1 ISSUES

1. How many streets should be shown on an in-vehicle map display?
2. What size text should be used for the street labels?
3. What orientation should be used for street names on an in-vehicle map display?

2 MAP TASKS

Sample Map

Bernard

Colleen

Theresa

Jennifer

Kristen

Ronald

Phillip

Heidi

Andrea

(12 point, 12 streets, vertical text, grid map)
(80% of actual size)

Task 1 - On-Street
What street are you on?
Subject Finds: Theresa
Responds: female (3 key)

Task 2 - Cross Street
What is the 1st Cross Street?
Subject Finds: Ronald
Responds: male (2 key)
What is the 3rd Cross Street?
Subject Finds: Colleen
Responds: female (3 key)
What is the 6th Cross Street?
Subject Finds: only 4 streets
Responds: not there (1 key)

Task 3 - Where is?
Where is Bernard?
Response: ahead (2 key)
Where is Andrea?
Response: behind (3 key)
Where is Helen?
Response: left (4 key)
Where is Jennifer?
Response: right (5 key)
Where is Douglas?
Response: not there (1 key)

Keypad Responses

Note: only necessary response keys were visible during each task

1 2 3 4 5

Task 1 - On-Street
2 = male
3 = female

Task 2 - Cross Street
1 = not there
2 = male
3 = female

Task 3 - Where is?
1 = not there
2 = ahead
3 = behind
4 = left
5 = right
### 3 Method

**Simulator Driving Scenario**

Subjects were shown either the 12-point or 18-point block first, balanced over age and gender.

### 4 Results and Conclusions

**Response Time (RT) and Error Rate**

#### Task Differences

**Age Effect on Error Rate**

For Error rate, age differences increase as task difficulty increases.

**Streets Effect on Response Time (RT)**

Streets effect on RT:
- Task 1 = 31 ms/street
- Task 3 = 167 ms/street

<table>
<thead>
<tr>
<th>Block Order</th>
<th>Young</th>
<th>Older</th>
</tr>
</thead>
<tbody>
<tr>
<td>12pt→18pt</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>18pt→12pt</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Terms for Regression Equations

\[ S = \text{Number of Streets} \ (S \geq 1) \]
\[ P = \text{Point Size} \ (12 \leq P \leq 18) \]

**Response Time Regression Equations**

**Task 1: On-Street**

\[
\text{RT (ms)} = 1334 + 264\times(A) + 31\times(S) + 378\times(\text{Or}) + 168\times(A)\times(\text{Or}) + 35\times(S - 14)\times(\text{Or})
\]

**Task 3: Where is?**

\[
\text{RT (ms)} = [2850 + 572\times(A) + 116\times(S) - 44\times(P) + 5\times(A + 0.5)\times(S - 9)\times(15 - P)] \times \text{SR}
\]

**Task 2: Streets by Point Size Effects**

- **Issue 1** - How many streets to display?
- **Issue 2** - What size text to use?
- **Issue 3** - What street name orientation to use?

**Recommendations:**

1. Display \( \leq 12 \) labeled streets
2. Only use 18 point with very few labeled streets (6 or less); otherwise use 12 point (when only 12 and 18 point are available)

**Recommendations:**

1. Use vertical, if possible
2. Do **not** use horizontal to label vertical streets (RT longer, error rate higher)

**Task 1: Name Orientation Effects**

**Task 2: Streets by Point Size Effects (1st cross-street only)**

**Recommendations:**

1. Display \( \leq 12 \) labeled streets
2. Only use 18 point with very few labeled streets (6 or less); otherwise use 12 point (when only 12 and 18 point are available)