TEXAS TECH UNIVERSITY SYSTEM™

Route Familiarity Affects Drivers' Situation Awareness

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Objective

To investigate the effects of familiar and unfamiliar driving routes on situation awareness of dynamic traffic variables

Background

- Research reveals that *familiar* locations yielded
  - ↑ Severe and minor traffic violations
  - ↑ Dangerous behaviors
  - ↑ Speeding

- *Perception* of familiarity influences behavior
- Issues related to study's controls

Rosenbloom, Perlman & Shahar (2007)

Background

- Situation awareness for *static* traffic variables seems to be higher in familiar locations
  - Glance durations are <u>shorter</u> along familiar routes
  - Memory for signs is <u>better</u> along familiar routes
- Situation awareness of *dynamic* traffic variables was not assessed

Martens & Fox (2007)

Background

- Knowledge and attention to traffic signs are two important components of situation awareness

- Drivers' ability to accurately respond to current and future driving conditions is an integral part of safe driving

Objective

To investigate the effects of familiar and unfamiliar driving routes on situation awareness of dynamic traffic variables

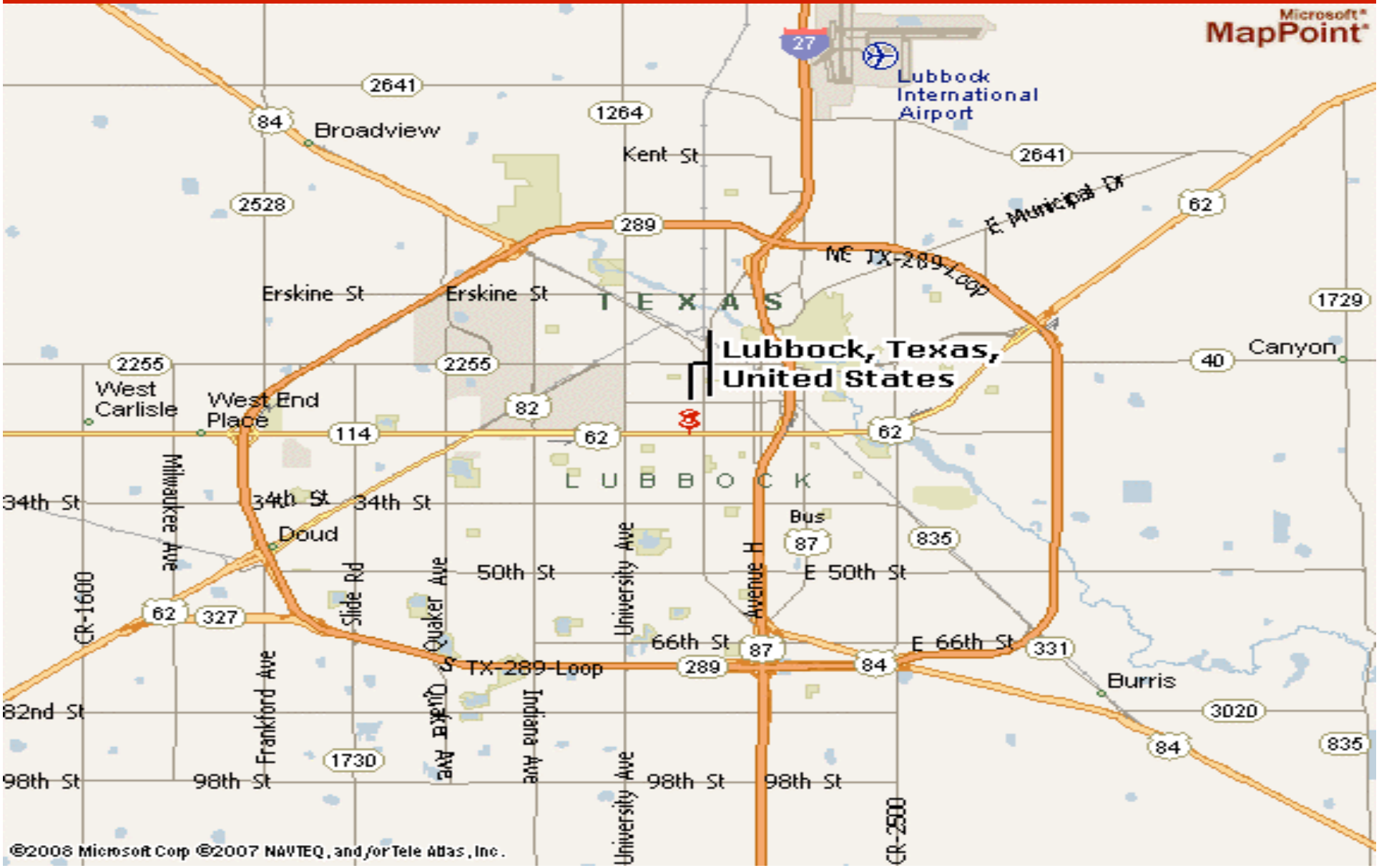
Method: Participants

- 16 students
  - 6.5 years of experience
  - 1.2 minor driving infractions
  - 0.5 accidents
- Current license & insurance
- Participants were compensated for their time

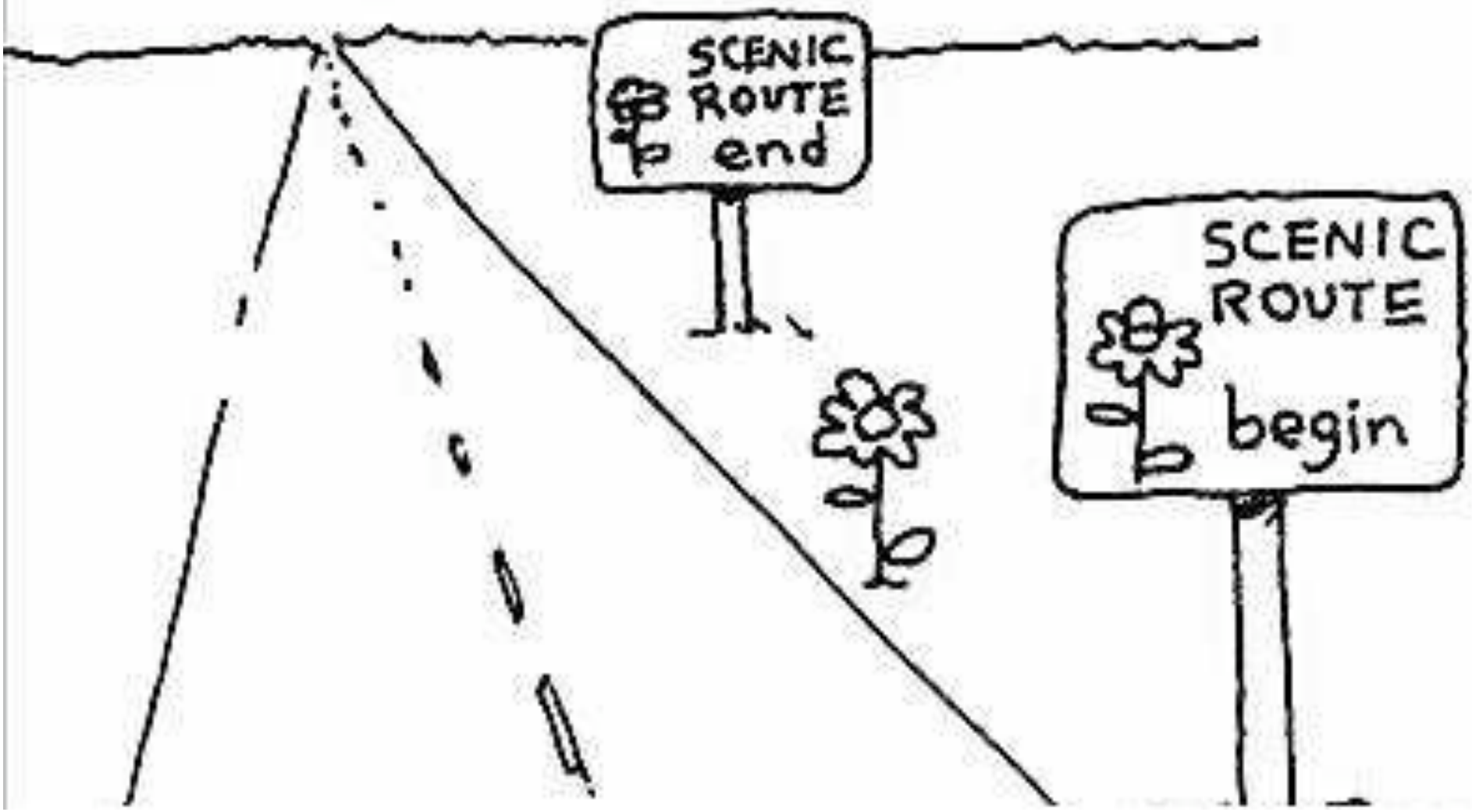
Method: Materials

- Driving routes
  - Research Methods class identified 3 most familiar driving routes
  - Controlled for
    - Number of right and left turns
    - Highway miles
    - Approximately same distance
    - Time of day

