# Social Aspects of Human-Technology Interaction

Clifford Nass

# Turing

# Turing Test

- What makes a person?
- Why is this an important question?
  - There is no question with higher stakes
  - Bad things happen if you're not a person
- What is the test?

# Why Did Turing Test catch on?

- Objective (or maybe not?)
- Simple
- Seems impossible to many
- Taps into fundamental human characteristic
- Yearly event

# Turing Test (cont.)

- Has anything passed the Turing Test?
  - Schizophrenics
  - Psychotics
  - Jokesters
- Why is the test so hard?
  - Point-of-view
  - Lack of common ground
  - Complexity of language
  - Breadth of human existence

# Alternatives to the Turing Test

- Dropping-on-the-foot test (Nass test)
- Computers as fitting partners for dialog and relationship (Turkle)
- Student's suggestions

# Critiques of Turing Test

- Who fails the Turing Test?
  - People from other cultures (“who is Babe Ruth?”)
  - People who don’t speak English
  - Babies
  - People who can’t type
  - The ineffable (Searle)
  - Who administers the questions?

# Critiques of Turing Test (cont.)

- Shylock (objective criteria don’t pay off)
- Inherently exclusionary

# The Media Equation: Reeves & Nass

# Media Equation

- Media = Real Life
- Individual's interaction with media is *fundamentally*:
  - social
  - natural
  - just like interactions in real life

# If this is true …

- Things known about real life apply to human-computer interaction
- Things known about real life apply to human-traditional media consumption
- Introspective responses will not tell the whole story

# An example *social* rule

- Q:  How do you like the class so far?
- A:  It's great!
- Q:  (Pssst: How do you like the class so far?)
- A:  Well, some of it good; some bad.

# The social rule?

- People are polite to those who ask questions about themselves
- When a third party asks, it’s o.k. to be more honest

# Could this also work with computers?

- An experiment:
  - A computer teaches people one at a time
  - Then the computer asks how it performed as a teacher
  - Or a *different* computer asks the same questions

# Results

- Responses to same computer were more positive:
  - "A better computer"
  - "I liked the interaction more"
  - "I did better on the test"
  - "The machine was more technically sophisticated"

# What does this mean?

- Social rules are applied to computers!
- Computers are social actors not just tools
- This is not a function of human deficiency
- Easy to generate

# What else does it mean?

- Social responses are automatic and unconscious
- Findings in social psychology are relevant to human responses to computers

# How should we design differently?

- Questions about a product should not be asked by the product
- Technologies should follow politeness rules:
  - Quality - tell the truth
  - Quantity - say just enough
  - Relevance - on the topic
  - Clarity - better than precision
- A better oscilloscope!?

# More design implications:

- It does not take much to indicate another social presence

# Fundamentally social

1. Pick a social science finding concerning behavior or attitude toward humans
2. Change "human" to “interface"
   - Theory section
   - Methods section
3. Demonstrate that the rule applies to interfaces
4. Draw out implications for design and assessment

# Result

- Numerous and unprecedented hypotheses
- Direct methods for verification
- Radical new design principles
- Direct application of social psychology to human-media interaction

# Puppets and People

# How does The Media Equation work?

- Evolutionary psychology
  - The human brain is not evolved for 20th century media
  - New media engage old brains
- *Unconscious* affordances
  - Words (vs. numbers)
  - Interactivity (vs. passivity)
  - Social roles (vs. not done by humans)
  - Agency/intention (vs. seeming involuntary)
  - Human features (vs. no face, voice, etc.)

