User-based evaluation and usability testing in cognitive ergonomics

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Research team "Cognitive Ergonomics"

Research expertise: Analysis and design of technology used at work and in the domestic domain

Overview

- Introduction
- Theoretical background
- Empirical research: Factors of influence
  - Prototype fidelity
  - Aesthetics
 - Set-up of laboratory
  - Culture and price
- Future work in IM2

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Field- and laboratory-based usability testing for formative and summative evaluation

Introduction
Background
Empirical research
Future work

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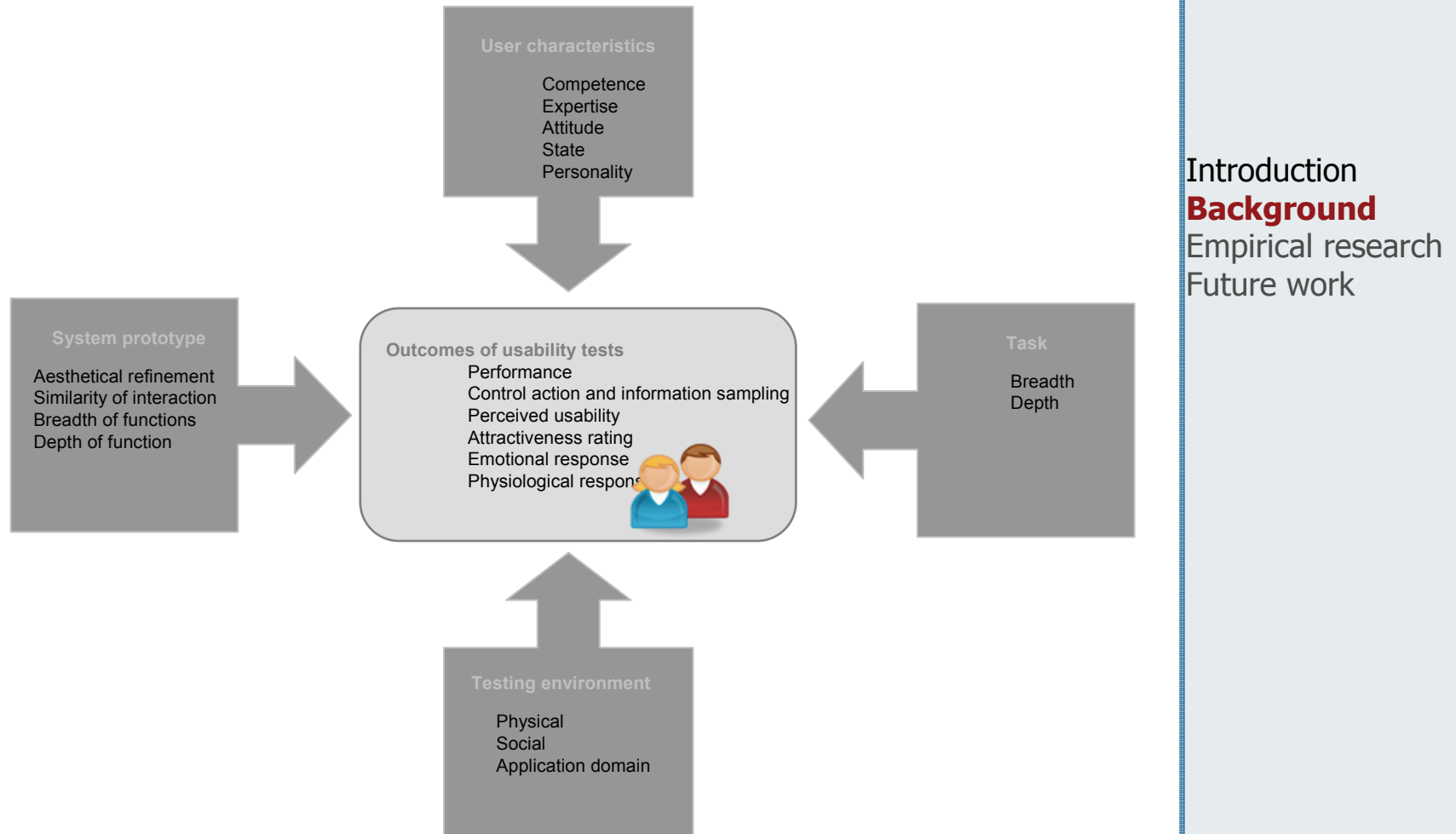*IM2 Summer Institute, Chavannes-de-Bogis, 31st Aug – 2nd Sept 2009*
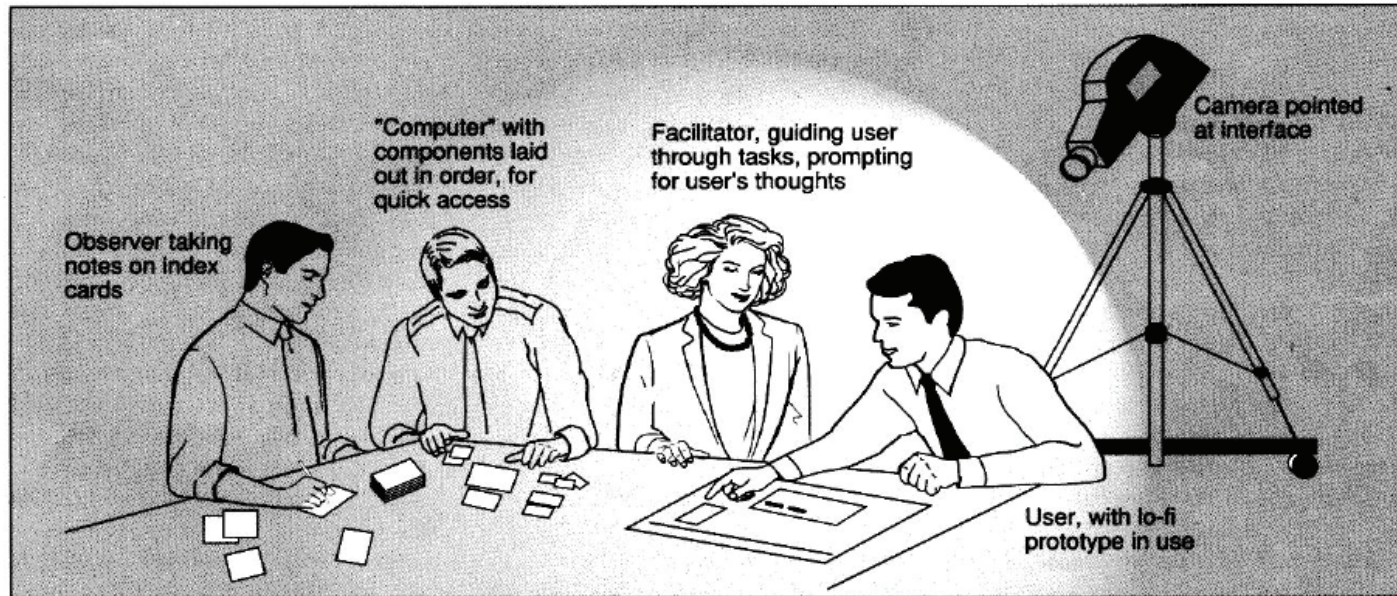
Multi-modal technologies in usability testing: Evaluation of multiple outcome measures

