

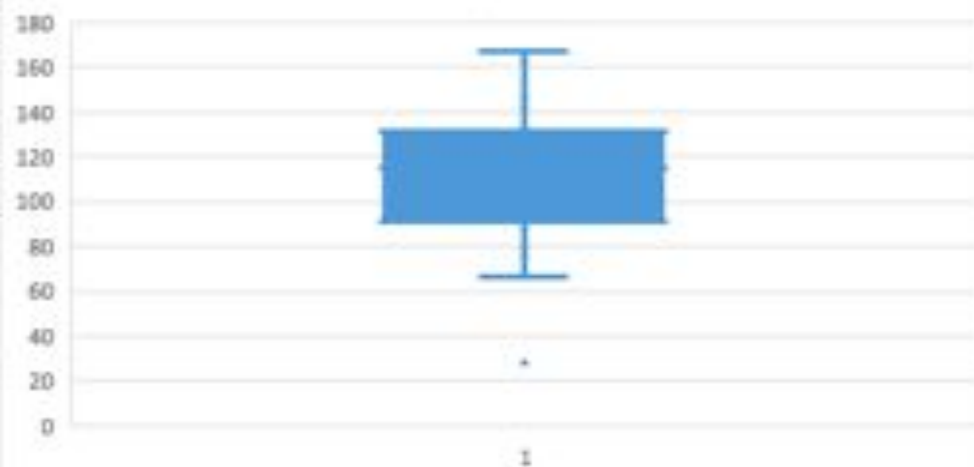
Results

- Participants tended to be males with low Memory Span scores
- Task Durations right-skewed
- Task Duration by group: Males and Low Memory Span participants take longer

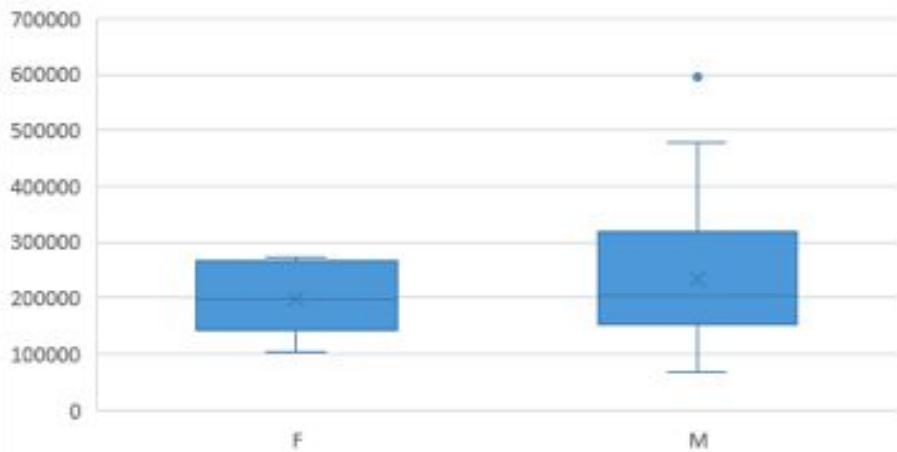
Verbal Closure Score Distribution



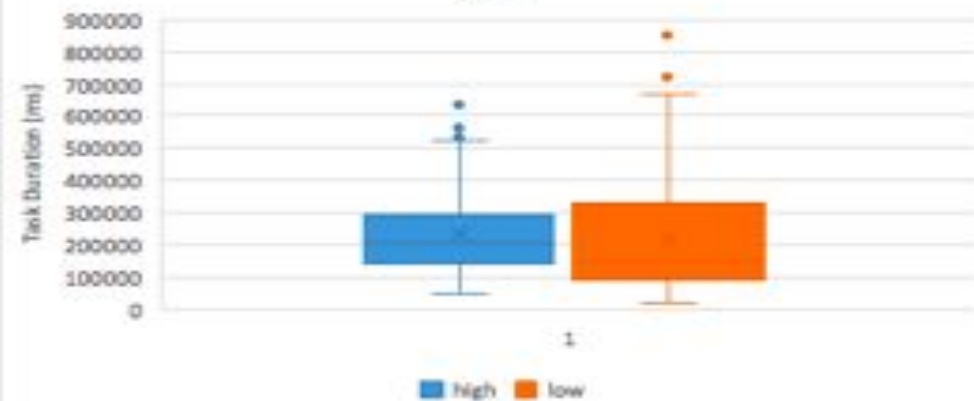
Flexibility of closure



Average Task Time for Males vs Females



Task Duration Distribution for High vs Low Memory Span





Secondary Analysis (P2)

