

DRIVER STRATEGIES AND WILLINGNESS TO MULTI- TASK WHILE DRIVING

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NHTSA Task Order Project

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PROJECT OBJECTIVE

Investigate how drivers make decisions about engaging in potentially distracting tasks

Focus on in-vehicle technologies:

Cell Phone

Navigation

PDA

NIH/NICHHD Co-funding to include teenage drivers

TWO-PART PRESENTATION

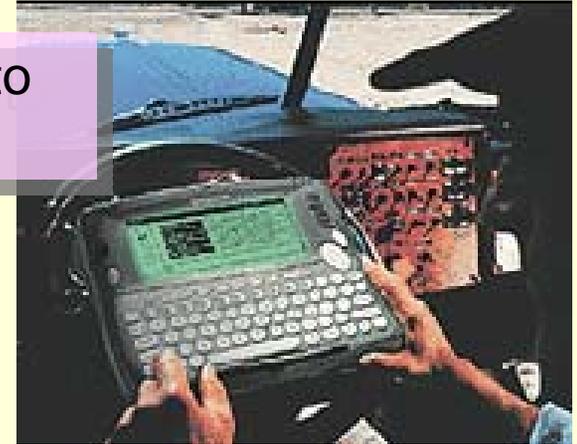
1. Project scope and methods
2. Selected findings with implications for adaptive interface

PROJECT TASKS

- Focus Groups of In-Vehicle Device Users
- On-Road Experiment
- Analysis of Other Existing Data

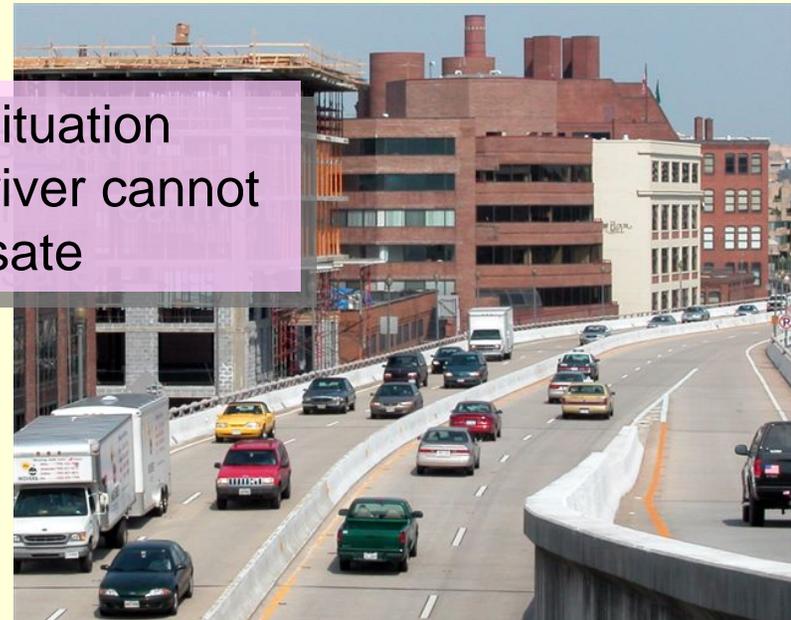
AN IN-VEHICLE DEVICE IS A SAFETY CONCERN ONLY IF:

Device has potential to interfere with driving

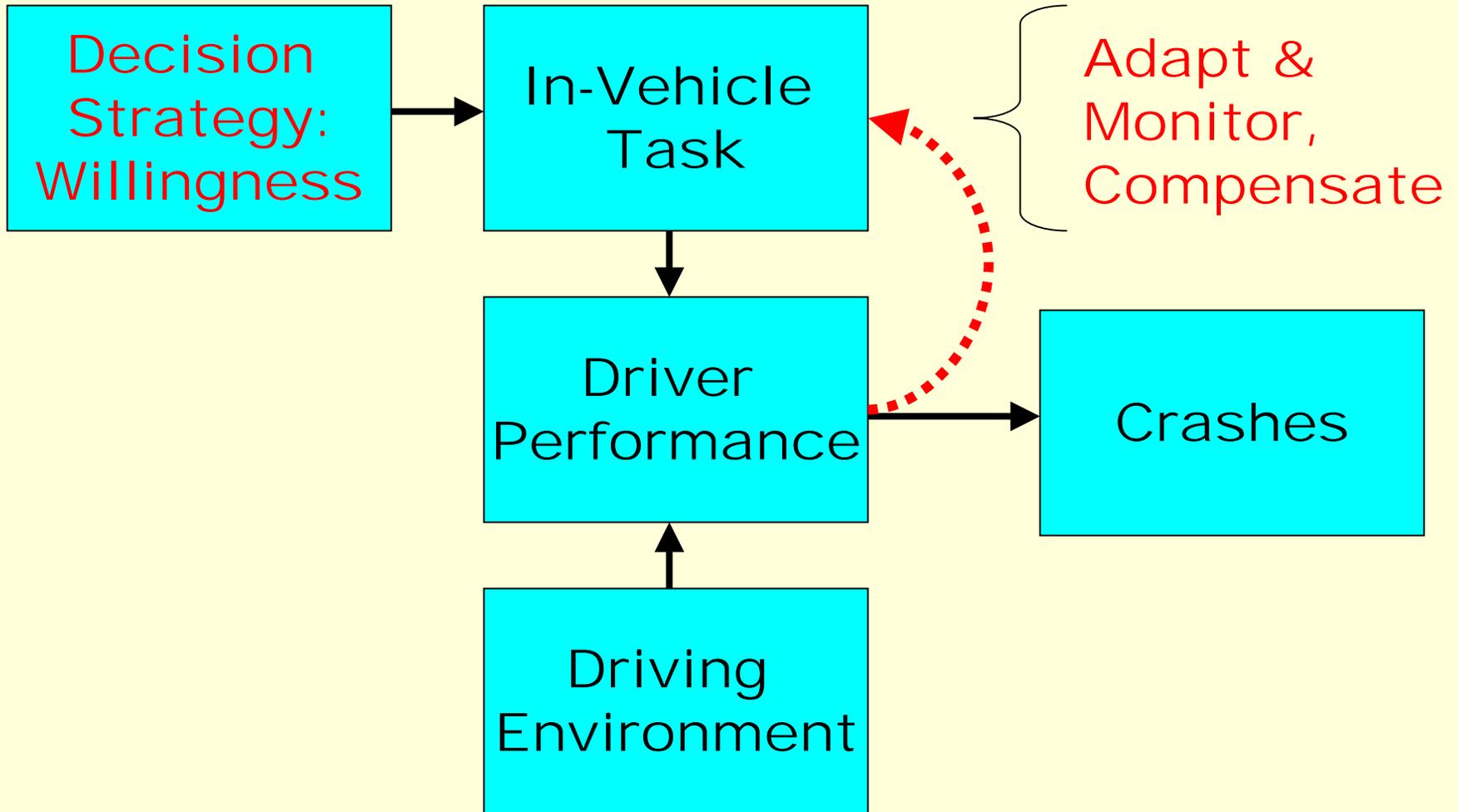


Driver decides to use that device at that time and place

Driving situation where driver cannot compensate



RELATIONSHIP OF IN-VEHICLE TASK AND CRASHES



FOCUS GROUPS

- Six focus groups
 - Teen (17-18)
 - Young (18-24)
 - Middle (30-55) [2 groups]
 - Old (60+)
 - Navigation system users (30-55)
- Total of 45 participants
- Technology users; cell phone plus other

FOCUS GROUP TOPICS

- Decision factors
- Errors/close calls
- Motivation and awareness
- Risk taking
- Specific driving situations
- Relative risks
- Decision process
- Suggestions

ON-ROAD WILLINGNESS EXPERIMENT

- Actual driving of pre-defined route, maneuvers
- At selected points, participant rates willingness to engage in specific task
- 14 in-vehicle tasks
- 11 driving locations/maneuvers
- Total of 81 situations included

IN-VEHICLE TASKS

- Cell Phone
 - Answer call
 - Key in call
 - Personal conversation
 - Text message
- PDA
 - Look up phone no.
 - Pick up/read email
 - Key in/send email
- Navigation System
 - Key in new destination
 - Call up stored dest.
 - Search for Starbuck's
- Other
 - Select & insert CD
 - Converse with passenger
 - Drink hot beverage
 - Unwrap & eat taco

ROADWAY LOCATIONS

- Freeway
 - Mainline
 - Entrance/merge
 - Exit
- Two-lane winding hwy
- Residential street
- Arterial
 - Mainline
 - Unprotected left turn
 - Protected U-turn
 - Stopped at red signal
- Parking lot
 - Search for space
 - Exit to arterial