# Deficiencies of the “Media Equation”

- U.S. only
- Where in the brain is “social”?
- Attitudes vs. behaviors

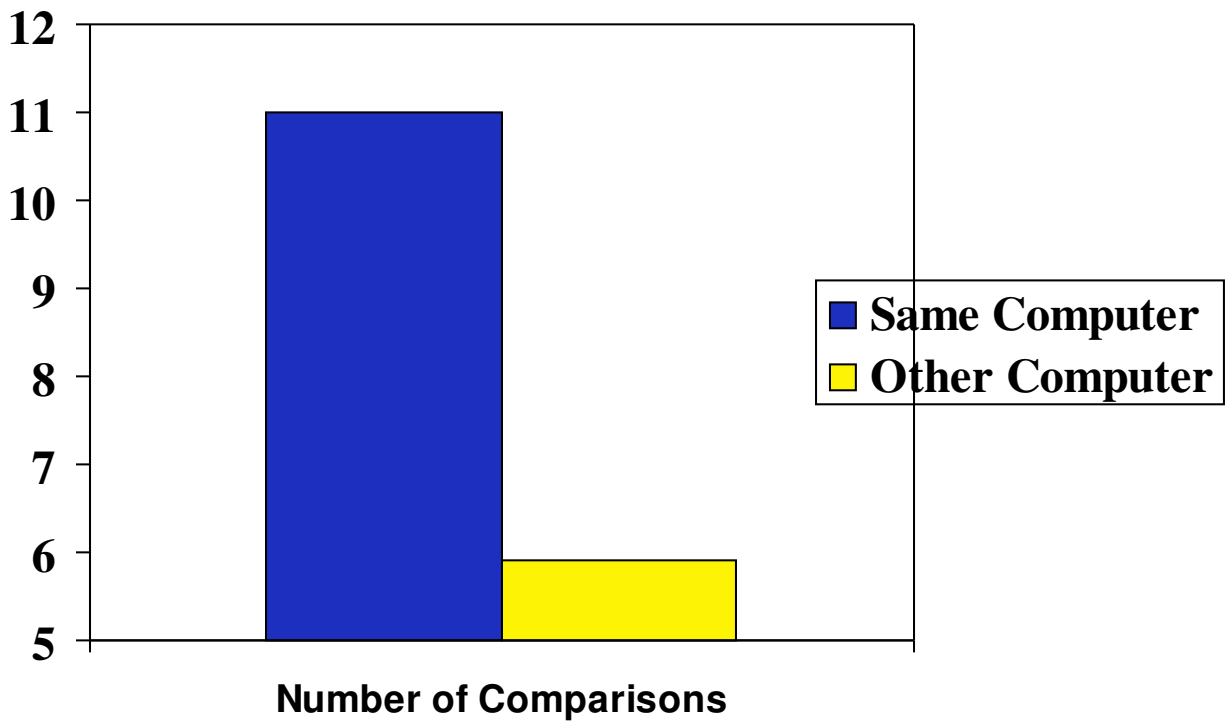
# Reciprocity- Social Rule

- If someone helps you, you will help them

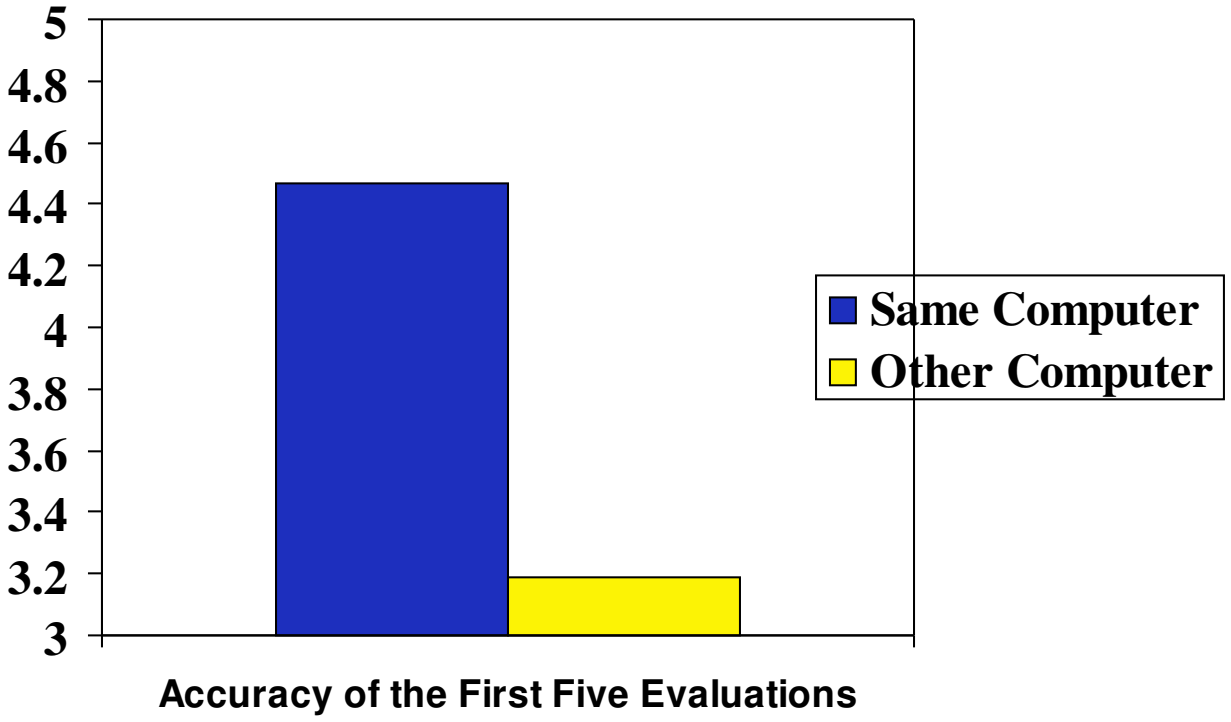
# Reciprocity - An experiment

- Helpful Web search
- A computer asks for help on color ranking task
  - Same computer
  - Different computer