Method

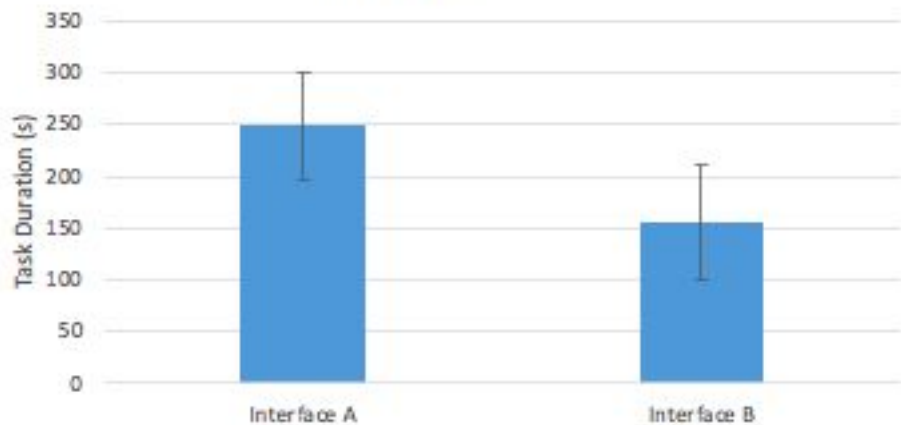
Identified three categories:

- Easy task duration by interface
- Difficult task duration by interface
- Task duration by complexity

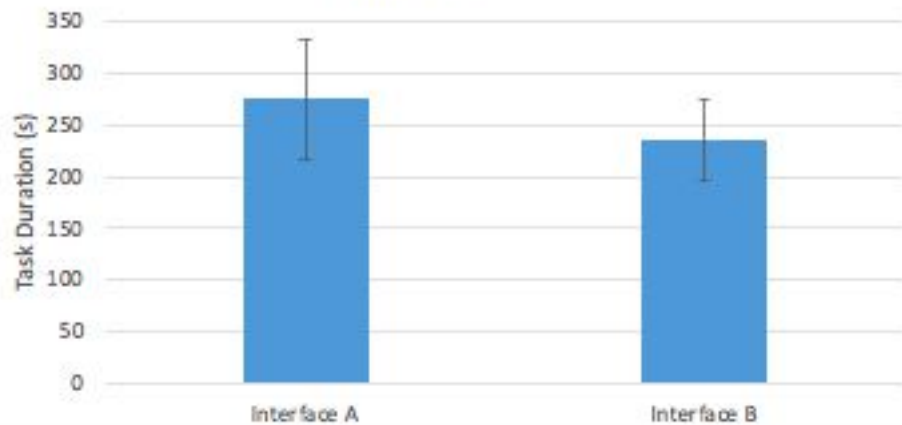
Results

- Significant difference in easy task durations by interface
- No significant difference in difficult task durations by interface
- Significant difference in task durations by task complexities

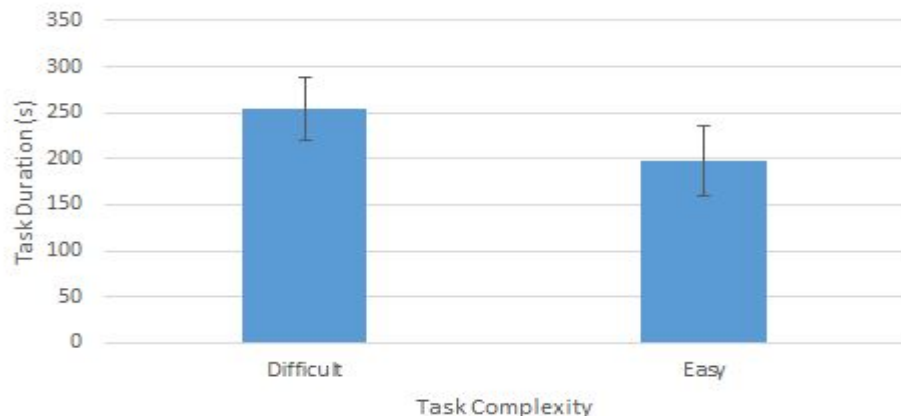
Easy Task Complexity Mean Task Duration per Interface; 95% CI



Difficult Task Complexity Mean Task Duration per Interface; 95% CI



Mean Task Duration per Task Complexity; 95% CI





Final Analysis (P3)

Method

Finally, we continued our analysis by looking at two additional variables:

- Fixation Duration
- Fixation Count

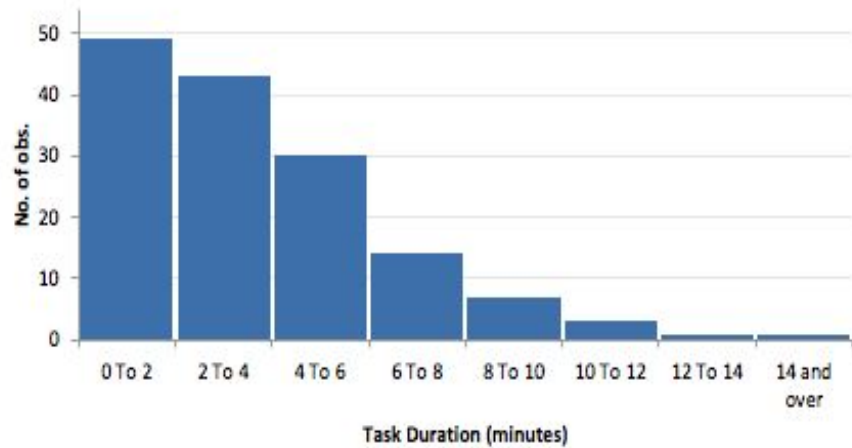
We looked at the effects of the interactions between memory span and interface on two responses:

- Total Task Duration
- Fixation Duration

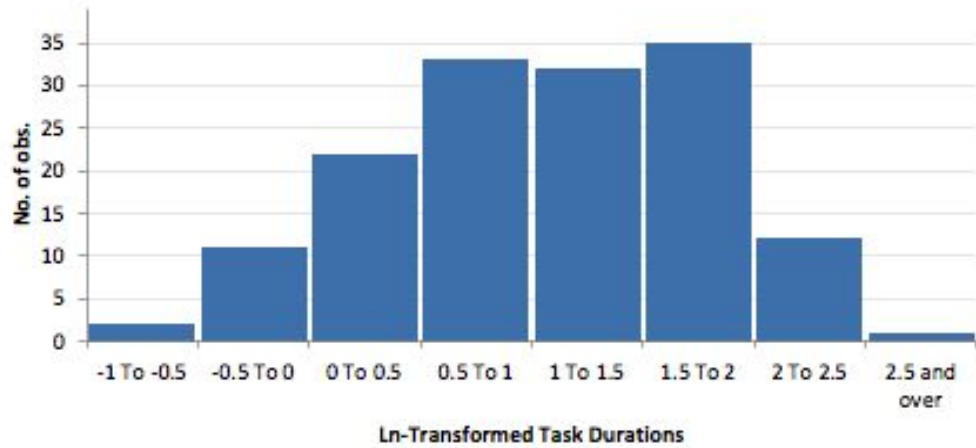
Results

- Both fixation variables were significantly skewed right in their original form
- Both fixation variables adopted a normal distribution when log-transformed
- Total Task Duration: Interface was the only significant factor in task duration, with Interface B showing lower task durations.
- Fixation Duration: Interface was again the only significant factor, with Interface B also showing lower fixation durations.
- Correlation analysis showed strong positive correlation between task duration and fixation count.