Method: Materials



Driving in Lubbock, TX



Method: Materials

- Driving Questionnaire
  - Familiarity with both routes
  - Driving history
    - Driving infractions and at-fault accidents in past two years

Method: Materials

- Situation awareness questions (24 total/route, 6/type of SPAM questions):
  - Present (e.g., are you currently turning?)
  - Future (e.g., will there be a car next to you in the next 5 sec?)
  - Own car (e.g., are you changing lanes?)
  - Traffic (e.g., is anyone around you changing lanes?)

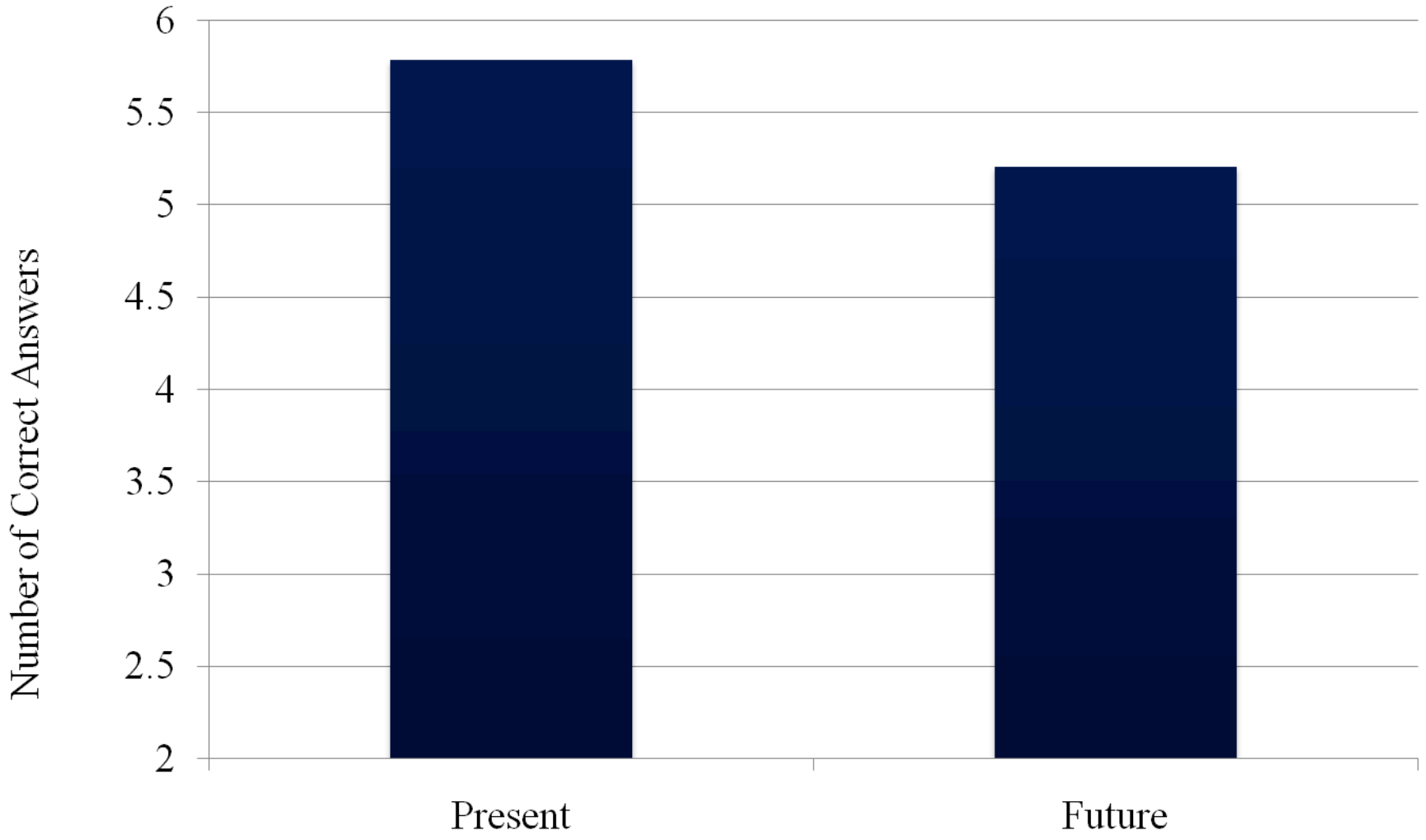
Method: Design

- IVs:
  - Familiar v. Unfamiliar
  - Own car v. Traffic
  - Present v. Future
  - 2 x 2 x 2 within-subjects design
- DVs:
  - Response times to SPAM questions
  - Accuracy