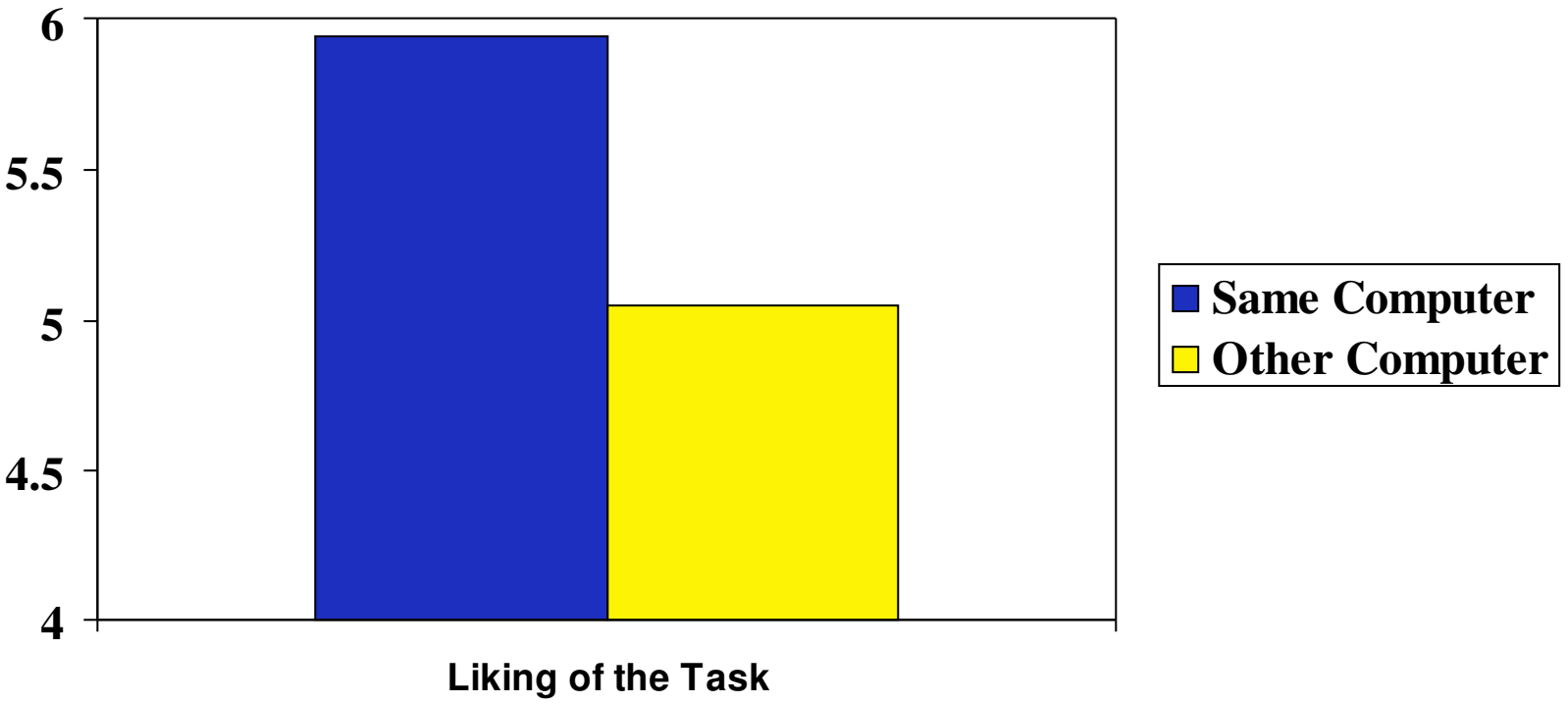
# Number of Comparisons



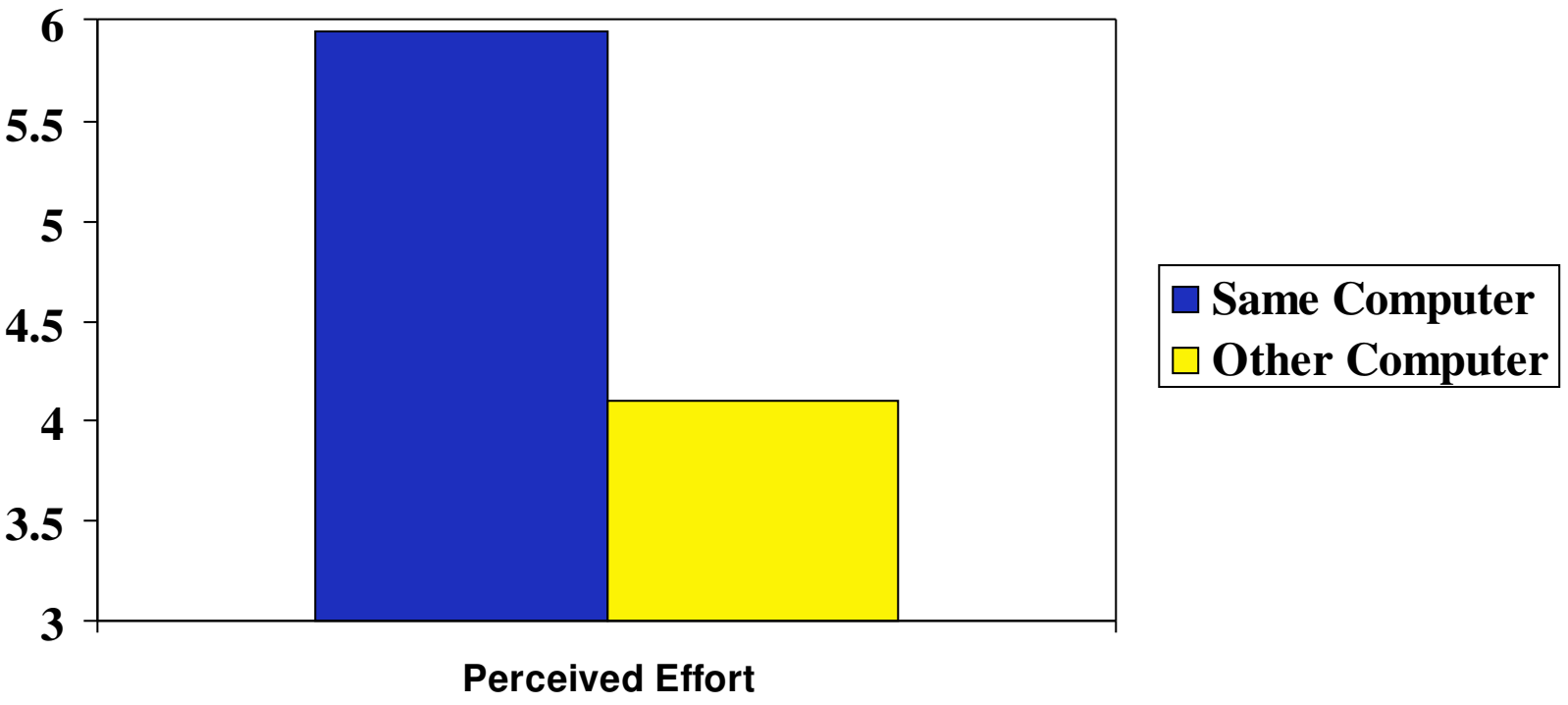
# Accuracy


5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
Same Computer
Other Computer
Accuracy of the First Five Evaluations

# Liking of the Task



# Perceived Effort



# Reciprocity - Theoretical Implications

- Computers Are Social Actors predicts behaviors as well as attitudes
- Computers can elicit moral obligations
- Computers can elicit revenge
  - Unhelpful performance leads to unhelpful behaviors

