The Social Psychology of Handheld Devices

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Key Themes

- Psychology of Non-vision
  - Devices as social actors
  - Misrecognition problems
- Psychology of Place
- Planning vs. sensing
- Contemporaneity
- Multitasking

Speaking is Fundamental

- Fundamental means of human communication
- *Everyone* speaks
  - IQs as low as 50
  - Brains as small as 400 grams
- Humans are built for words
  - By 18 months, new word every two hours! (through adolescence)

Listening to Speech is Fundamental

- *Womb*: Mother's voice differentiation
- *One day old*: Differentiate speech vs. other sounds
  - Responses
  - Brain hemispheres
- *Four day olds*: Differentiate native language vs. other languages
- *Adults*:
  - 40-50 phonemes per second differentiation (other sounds < 20)
  - Cope with cocktail parties

Speech is more than words

- Humans are acutely aware of para-linguistic cues
  - Traits
  - States

But What About Technology?

- Will people treat voices from *technology* (synthetic or recorded) as real people?
- Will people speak to *technology* as they speak to real people?

Where Did this Research Agenda Come From?

Voices and Gender

- Can computer-generated speech (TTS) have gender?
- Does the gender of TTS affect users' attitudinal/behavioral reactions?
- How does the gender of a user interact with that of TTS?

Findings

- Gender is the first attribute one recognizes in a *human* voice
- Gender triggers stereotypic reactions
  - males are more assertive, ambitious
  - males are more persuasive
- Gender is a key social identity cue
  - in-group favoritism

Procedure

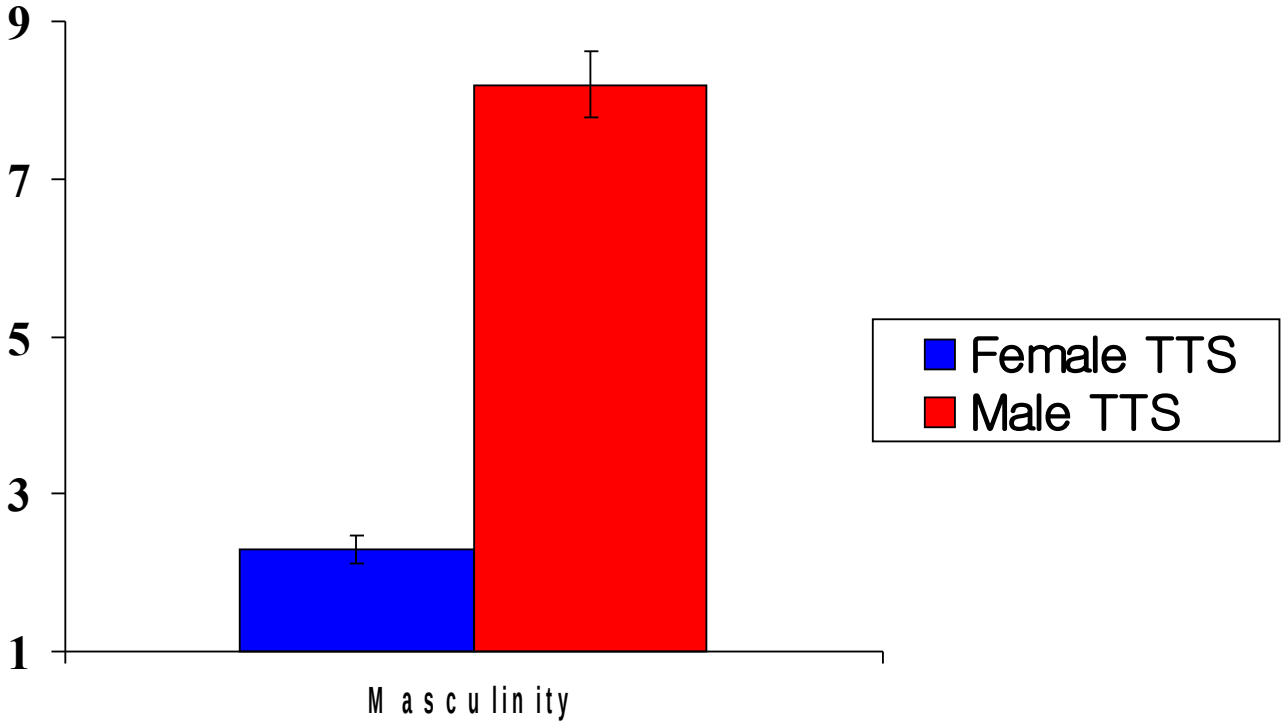
- Choice-dilemma
- Voice provides suggestion and rationale
- Participant fills out paper-and-pencil questionnaire

Sample Choice Dilemma

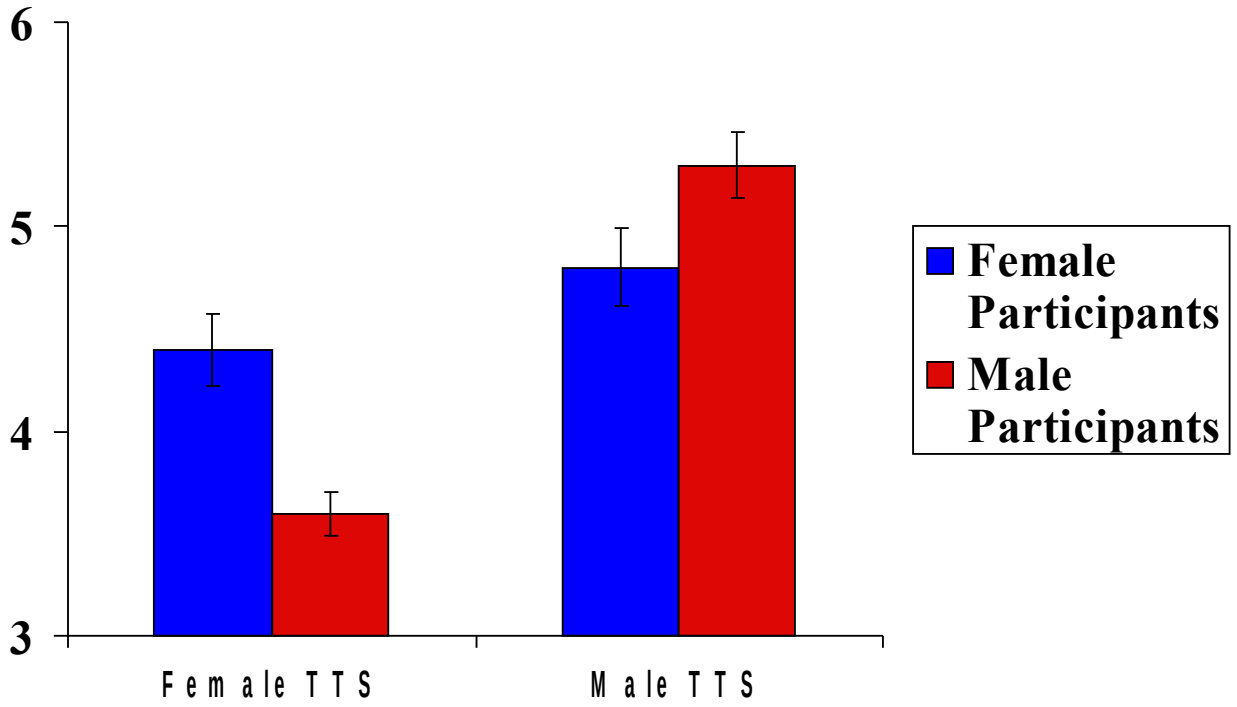
- Amy and John are college students who have been living together in an apartment near campus. John's allowance buys food and they are sharing the rent. Amy has told her parents that she is rooming with another girl, and now her parents are coming to visit their daughter. They have never seen the apartment. Amy is considering asking John to move out for the time that her parents are in town.