- User performance (e.g. task completion time)
- Perceived usability (i.e. subjective user rating)
- Information sampling and control action
- Emotion
- Perceived attractiveness
- Physiological responses (e.g. heart rate variability)

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Four-factor framework of contextual fidelity
(Sauer, Seibel & Rüttinger, 2009)

User characteristics

Competence
Expertise
Attitude
State
Personality

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System prototype

Aesthetical refinement
Similarity of interaction
Breadth of functions
Depth of function

Outcomes of usability tests
Performance
Control action and information sampling
Perceived usability
Attractiveness rating
Emotional response
Physiological respons

Task

Breadth
Depth

Testing environment

Physical
Social
Application domain

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Usability testing: Examples of interactive consumer products

Modelling task scenarios

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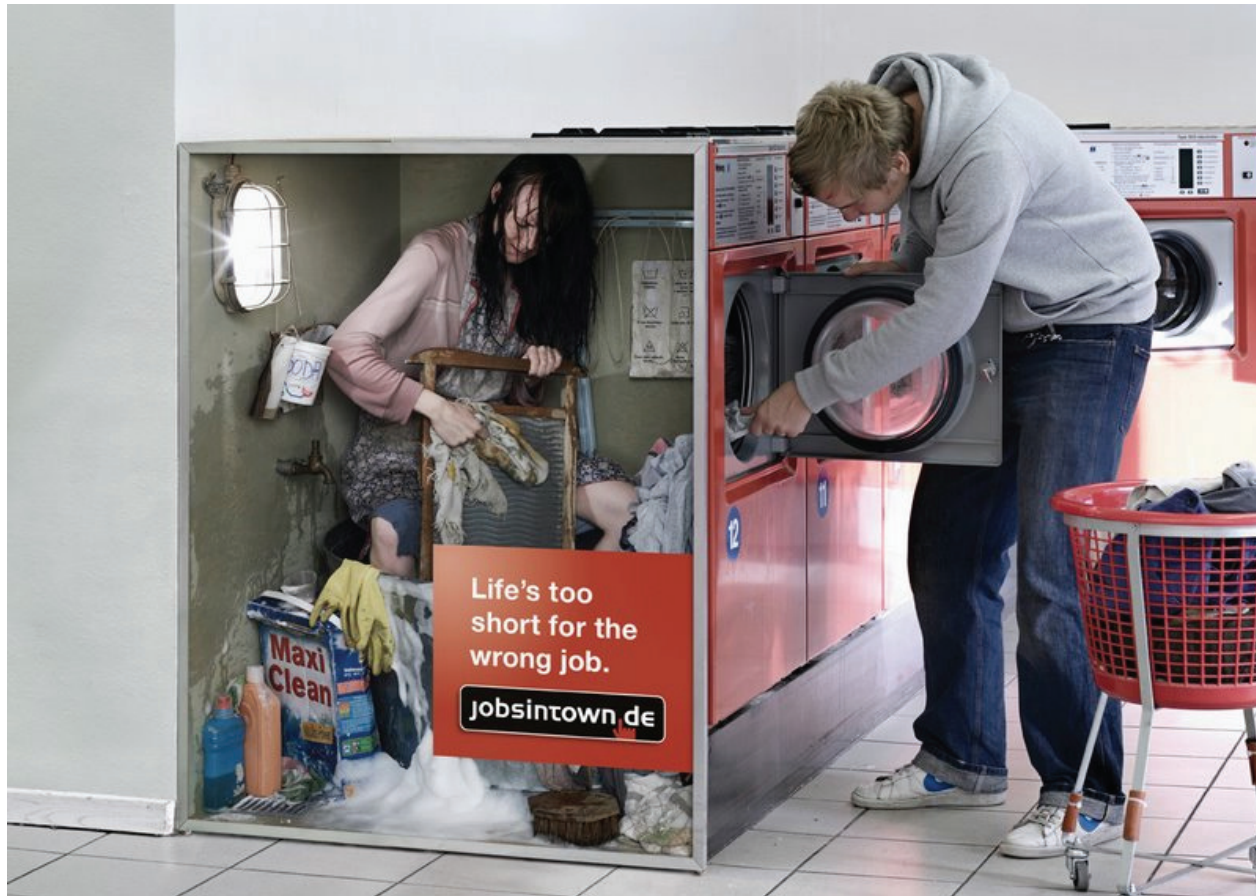
Study 1: Prototypes of different fidelity levels