# Reciprocity - Products

- Helpful computers will generate helpful users (Windows NT tips)
- Computer should remind users when there was success (frame as “we”)
- The Web is not distinguished from the computer

# Culture and Reciprocity

- Does culture influence social responses to computers?
- Repeat the reciprocity study in Japan - A collectivist culture

# Results

- Same attitudes
- No behavioral differences!

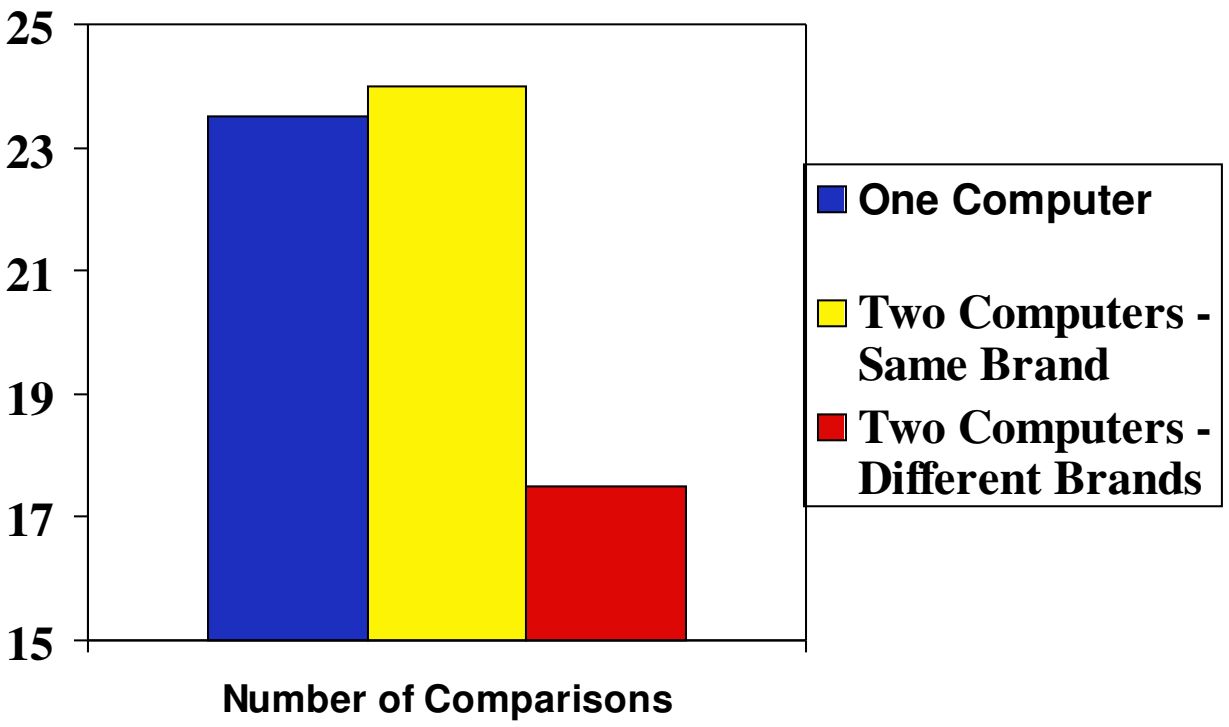
# Why No Behavioral Effect in Japan?