(.wav)

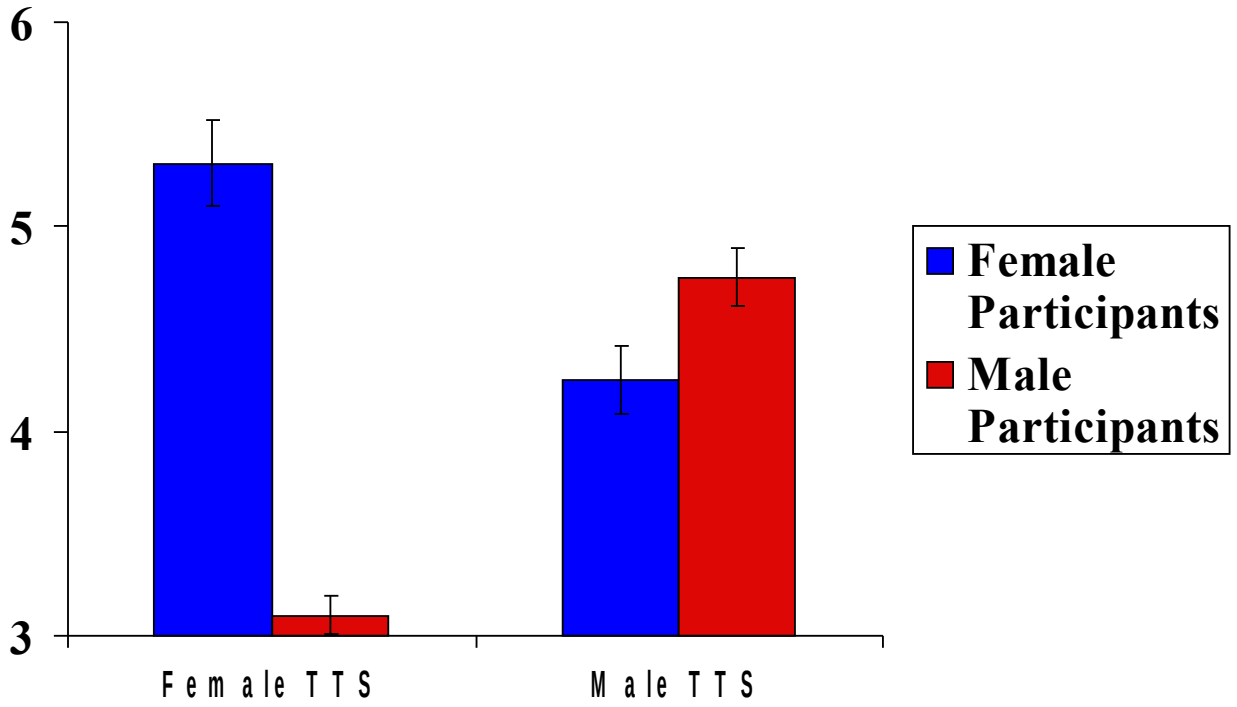
Masculinity of the Voice



Conformity


6
5
4
3
Female TTS
Male TTS
Female Participants
Male Participants

Social Attractiveness



Implications

- Even synthetic speech (TTS) can manifest gender
- TTS elicits gender stereotyping
- TTS elicits gender-based social identification
- “Casting”of voice gender is important consideration
  - Matching stereotypes vs. Challenging stereotypes
  - Matching gender of user?

The Case of BMW

Understanding Speech

- Speech understanding could be a very powerful technology

If it worked!

How Should A System Handle Errors?

- "That was not understood."
  - "This system failed to recognize what you said."
  - "Please repeat."
  - "Please speak more clearly."

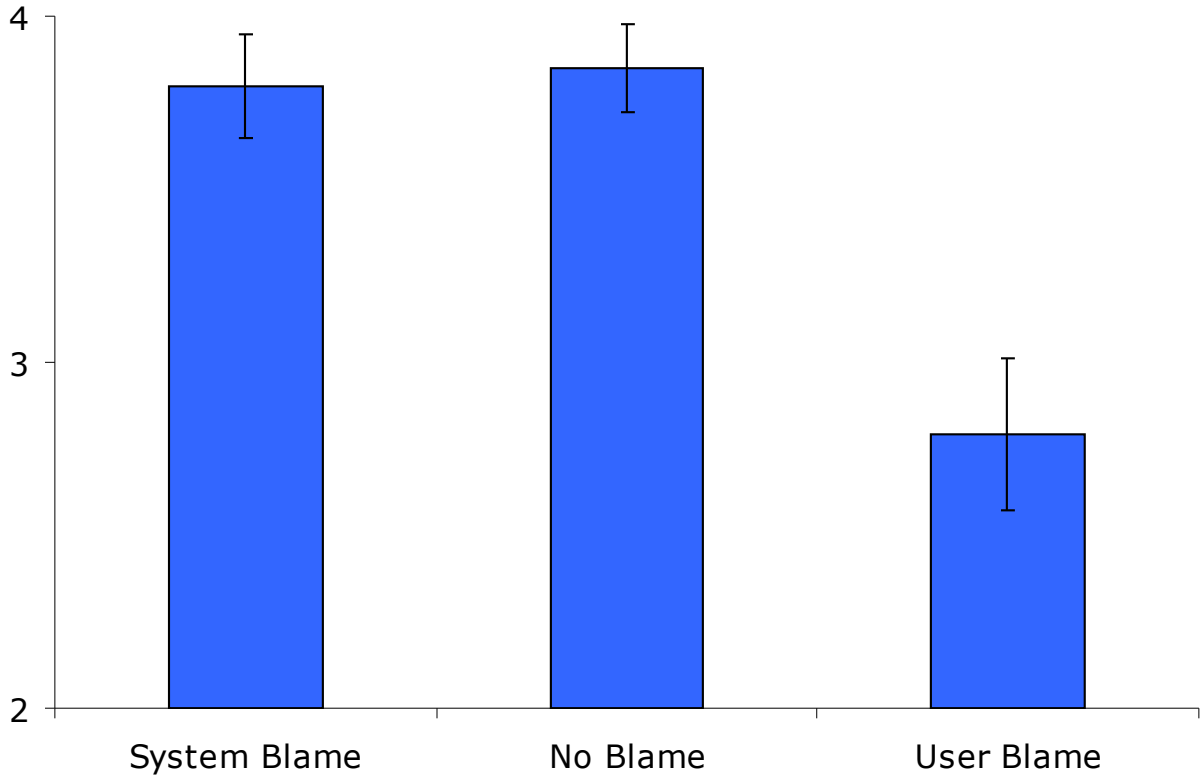
Findings with Respect to Other's Failures

