Matching Robots to Tasks

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Premise: The design of a humanoid robot’s appearance and demeanor will influence people’s acceptance and cooperation with it.
Research questions

• Should a robot that interacts with people look as humanlike as possible?

• Should a robot act as cheerful, friendly, and playful as possible?

• Positivity hypothesis vs matching hypothesis from the social psychology and medical literature.
3 studies reported here

study 1
Matching a robot’s appearance to the robot’s job.

study 2
Compliance with a playful or serious robot.

study 3
Matching a robot’s demeanor (playful or serious) to the task (fun vs. serious).
Study 1: Which of these robots are more suitable for different jobs?*

- Compared 6 categories of jobs varying in social interaction.
- Robot heads presented in pairs.

Example: “Which robot would be more suitable for the job of . . . security guard?”

Results: Judgments match population stereotypes

More suitable for social and artistic jobs such as retail clerk, hospital messenger, or food carrier*

More suitable for investigative and security-related jobs such as lab assistant, guard, and soldier*

*Main effect of style and career category was statistically significant, p<.0001
Study 2. Pearl leads exercise.

Playful:
“Close your eyes...Relax... Breathe in...Don’t forget to breathe out. I don’t want you to pass out!”

Serious:
“Close your eyes...Relax... Breathe in...Breathe breathe out. Do you feel relaxed?”

Compliance = time doing own exercise.
Results of Study 2.

- The serious robot was rated as more conscientious (manipulation check).
- The serious robot led to significantly longer compliance.
- One explanation is that the playful robot was a poor fit for the task. Exercise is effortful and requires justification.
Study 3. Comparing the exercise task with a fun jellybean task

Logic of this study:
If the matching hypothesis is valid, then the playful robot should be more effective when the task is intrinsically enjoyable. The serious robot should be more effective when the task is effortful and requires justification.

- Pretested many fun tasks
- Created 2 x 2 design
Results: Compliance with Pearl Robot

Studies support the matching hypothesis.
Conclusions

• One-size-fits-all design of a humanoid will not achieve best results.

• Experiments suggest both appearance and demeanor of a robot influence how people will interact with it.

• Match the robot with the task it will do and the intended relationship with the user.
Future Project Work in Human-Robot Interaction

- Design of robotic products
  Jodi Forlizzi, CMU (tomorrow’s talk)
- Robots in work relationships
  Pamela Hinds, Stanford University
- Anthropomorphism
  Attributions of purpose and reason
  Knowledge estimation - Sau-lai Lee
  Attachment
  Anthropomorphic form - Francine Gemperle
- Studies of Lifelikeness - Carl DiSalvo
Advertisement: Special journal issue - *Human-Computer Interaction*

- Special issue on human-robot interaction
- Scheduled Jan 2004
- Authors
  - Sebastian Thrun
  - Jodi Forlizzi, Carl DiSalvo, & Francine Gemperle
  - Takayuki Kanda, Takayuki Hirano, Daniel Eaton, & Hiroshi Ishiguro
  - Jennifer Burke, Robin Murphy, Michael Coovert, & Dawn Riddle.
  - Holly Yanco, Jill Drury, & Jean Scholtz.
  - Pamela Hinds, Terry Roberts, & Hank Jones.