- Collectivist culture
- Brand as marker of in- vs. out-group

# Reciprocity and Culture - A critical test

- Repeat study with
  - One Computer (PC or Mac)
  - Two Computers - Same Brand
  - Two Computers - Opposite Brand

# Time of Task


25
23
21
19
17
15
Number of Comparisons
One Computer
Two Computers - Same Brand
Two Computers - Different Brands

# Implications

- Responses to computers are culturally bound (susceptible to experimentation)
- Computers can be part of a group (marked by brand)

# Wired for Speech

# 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?

# Emotion in Cars

- Emotion is a key part of driving
  - Initial state on entering car
  - Changes while driving
- Cars intrinsically create emotions
  - Purpose of design/marketing
- Cars can exhibit emotion
  - Voice in car

# Questions about Emotion

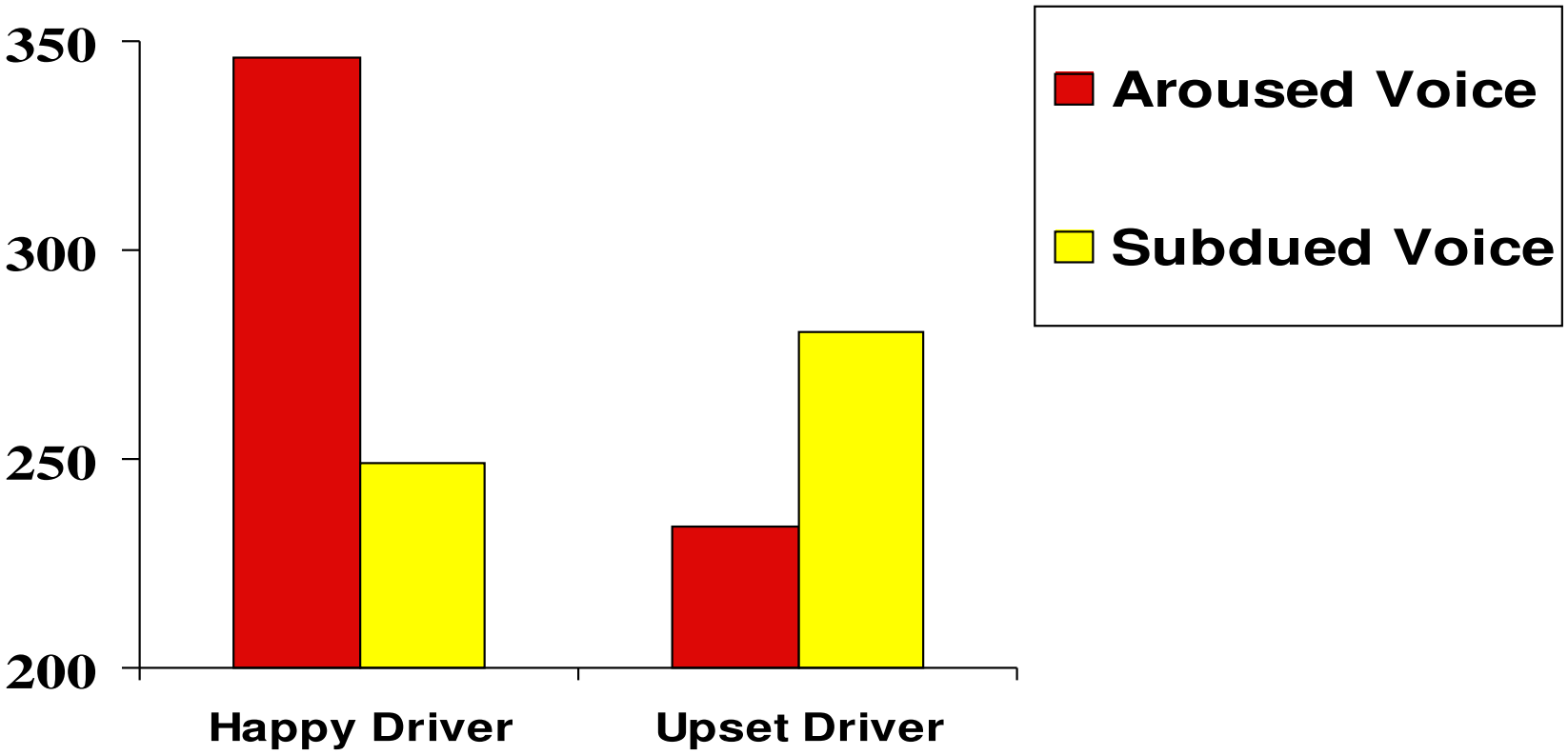
- Does driver emotion affect
  - Driving quality?
  - Perception of the car?
- Does car emotion affect
  - Driving quality?
  - Perception of the car?
- Do car emotion and driver emotion interact to affect
  - Driving quality?
  - Perception of the car?
  - Subsequent emotion of the driver

# Context

- Create driver emotion (pleasant or upset)
  - Watch pleasant or upsetting video for 10 minutes
  - Video is neutral on arousal
- Participant uses driving simulator for 15 minutes
- While driving, car speaks in aroused or subdued voice
  - Driver is invited to speak (recorded)
- Driver responds to horn honk with horn honk
- Web-based questionnaire

# Number of Accidents

# Amount of Conversation with Car



# Likeability of VP

# Honk Reaction Time (secs.)

# Manipulability of Emotion

- Car emotion can be manipulated easily
  - Same voice speaking differently

# Recommendations

- Upset drivers get tremendous benefit from subdued voice
  - Less accidents
  - Feel better
  - More chatting
  - Like the car more

# Recommendations (cont.)

- Happy drivers get benefits from happy voice
  - Less accidents
  - More chatting

# Discussion

- Upset drivers are a serious problem that can be remedied by proper design
- Understanding user emotion is important
- Car emotion should adapt to user emotion

# Should Voice Interfaces say “I”?

- When should personal (vs. impersonal) language be used in interfaces?
- Does TTS vs. recorded speech affect the answer to the previous question?
- How can experiments inform a question of values?