- Negative experiences are
  - More memorable
  - More arousing
- Modesty is likeable
- … and believable
- Criticism is unpleasant
- … but intelligent
  - The movie critic thing

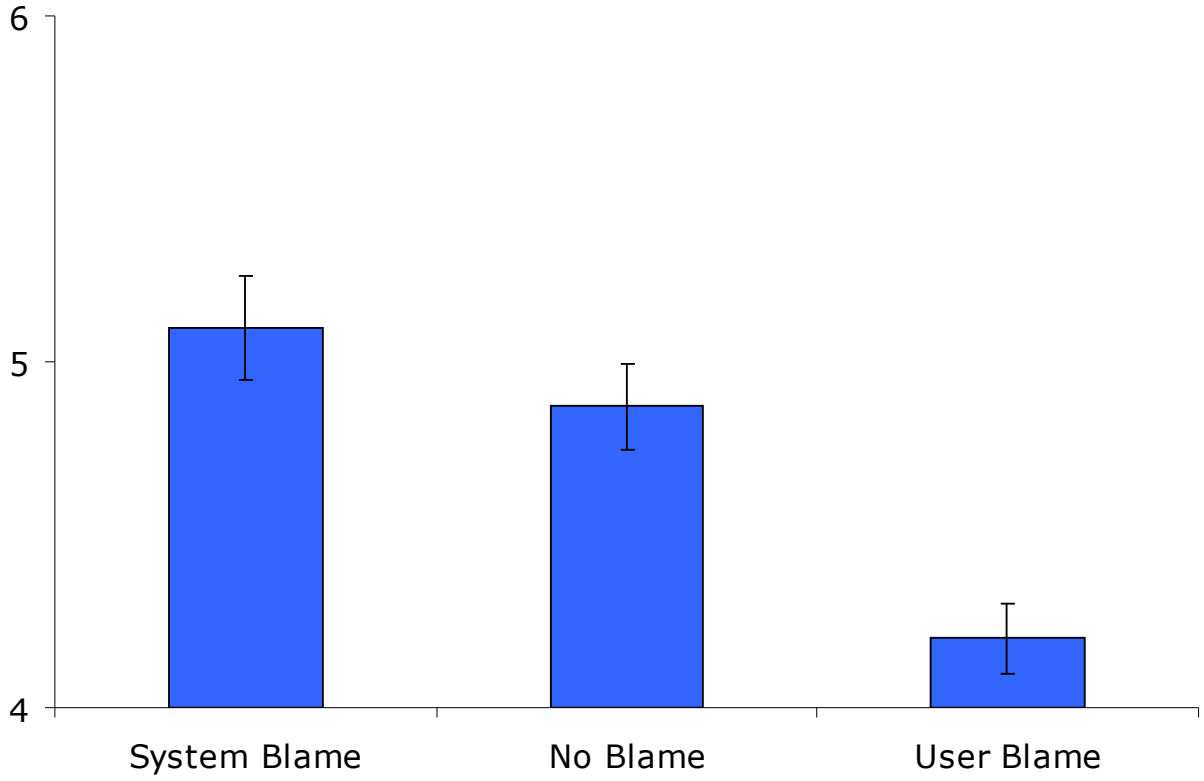
Method

- Telephone-based system
- Amazon.com
- Numerous recognition errors

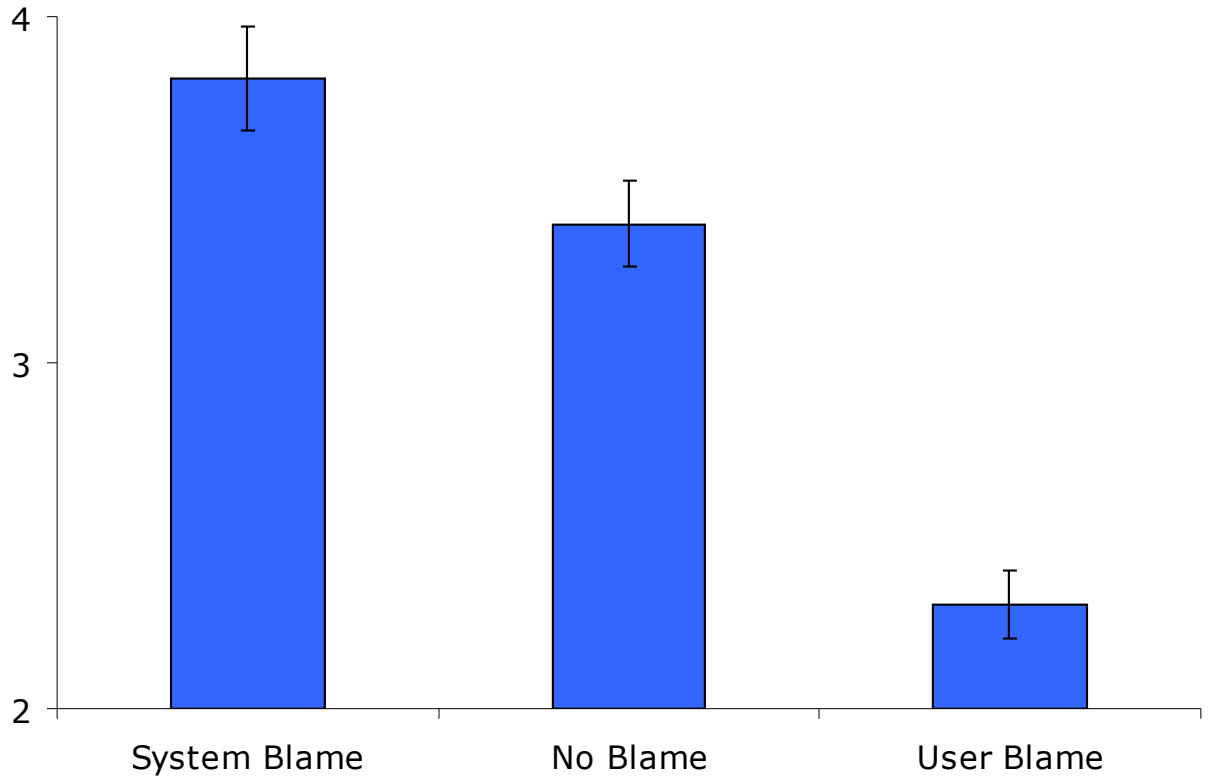
Purchasing