ON-ROAD METHOD

- Pre-training for task familiarity
- Training and practice in method
- Method
 - Experimenter reads task description
 - Experimenter says “now” at defined point
 - Participant provides two ratings
 - Willingness to engage in the task now
 - Risk of doing the task now

TAKE-HOME BOOKLET

- Provided at end of session
- Generally returned within a week
- Sections
 - Explain reasons for on-road ratings (8 scenarios)
 - New ratings for 20 scenarios with added factors
 - Rain, congestion, passengers, etc.
 - Risk ratings for 32 tasks, 10 driving situations
 - Ratings of familiarity with technologies & tasks
 - Self-rating of driving style, multi-tasking, decision making style

IMPLICATIONS FOR ADAPTIVE INTERFACE

- Highlights selected findings to-date that may have implications for adaptive interface
- Quantitative/qualitative, firm/speculative
- After completion of all phases of project, more systematic treatment of countermeasures

IMPLICATIONS RELATED TO FINDINGS ABOUT:

- In-vehicle task attributes
- Driving environment
- User motivations
- Driver decision strategies
- Situational awareness
- Driver factors

Implications: Task Attributes

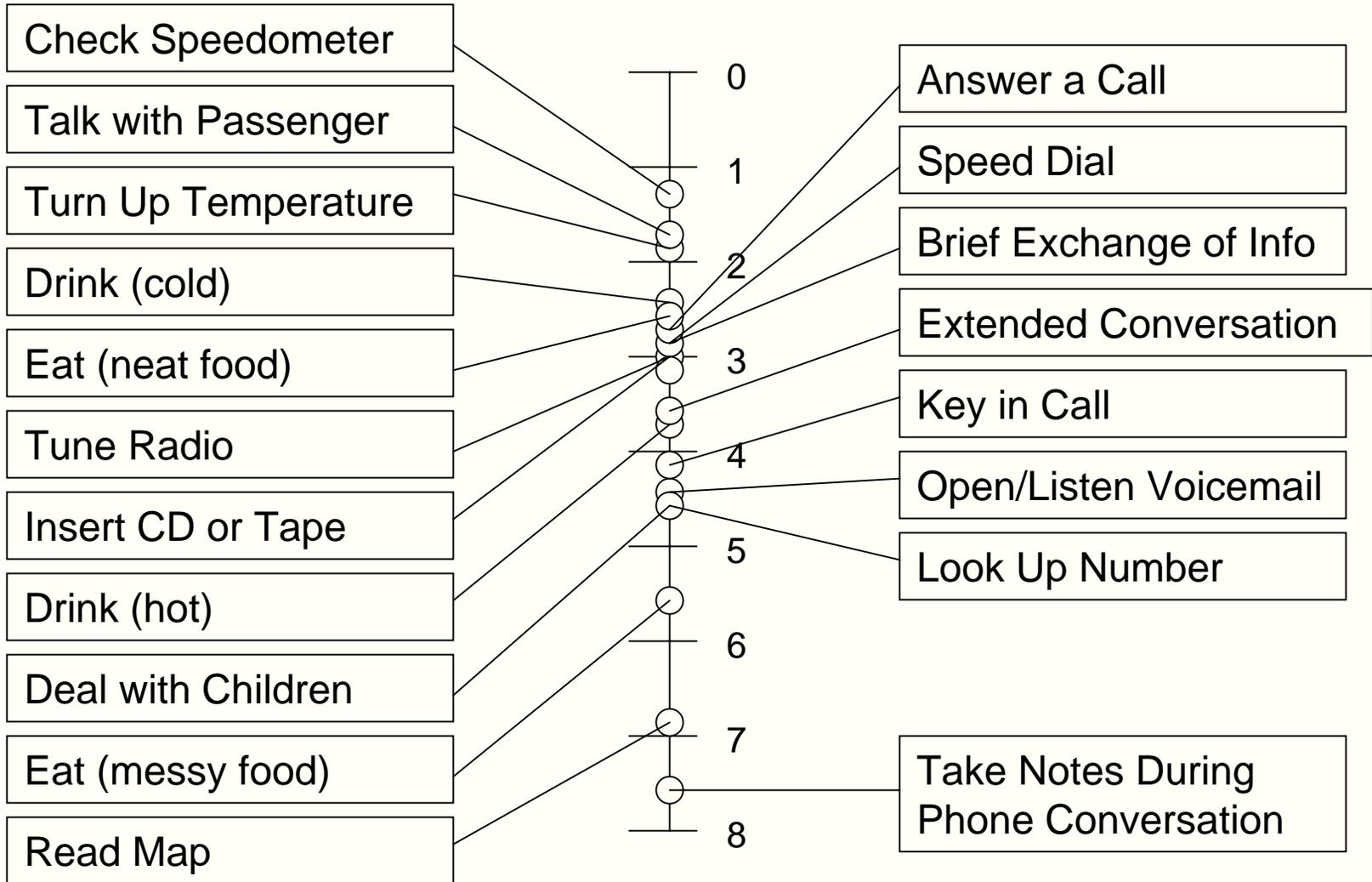
Consideration of Task Attributes

Types of task attributes NOT cited:

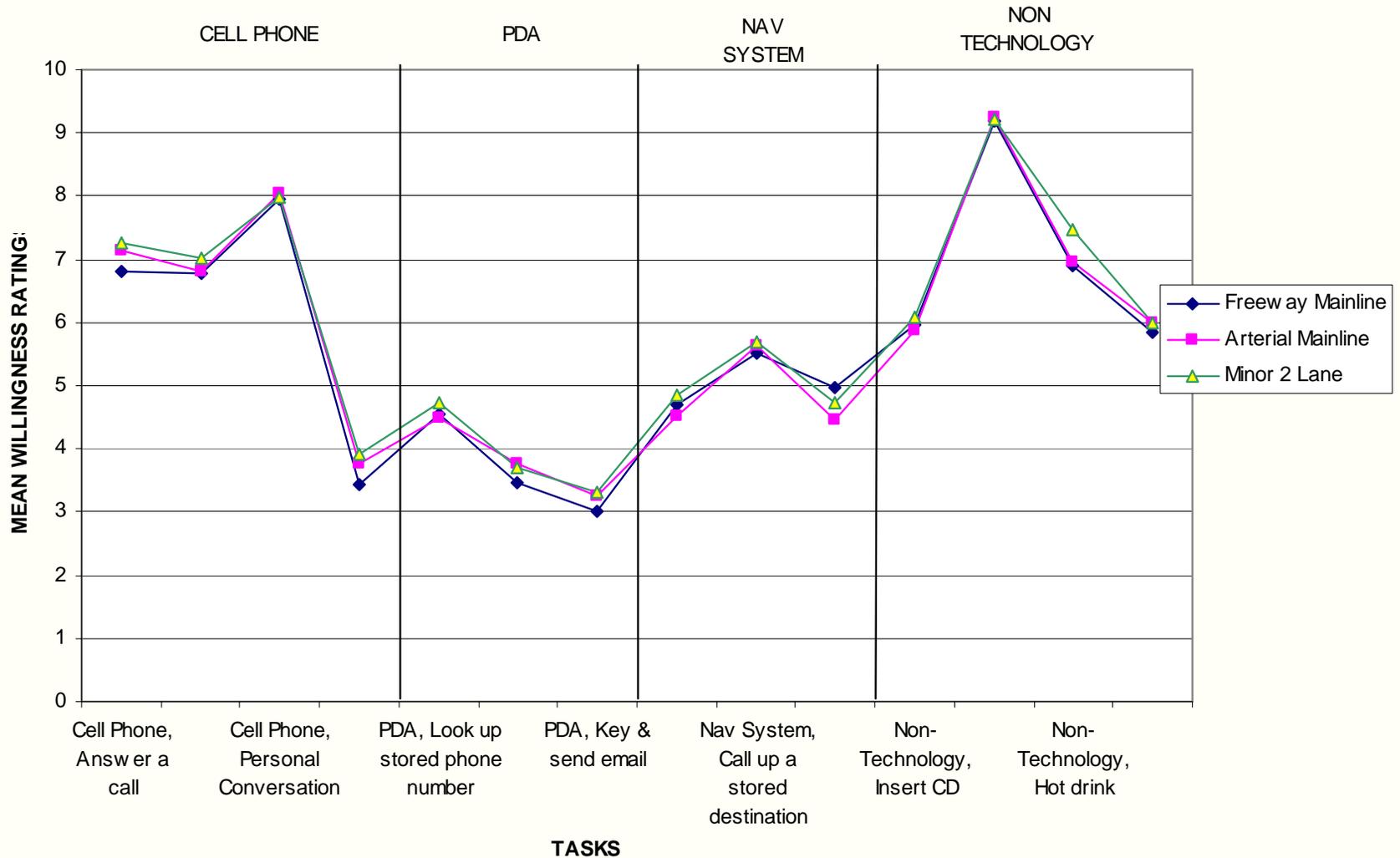
- Chunkability
 - Little mention of some potentially
- Cognitive capture
- Control over task initiation, pacing
- Ability to self-monitor
- Potential for incidents, errors
- Demands of error recovery