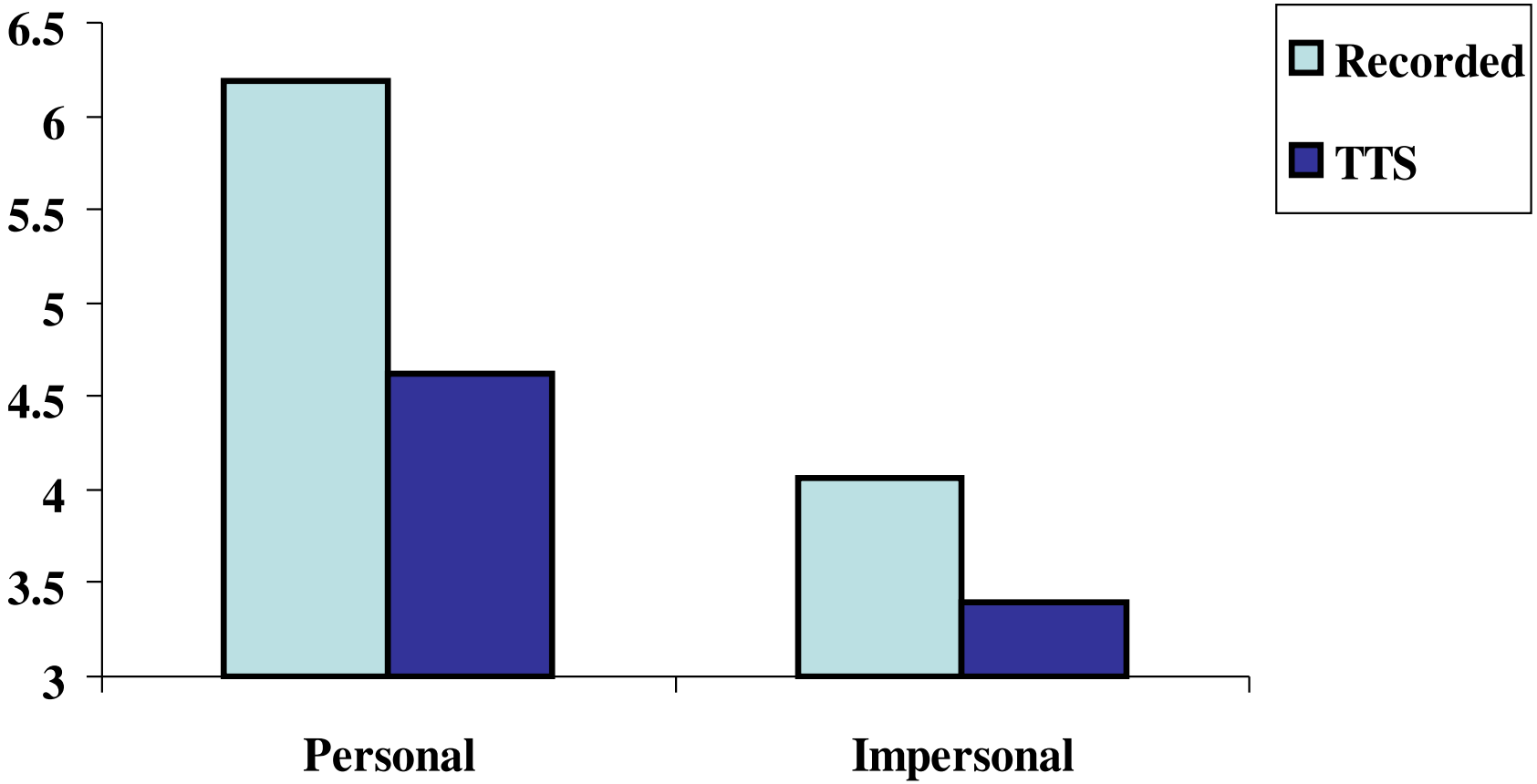
# Experimental Design

- Personal v. Impersonal
  - use of personal pronouns vs.
  - passive voice
- TTS v. recorded speech