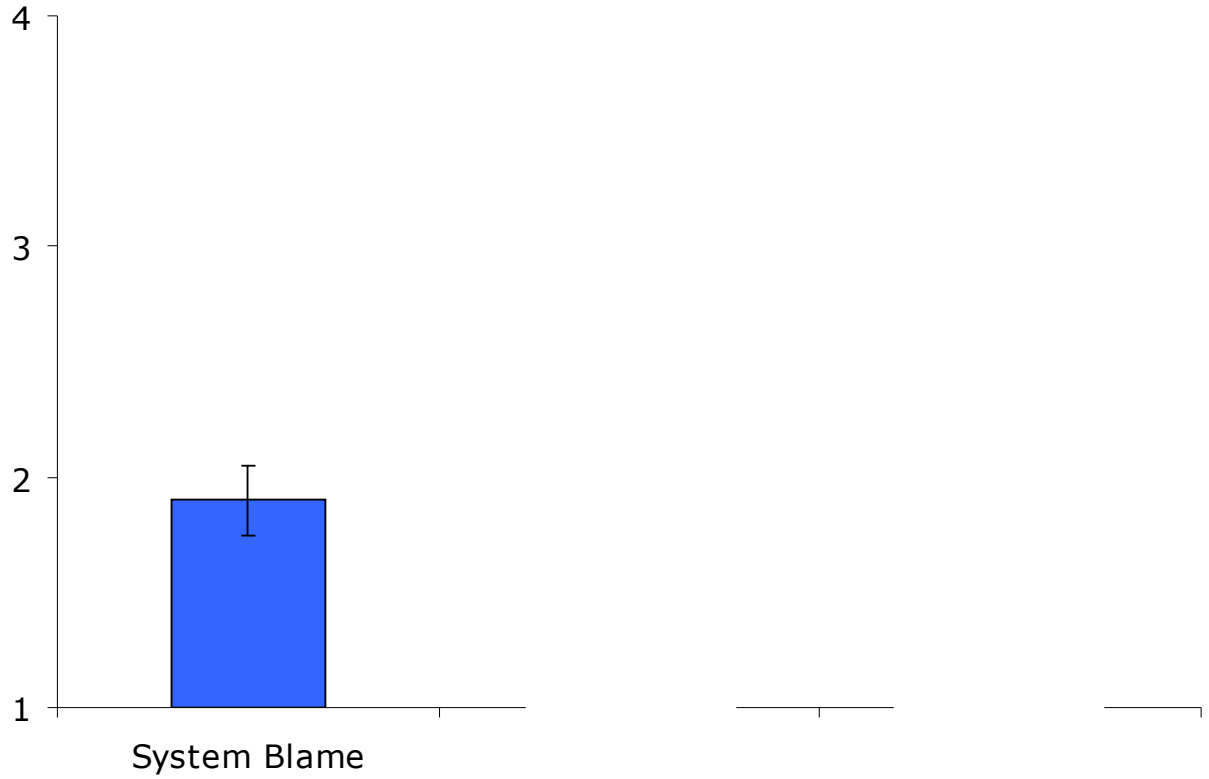
Ease of Use



Friendliness of the System



Intelligence of the System

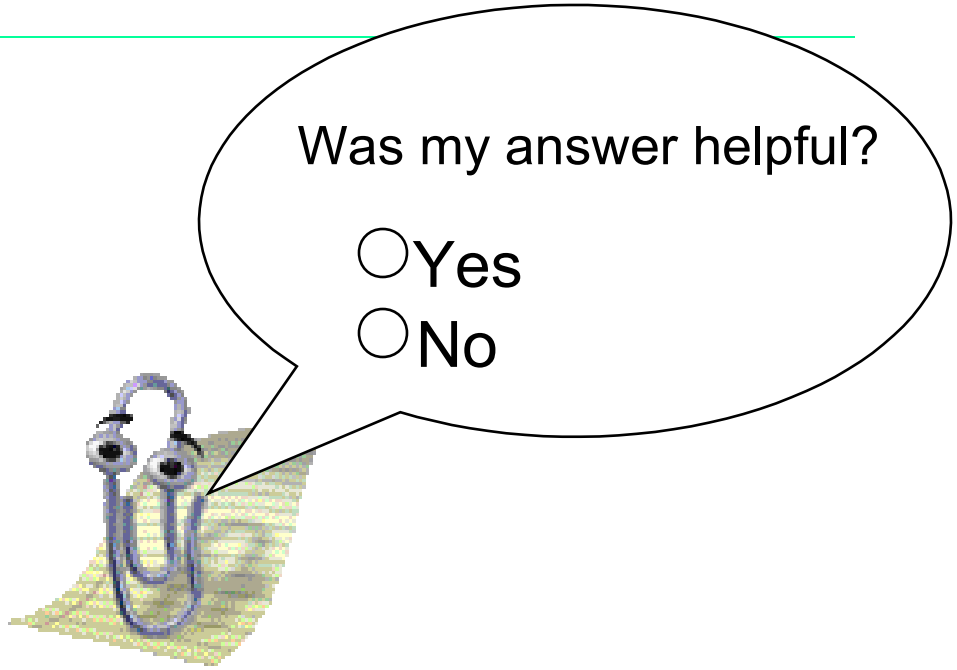


Implications

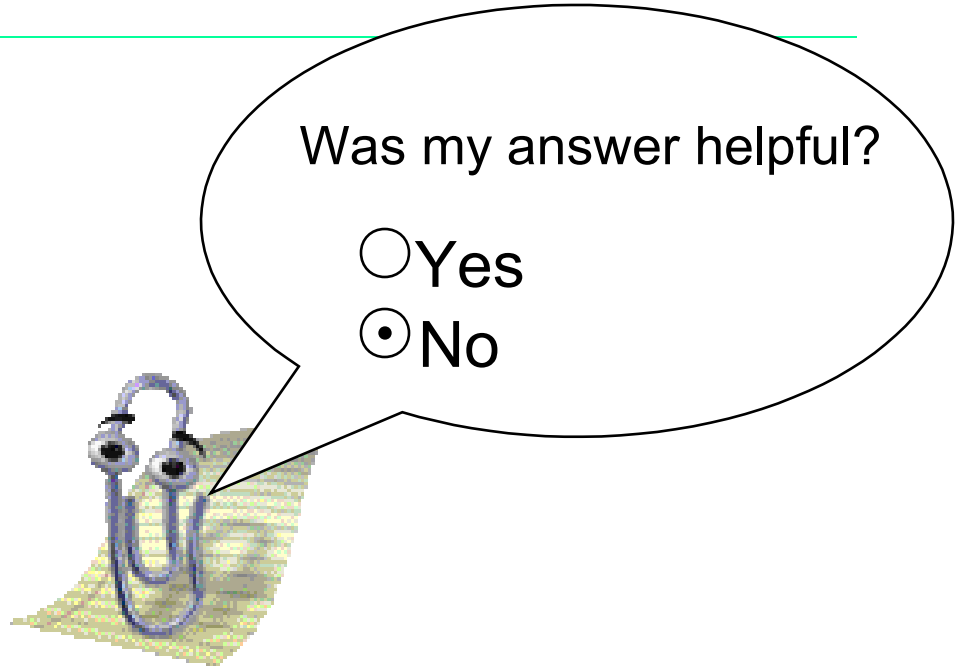
- Misunderstandings are a serious *social* problem
- To optimize liking, be modest or neutral
- To optimize intelligence, be arrogant