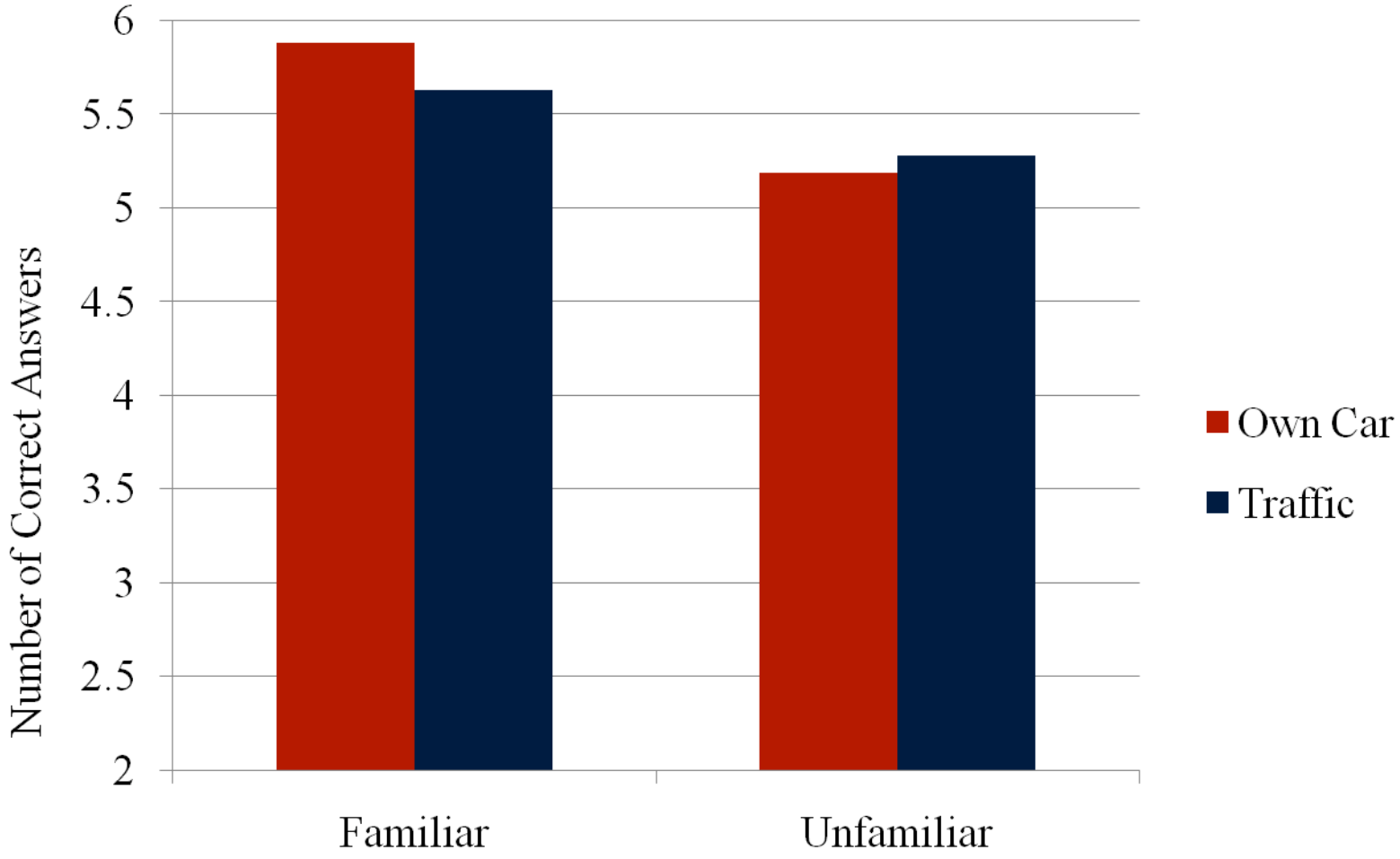
Method: Procedure

- Turn off radio and cell phone
- Experimenter acted as GPS
- Ready?
- Yes {RT measured for workload}
- Is the car in front of you currently turning?
- No
- RT and accuracy measured for SA