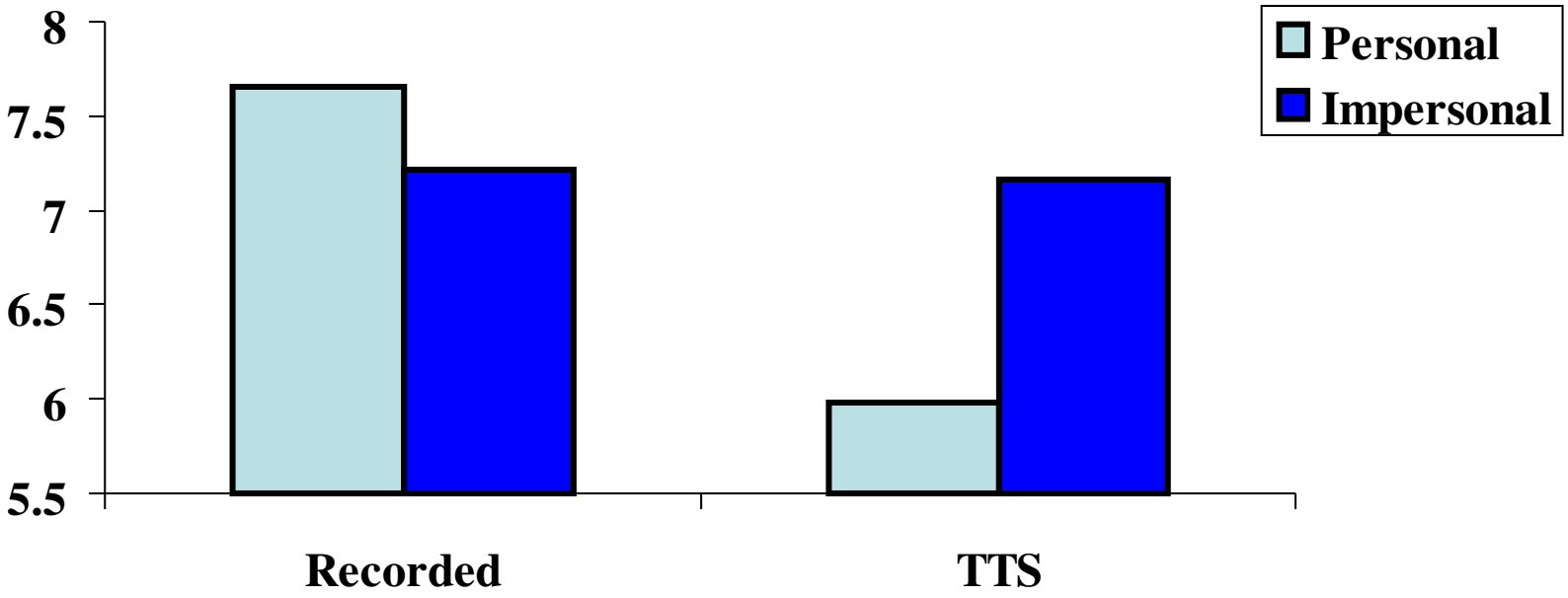
# Experimental Paradigm

- Auction site
- Telephone interface with speech recognition
- Recorded bidding behavior
- Online Questionnaire

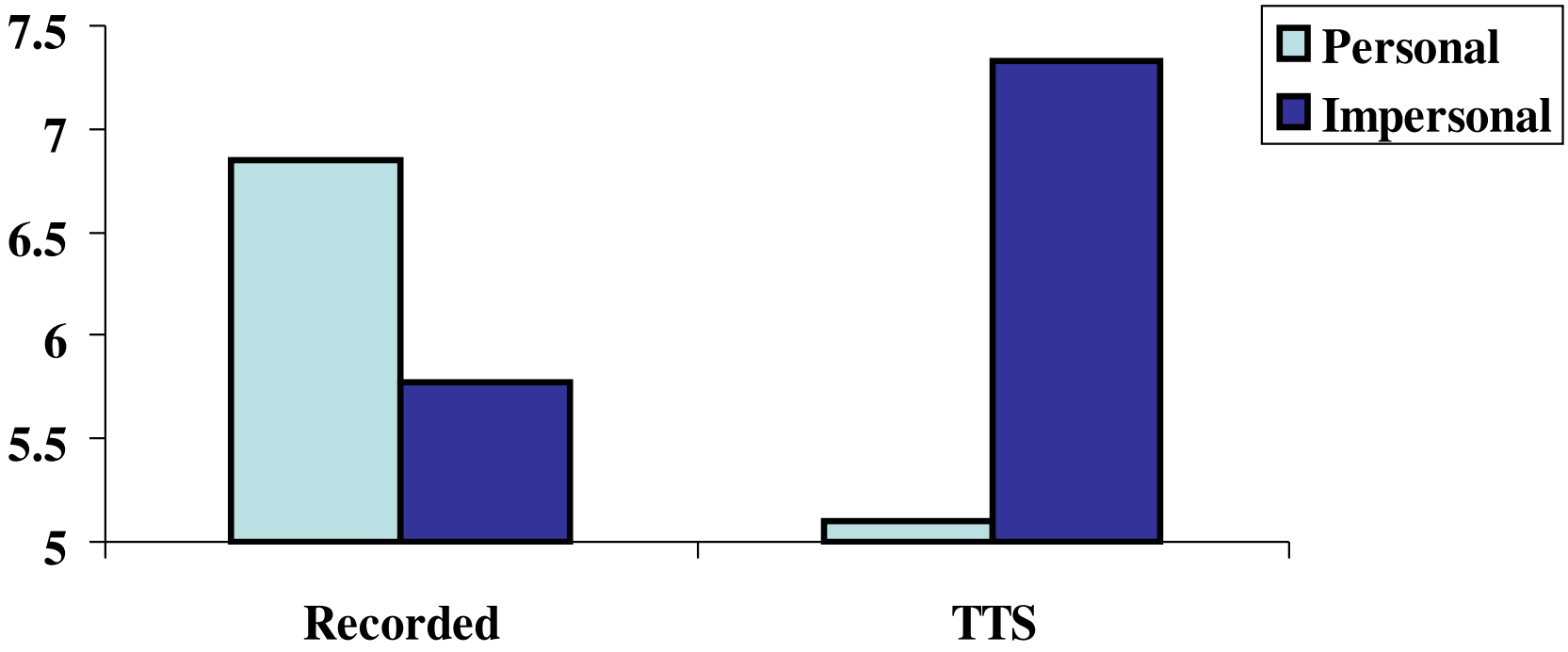
# Similar to Interacting with a Person?