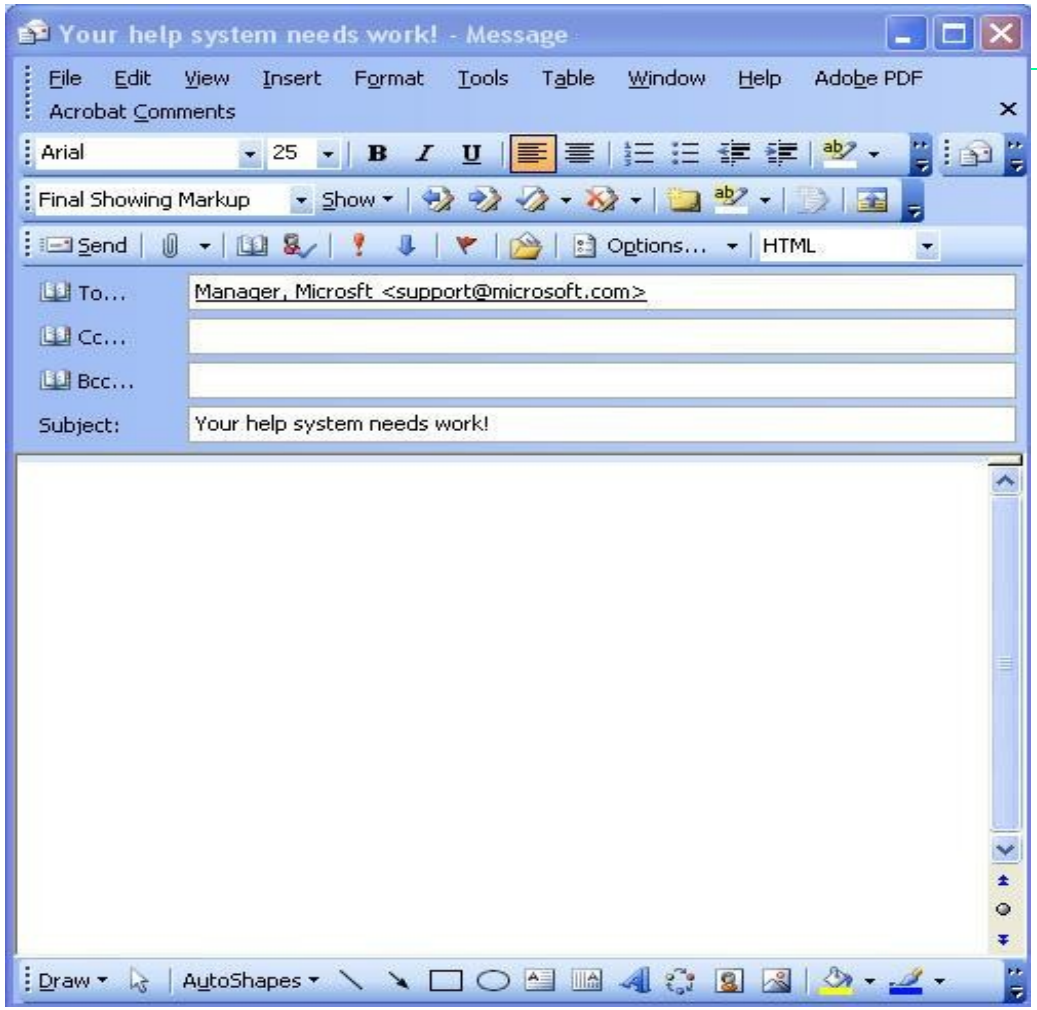
Can the Paperclip Rehabilitate Its Image?