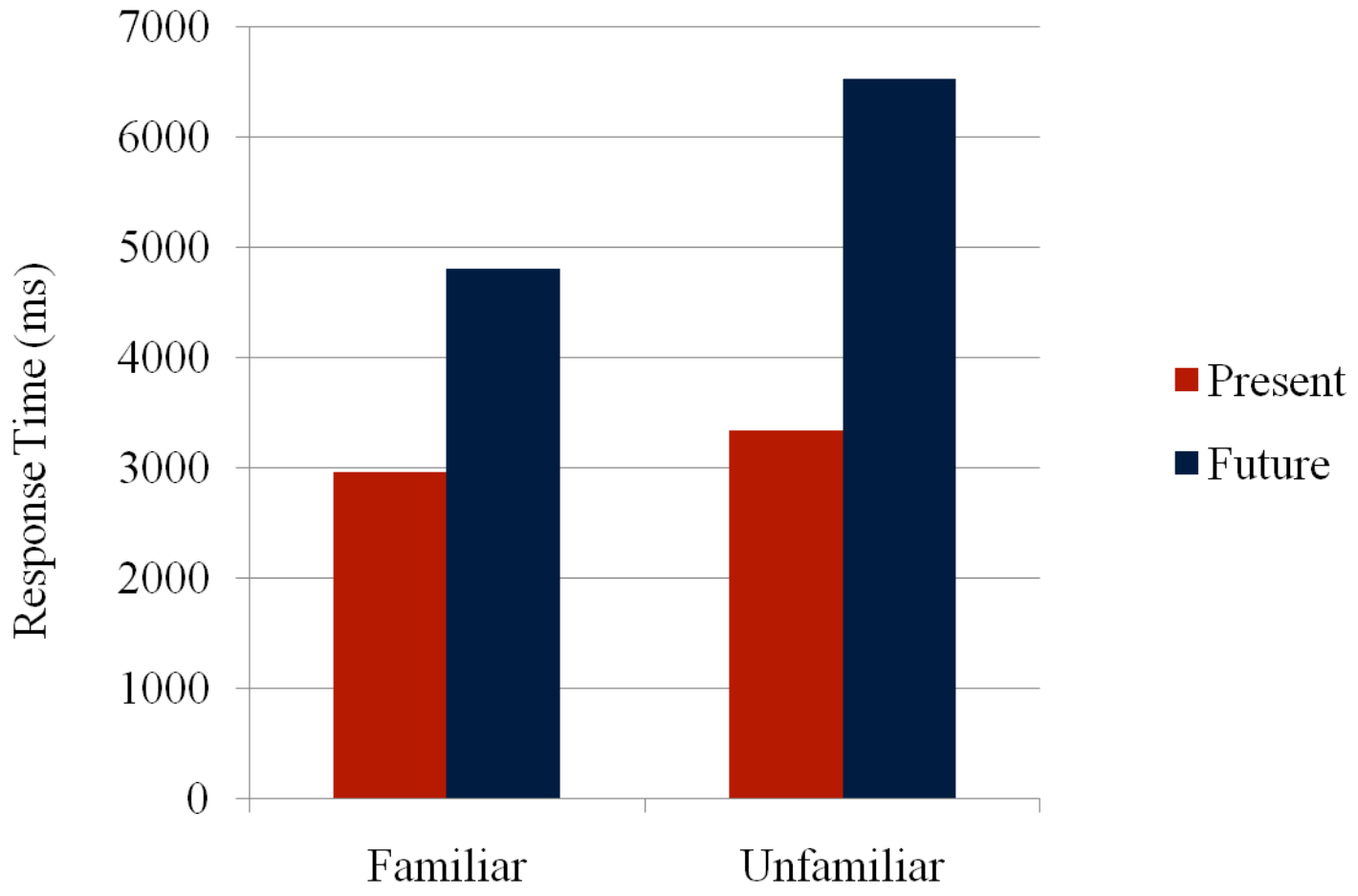
Main effects: Accuracy



Interaction: Accuracy



Interaction: Response Time



Discussion

- Participants were more accurate when asked about their own car (familiar surroundings)
  - Unfamiliar environments are more demanding requiring attention to both static and dynamic elements

Discussion

- Participants responded more slowly in unfamiliar situations (future)
  - SA in unfamiliar situations is worse than in familiar situations (future)
  - Thus, even with a very intelligent GPS system, the driver's SA of the future is poor in unfamiliar environments.

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