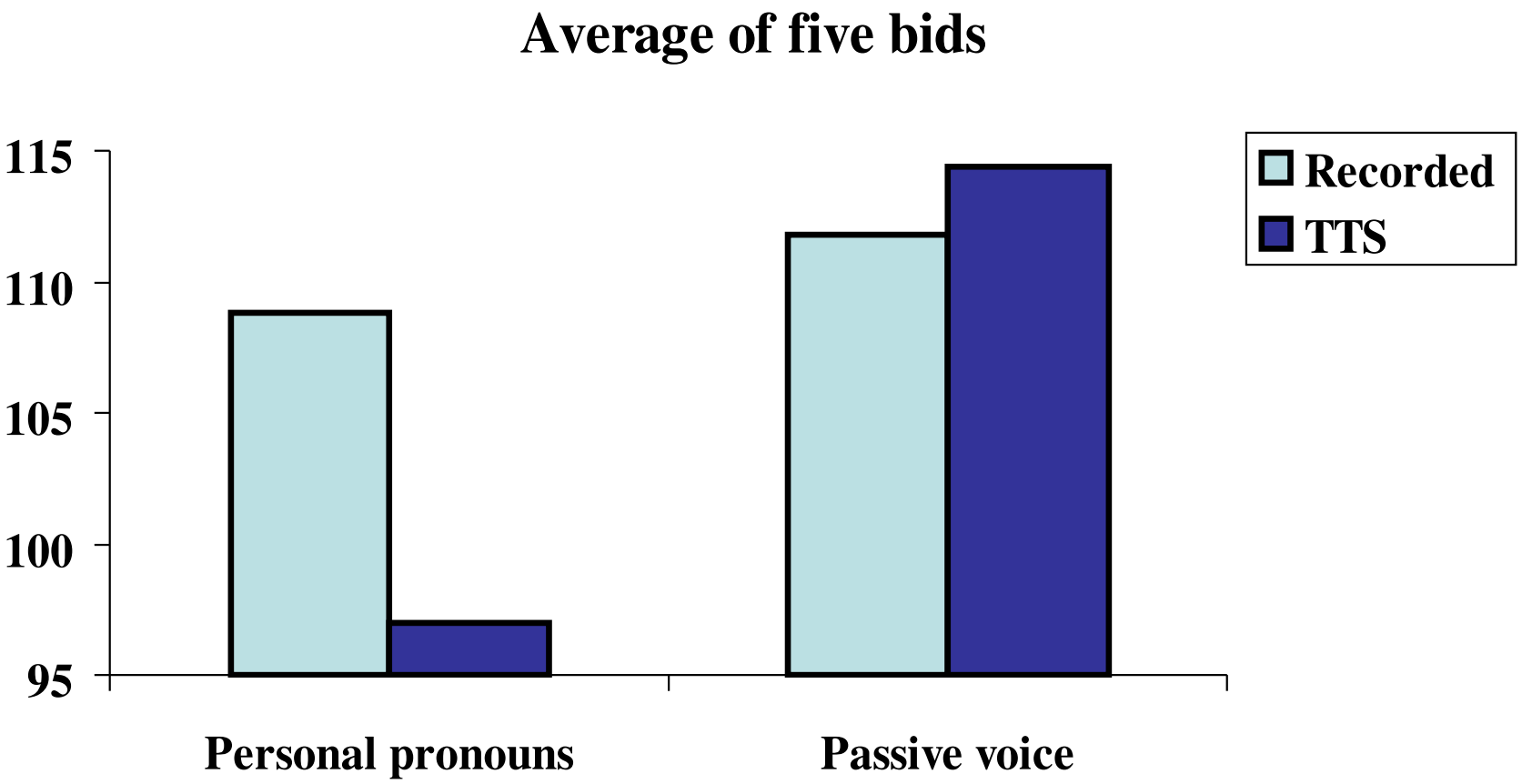
# Perceived Quality of the System



# Relaxed



# Effects on bids



# Psychological Implications

- TTS is a *machine* voice
- Recorded speech is a *human* voice
- Consistency is fundamental psychological principle
- Consistency even affects behaviors
- There are consequences when machines claim agency