The Power of Error-Handling

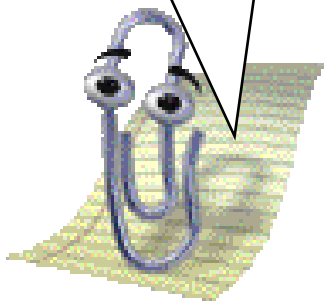


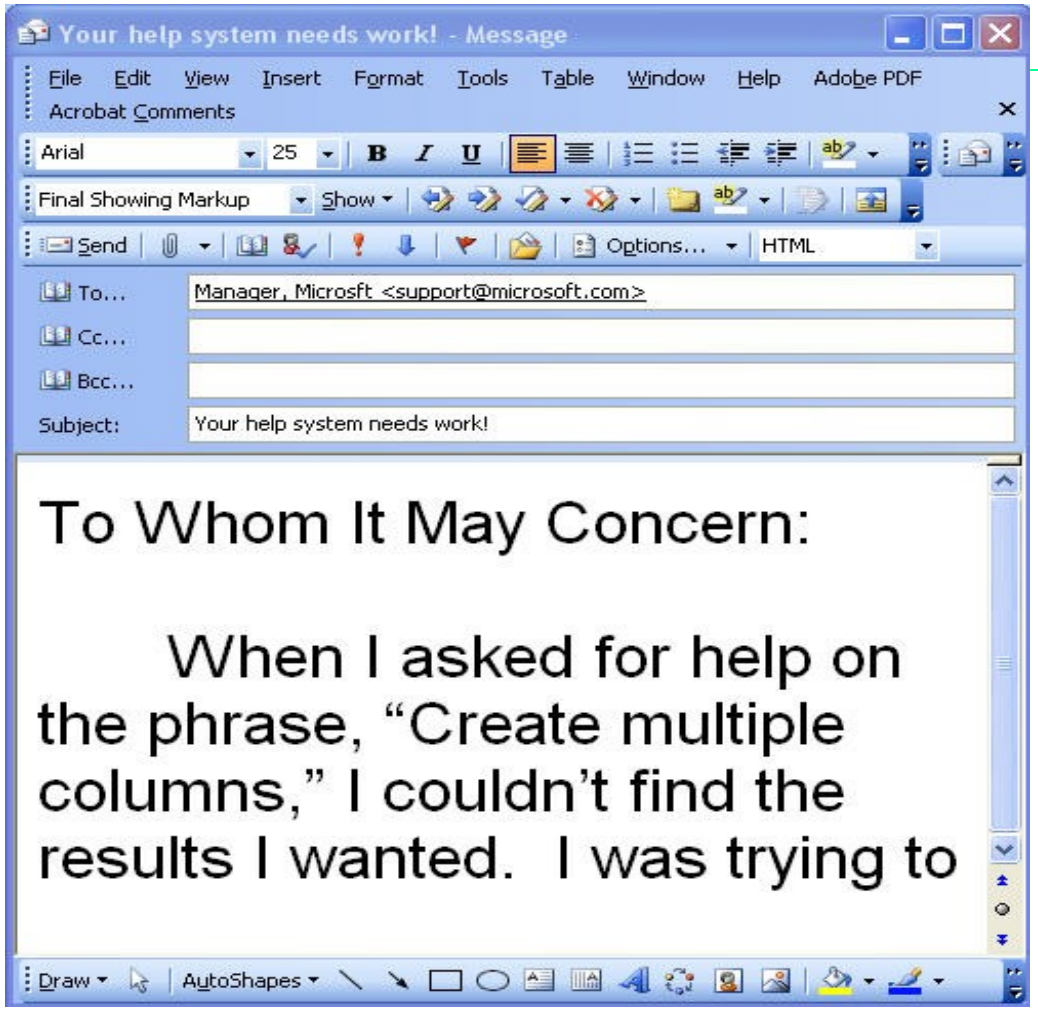
The Power of Error-Handling



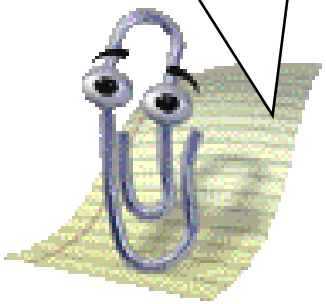


That gets me really angry! Let's tell Microsoft how bad their help system is.





C’mon! You can be More blunt than that. Let ‘em have it!



Results

- “The paperclip is awesome!”
- “He’s clearly on my side!”
- “I wish all software was like this!”

BUT …

People were furious at Microsoft

- Finding the right scapegoat is important

Psychology of Place

- Mobile phones have decoupled place and conversation
- If a caller **changes place rather than staying constant**, what psychological and cognitive effects would that have on mobile users' conversations?

Placeless / Placeful

- Multi-part conversations were normally held in a single place
- The link between topic and place has broken down
  - Learn in classroom, Internet, via phone
  - Work from home, in a car, etc.
  - Answer surveys on mobile phones
- Does this change conversation?

Experiment: Independent Variables

- People make a series of calls (one per day) from:
  - Same location for each call
  - Different locations for each call
- Salience of the location:
  - Prime location
  - No prime of location

Experiment: Dependent Variables

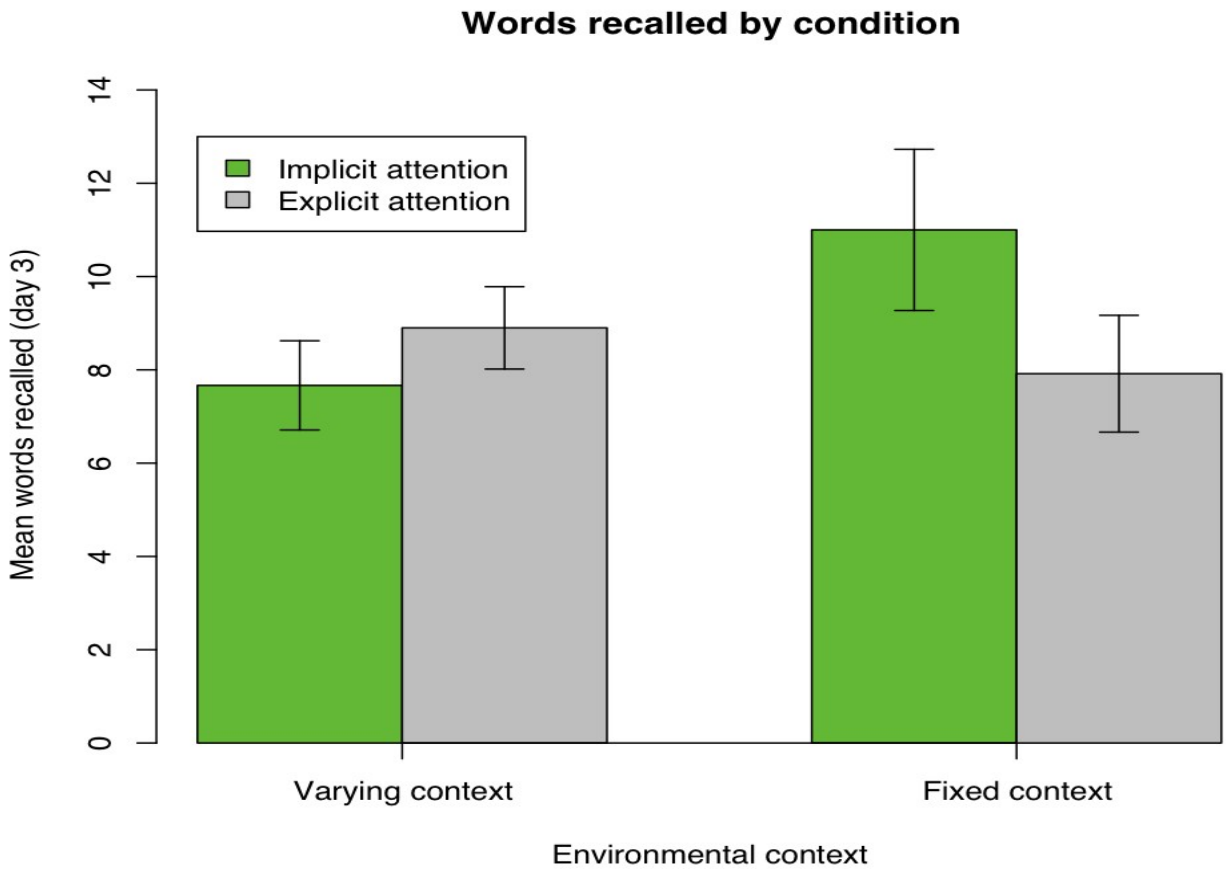
- Learning
  - Memorize 40 words over 4 days
  - Two-syllable words controlled for frequency
- Creativity
  - Alternate uses creativity task,
  - Two items per day
- Disclosure
  - Pretested self-disclosure questions
  - 4 questions per day (increasing intimacy)