Non-Technology Tasks

Cell Phone Tasks



MEAN WILLINGNESS RATINGS ON THREE ROAD TYPES



DESIGNER

- Minimize workload
- Maximize safety

DRIVER

- Control personal time
- Maximize productivity
- Use of resources
- Social interaction
- Enjoyment: gee whiz, challenge

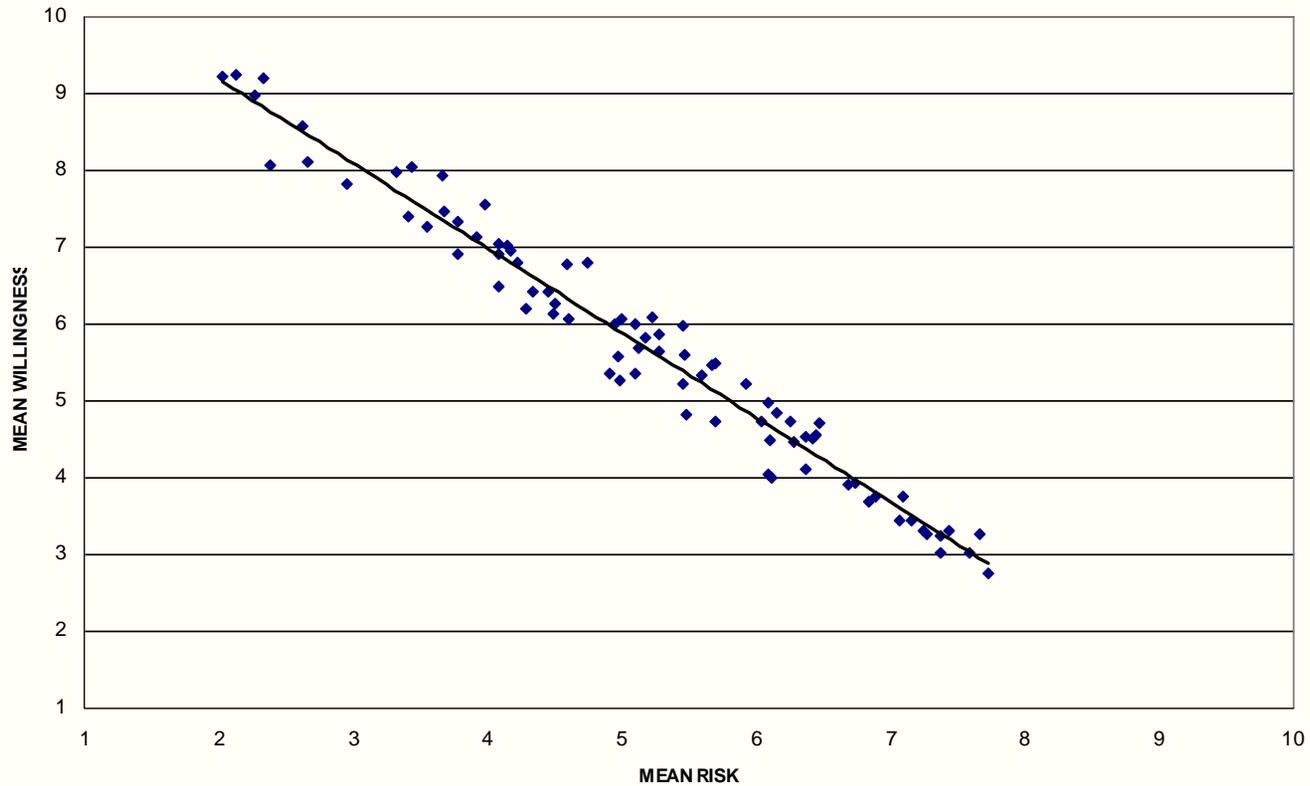
-
- Safety

Two

- U
- R

Gene

Two-



Willingness = risk

Once started, unlikely to terminate

IMPLICATIONS: SITUATIONAL AWARENESS

Drivers acknowledge “zone out”

Seems to be more concern about loss of awareness than about workload

Does not appear to be much of a decision factor

DRIVING INTENSITY SCORES FOR AGE GROUPS