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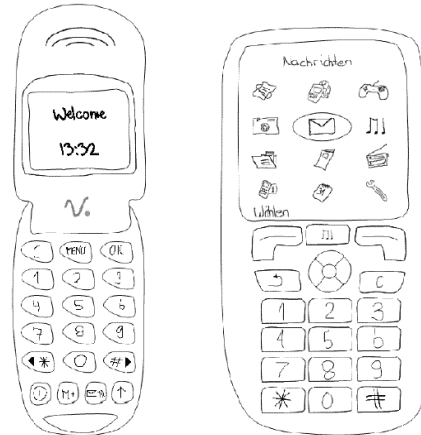
Study 1: Usability rating
(Multimetrix; Willumeit, Gediga & Hamborg, 1995)
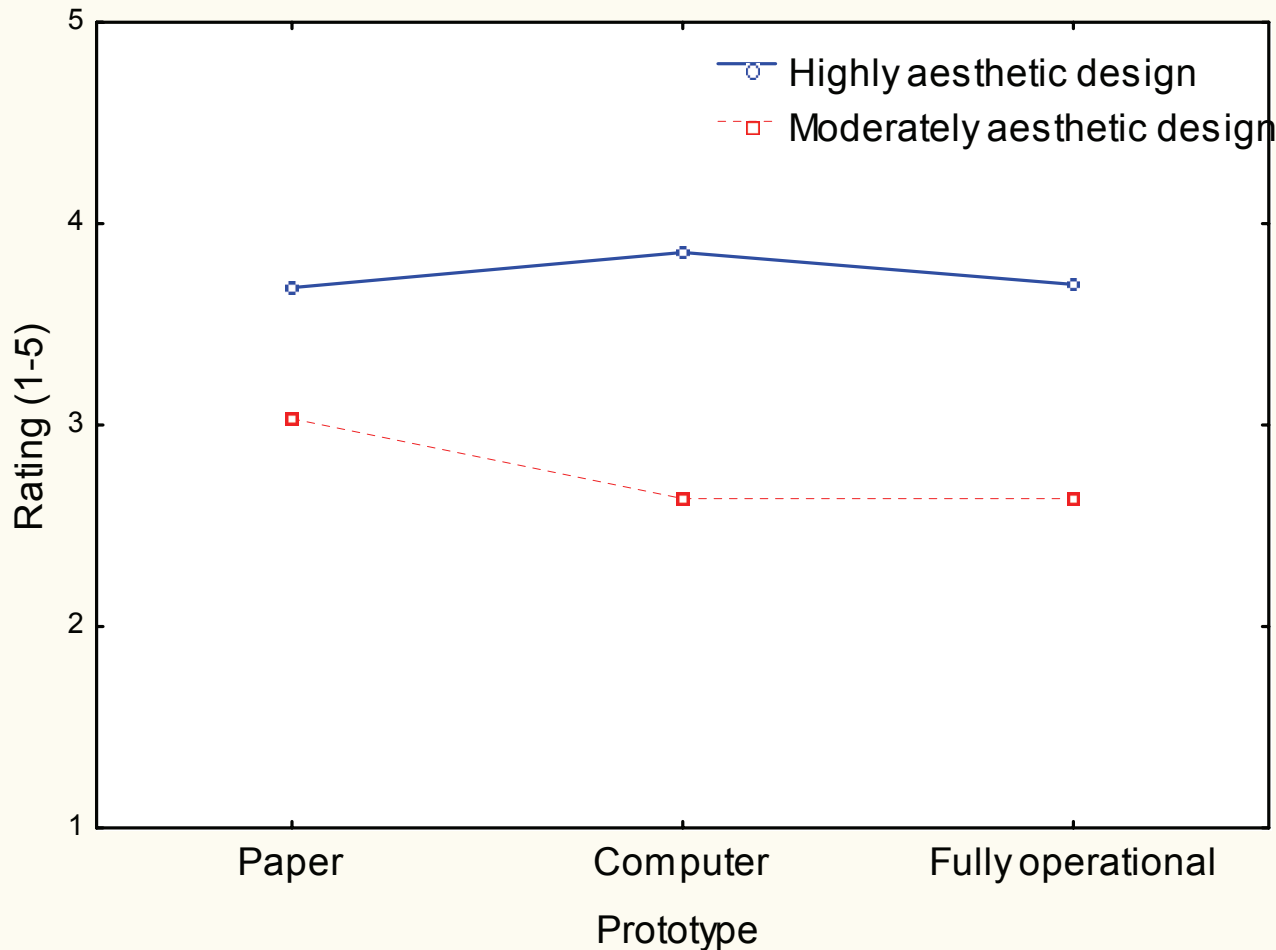
Study 1: Rating of product atttractiveness
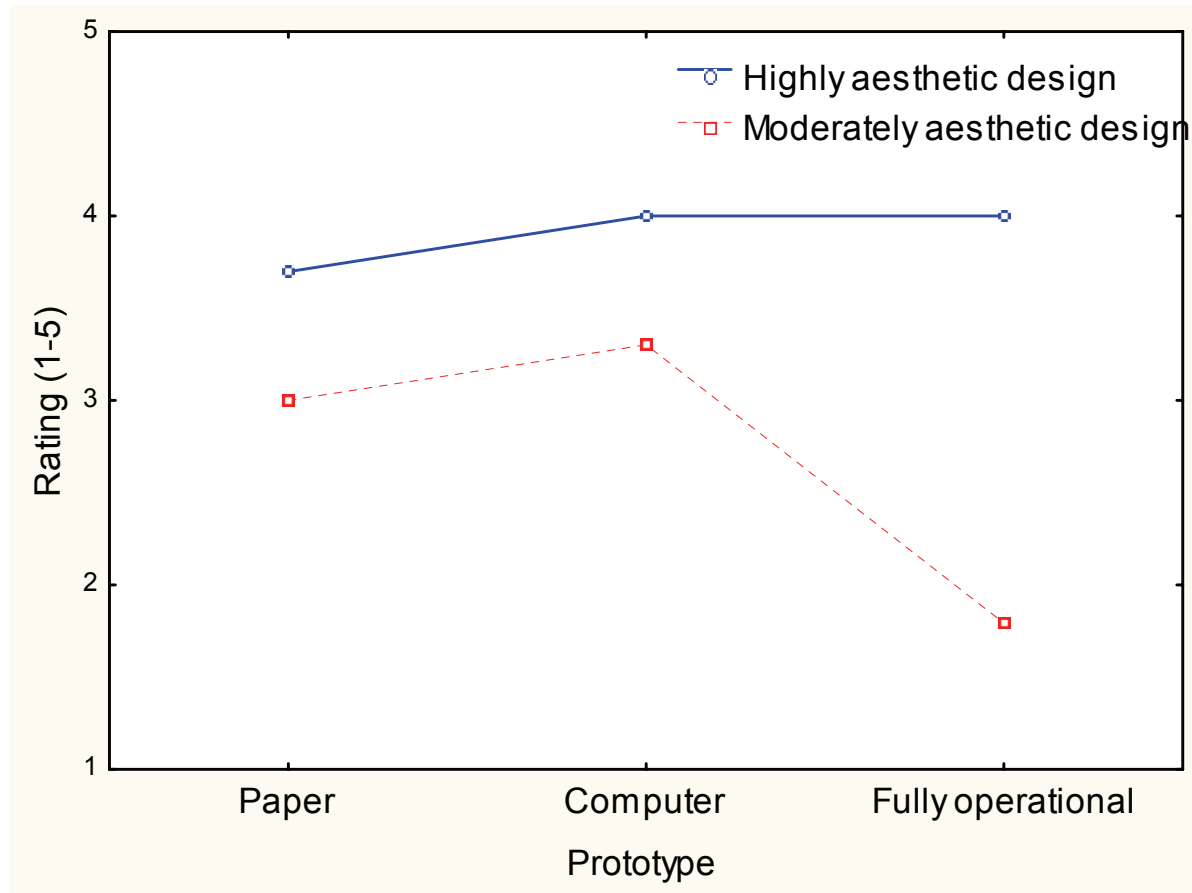
Study 2: Influence of aesthetics using real products