Method

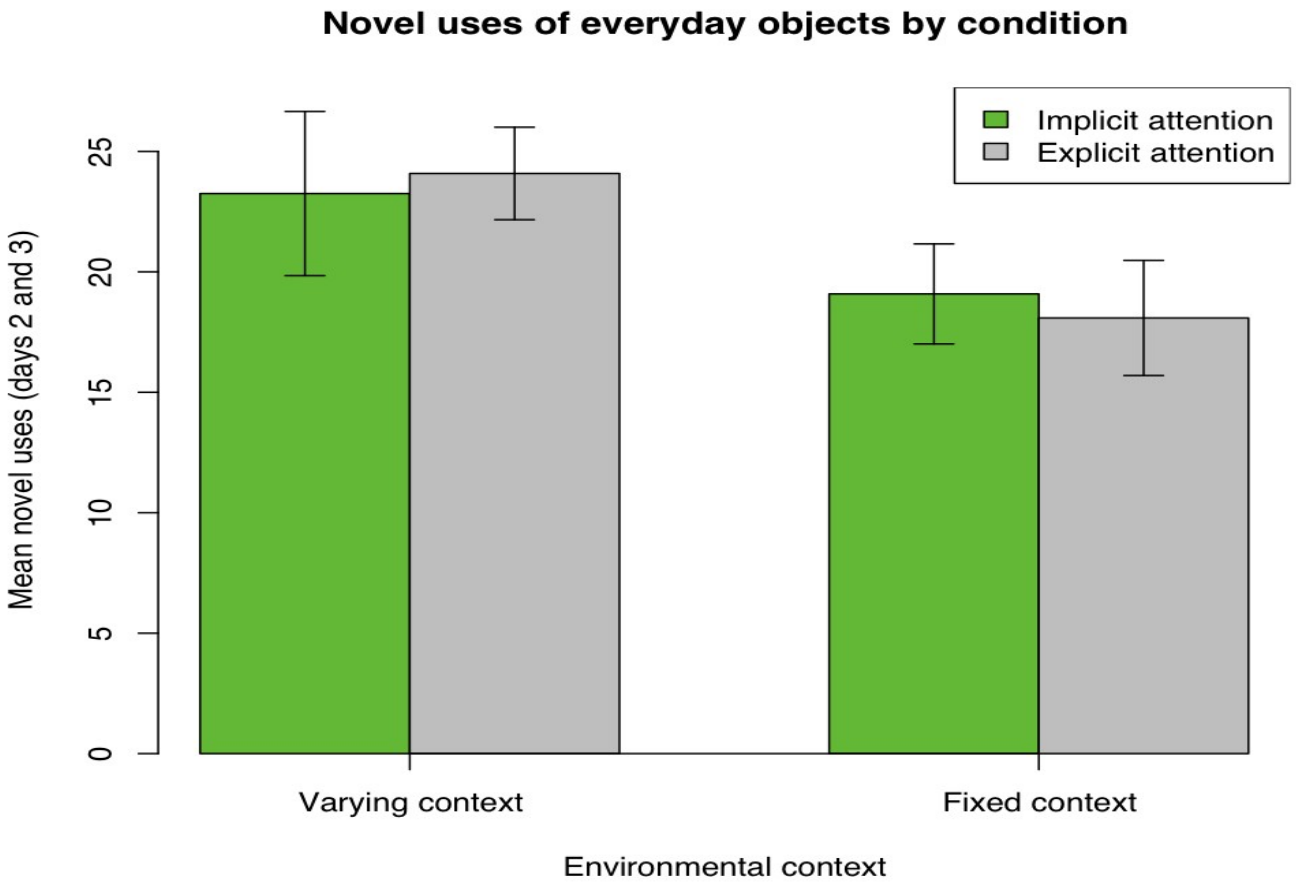
1. Participant goes to assigned location
2. Participant calls into our phone server to do tasks through voice UI
3. Primed group asked to describe their surroundings at start of call
4. Three tasks
5. For Days 2 and 3, repeat Steps 1 through 4
   a. Same location
   b. Different location
6. For Day 4, everyone goes to a new location

Locations

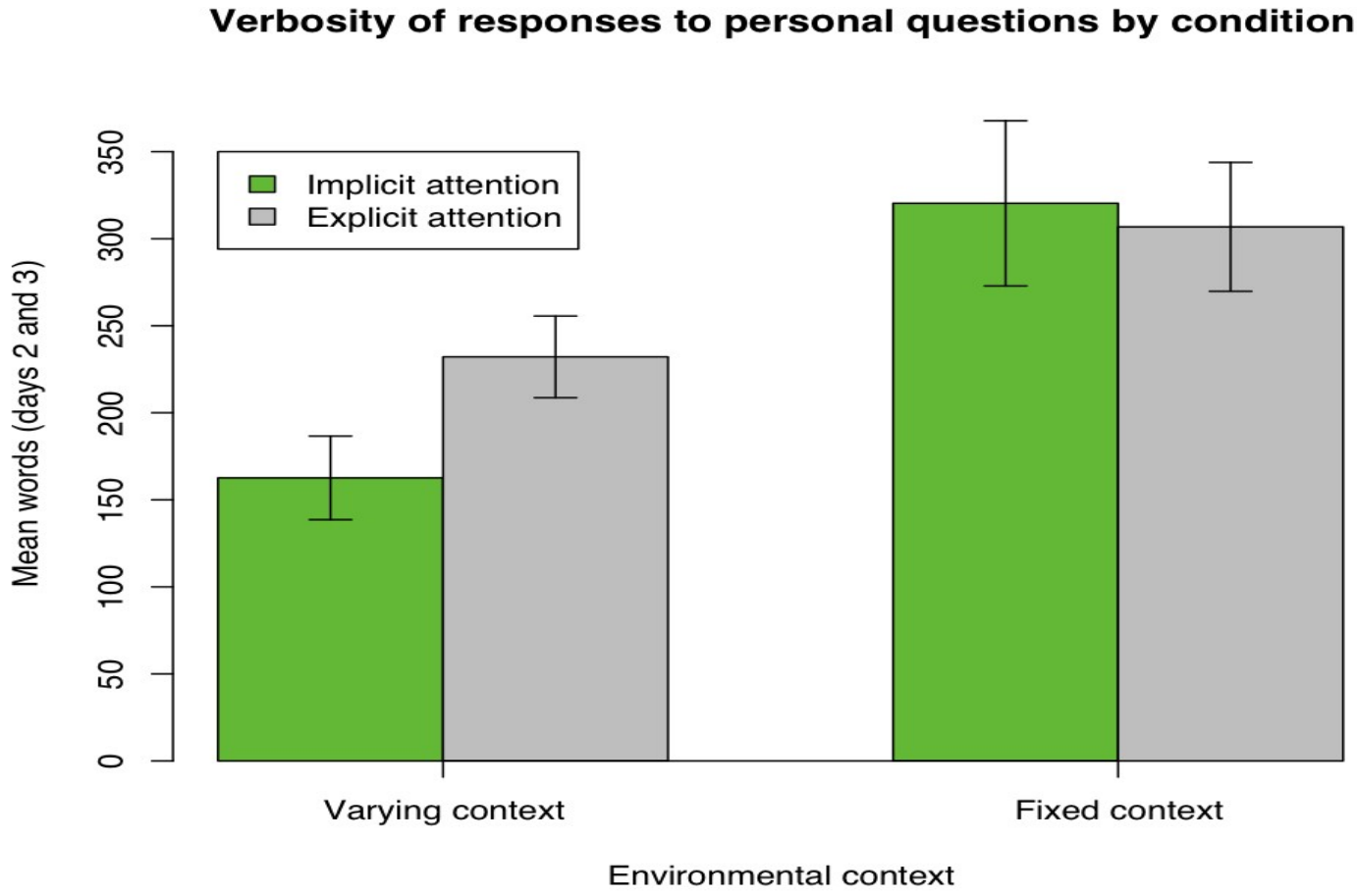
Learning Results



Creativity


Novel uses of everyday objects by condition
Implicit attention
Explicit attention
Mean novel uses (days 2 and 3)
0
5
10
15
20
25
Varying context
Fixed context
Environmental context

