Manual Texting vs. Voice-to-Text Mobile Applications

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Objectives

- Sponsored by the Southwest Region University Transportation Center (SWUTC)
- The purpose of this research was to evaluate the impacts of using voice-to-text mobile applications to send and receive text messages while driving and was driven by three primary research questions:
  1. When texting using a voice-to-text application, does driving impairment improve, remain the same, or increase when compared to manual-entry texting and the baseline?
  2. Are there any significant differences in performance between the two types of voice-to-text applications that were tested?
  3. How do driver perceptions toward texting while driving compare to their actual performance?
Methodology

- 43 participants drove an instrumented vehicle on a closed course (23 females/20 males)
- Ages ranged from 16-63
- Had to be very familiar with texting on a smartphone
- Four experimental conditions:
  - Baseline
  - Manual texting
  - Texting with Siri
  - Texting with Vlingo
Methodology
Methodology

- 3.8-mile long course
- Text messaging tasks were initiated at the same physical locations for each condition
  - Task 1: Send Only
  - Tasks 2-4: Read & Reply
  - Task 5: Read Only
- Content: Same short-phrased script for each condition
What are you doing tonight

Nothing. Do you want to get together for dinner?

Yes where do you want to eat

Subway

Okay what time

7:00pm

See you later

Okay, bye!
Methodology

- Performance metrics recorded:
  - Driver response times
  - Speed
  - GPS (used to measure changes in lateral lane position)
  - Gaze tracking
  - Accuracy of and length of time to complete text messaging tasks
  - Self-performance ratings and comments
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Key Findings

- Reaction times were nearly two times slower no matter which texting method was used
Key Findings

Mean Response Times

<table>
<thead>
<tr>
<th>Seconds</th>
<th>Baseline</th>
<th>Manual</th>
<th>Siri</th>
<th>Vlingo</th>
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</table>

Baseline Manual Siri Vlingo
Key Findings

- Reaction times were nearly two times slower no matter which texting method was used.
- The percentage of time drivers spent looking at the forward roadway significantly decreased in any of the three texting conditions compared to the baseline.
Key Findings

Time Spent Not Looking at the Forward Roadway (Per Minute) as Compared to Baseline

- Manual: -10 seconds
- Siri: -9 seconds
- Vlingo: -12 seconds
Key Findings

• Reaction times were nearly two times slower no matter which texting method was used

• The percentage of time drivers spent looking at the forward roadway significantly decreased in any of the three texting conditions compared to the baseline.

• Task accuracy: Siri produced fewest typographical errors compared to manual and Vlingo

• Task Completion Times:
  • Send Only: each method took approximately the same length of time
  • Read & Reply, Read Only: manual-texting took least amount of time

• Self-performance Ratings: Participants rated Siri as much safer to use while driving than manual or Vlingo
Key Findings

Are Assisted Forms of Texting Safer than Manual Texting?

Percentage of drivers who view assisted texting as less safe (left of zero) and safer (right of zero) than manual texting.

Perception
- Considerably Less Safe
- Somewhat Less Safe
- Somewhat Safer
- Considerably Safer
Key Findings

Self-Assessment Ratings During Experiment

<table>
<thead>
<tr>
<th></th>
<th>Very Unsafe</th>
<th>Unsafe</th>
<th>Safe</th>
<th>Very Safe</th>
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<tr>
<td>Baseline</td>
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<tr>
<td>Manual</td>
<td>11</td>
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</tr>
<tr>
<td>Siri</td>
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<td>3</td>
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<tr>
<td>Vlingo</td>
<td>4</td>
<td>18</td>
<td>10</td>
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</table>

Perception: Very Unsafe, Unsafe, Safe, Very Safe