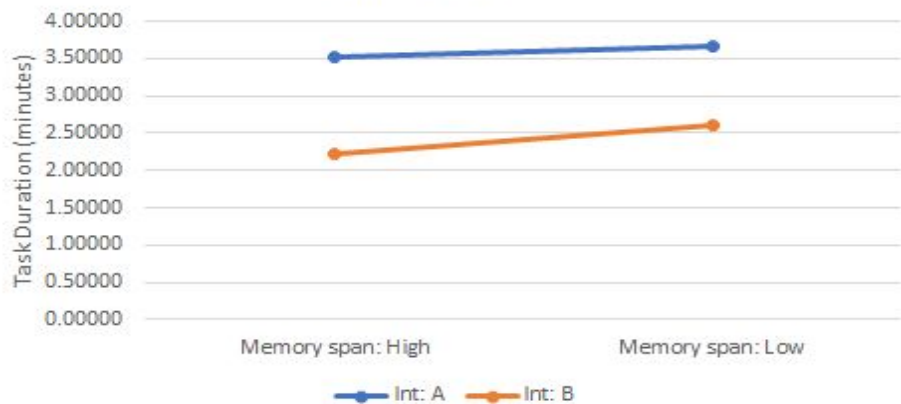
Original Task Duration Data



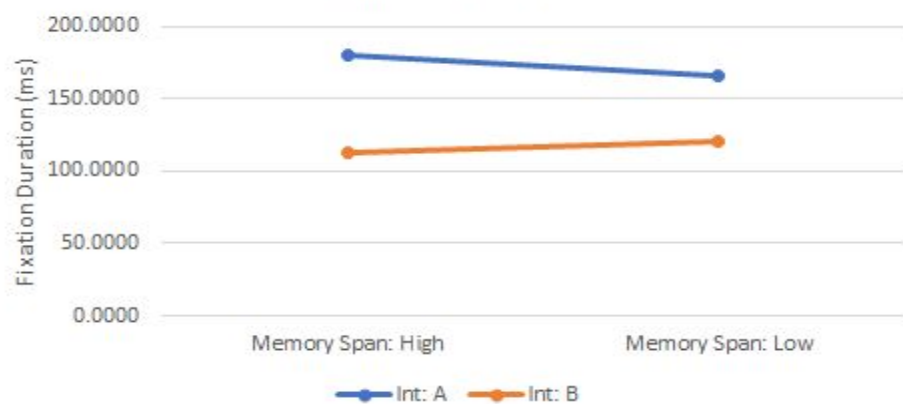
Log-transformed Task Duration Data



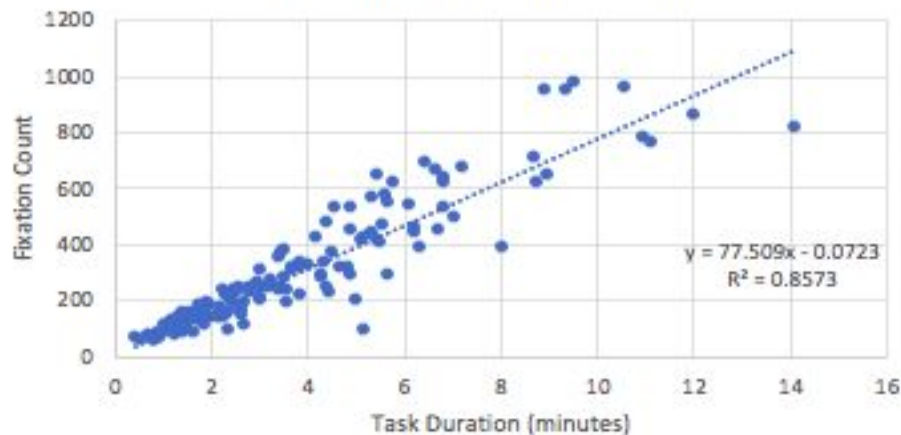
Interaction Between Memory Span and Interface on Task Duration



Interaction Between Interface and Memory Span on Fixation Duration



Task Duration vs. Fixation Count





Overall Findings

Over the course of the project, we found that certain factors had pronounced effects on user interaction behaviors. The statistically significant factors were:

- Task Complexity
 - Easy task complexity resulting in shorter task duration
 - Difficult task complexity resulting in longer task duration
- Interface
 - Interface B resulting in lower tasks durations overall
 - Interface B resulting in lower fixation durations
 - Interface B resulting in lower task duration for easy task complexities

Other factors we looked at were found to be statistically insignificant. One such factor was memory span, which did not impact task duration or fixation count.



How we worked

We used a number of tools to work on this assignment:

- Google Docs, Slides, and Sheets
- Excel
- Zoom
- StatPlus

We mainly communicated through email to set up Zoom meetings and to give periodic updates on our working status.



Online experience

The online nature of this course had both benefits and drawbacks. Some benefits were that as we're already online-oriented, scheduling online meetings was much easier than if we were both unfamiliar with Zoom and had to set it up for the first time. In turn, online meetings are much easier to attend since you don't have to go anywhere and therefore they were much more convenient. On the other hand, it can be a lot harder to understand each other through a screen, as well as the introduction of problems like connection issues.



Isabel's Project Experience

- Attention to detail is important
- Era of online learning affords convenience but makes it difficult to develop relationships between people
- After taking this class, I feel more comfortable choosing appropriate formulas and executing them correctly when analyzing UX data
- My advice would be to put an emphasis on the statistical interpretation and make sure to tell a story



Jonathan's Project Experience

- I learned that it's better to start earlier than later
- Online learning made meeting up a lot more convenient, but less meaningful
- Learned a lot about UX studies, user studies in general, analyzing data
- I'd say to start familiarizing yourself with stats using various tools like Excel, Python, and Statplus.



Thank You!

Any questions?