Disclosure


Verbosity of responses to personal questions by condition
Implicit attention
Explicit attention
Mean words (days 2 and 3)
0
50
100
150
200
250
300
350
Varying context
Fixed context
Environmental context

Discussion

- There is no simple relationship between task and mobility
  - How will other task types be affected?
    - Negotiation
    - Emotional conversations
    - Complex learning
  - Efficiency issues
- There is no simple relationship between task and priming

Contemporaneity

- Does *when* matter as much as *what*?
  - Twitter vs. Facebook
- People like people like themselves
  - Personality
  - Appearance
  - Activities
- Do people like people who temporally match themselves?

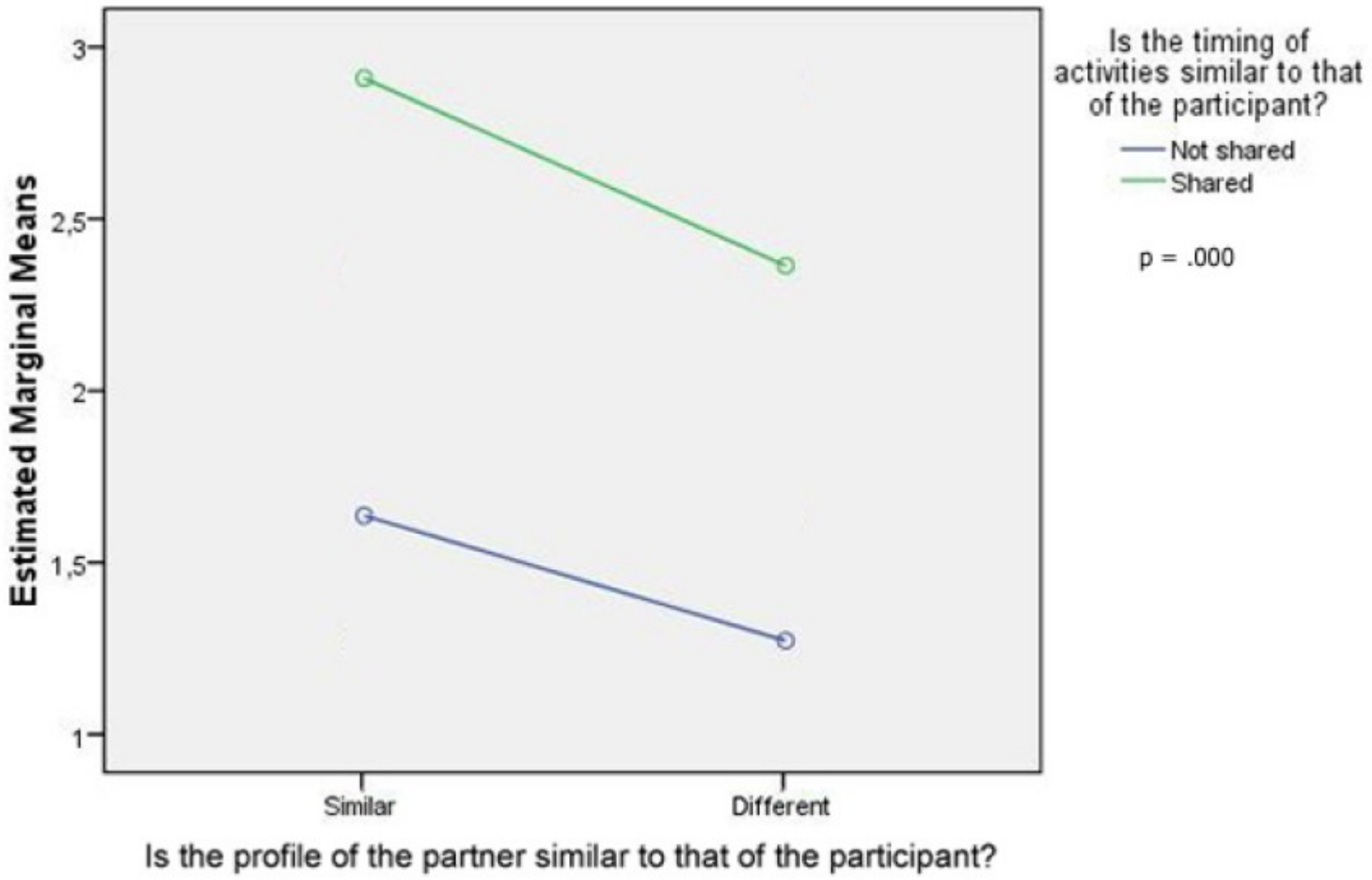
Context

- Six pings per day for five days
  - What are you doing now?
  - Here is what partner is doing
- People are told that they are paired with another person
  - Similar personality
  - Different personality
- 5 out of 6 event per day match
- Time of day matches or not

Method

- Independent variables
  - Who?
    - Similar vs. different
  - What?
    - Controlled so that mostly similar
  - When?
    - Same times or different times
- Dependent variables
  - Liking

Liking of Relationship



Discussion

- Time is powerful
- Manipulating time can be business opportunity

The Most Important Trend in Media

- Classical psychology says it is impossible
- Started with teenagers
- Moved from entertainment to business
- Growing at an ever-faster rate

Multitasking

Media Multitasking

- 26% of the time young people spend using one medium, they are concurrently using a second medium
- 61% of young people are using some form of media for fun while simultaneously doing their homework
- Of 12-34 year-olds watching the NBA or NCAA finals in 2007, two-in-three were simultaneously communicating with others using the Internet or a mobile device

Multitasking:
Inevitable step in 100+ year historical trend

New media product or service appears

↓

Steals time from

i) Media activities

ii) Non-media activities

↓

Used in **parallel** with other media activities

Multitaskers

- Media multitasking is becoming ubiquitous, but:
  - Humans have difficulty attending to multiple stimuli
  - Cognitive bottlenecks allow one decision-making process at a time
- How are habitual media multitaskers cognitively handling this load?

Implications of Growth of HMMs

- Design strategies must change
- Teaching strategies must change
- Advertising must change
- Media must change

Summary

- Handheld devices have a unique psychology
- Voices have social characteristics
- Mistakes are highly consequential
- Location matters
- Sensors are not a substitute for calendars, nor vice versa
- Multitasking is important social problem