Study 2: Usability rating
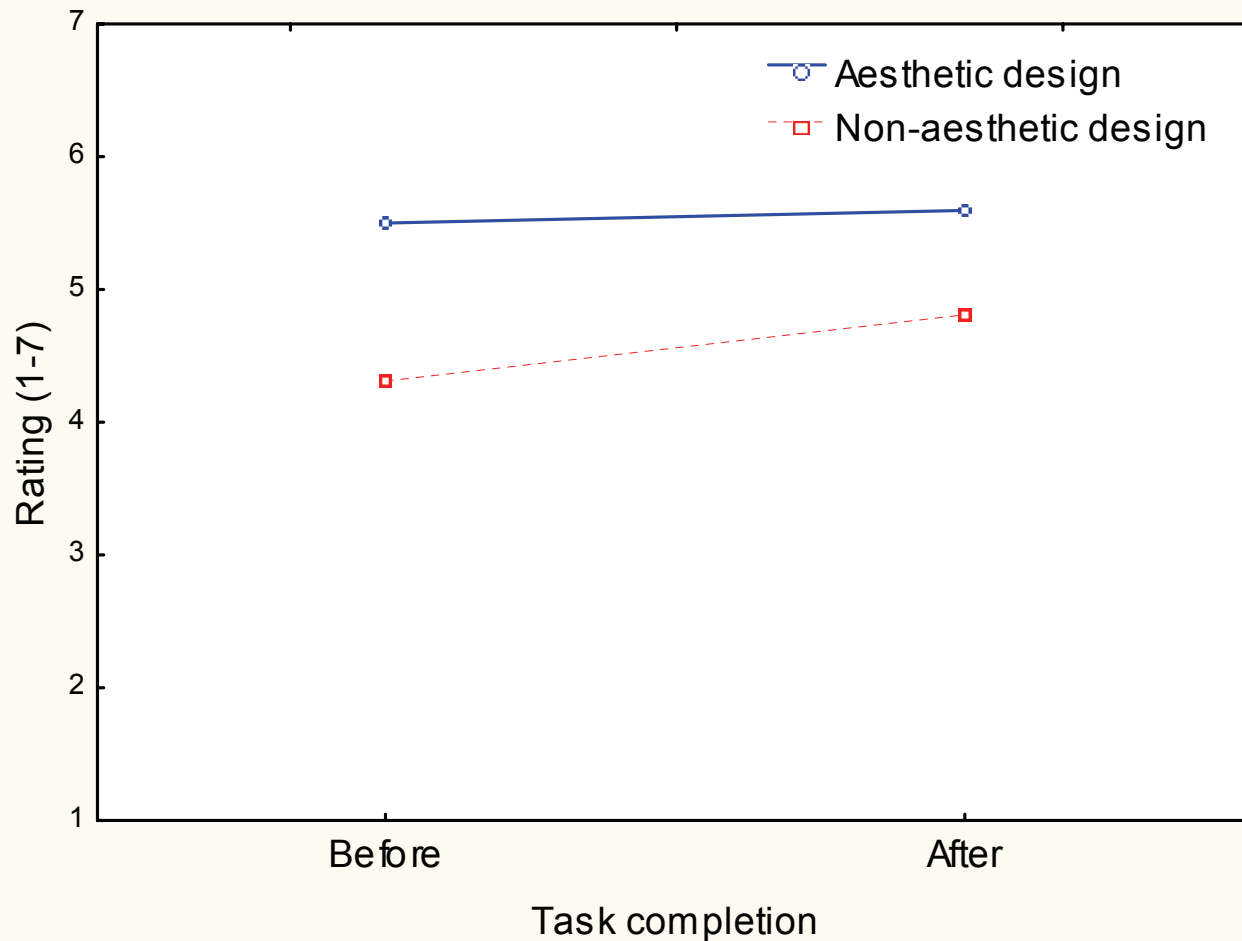
Study 2: Task completion time
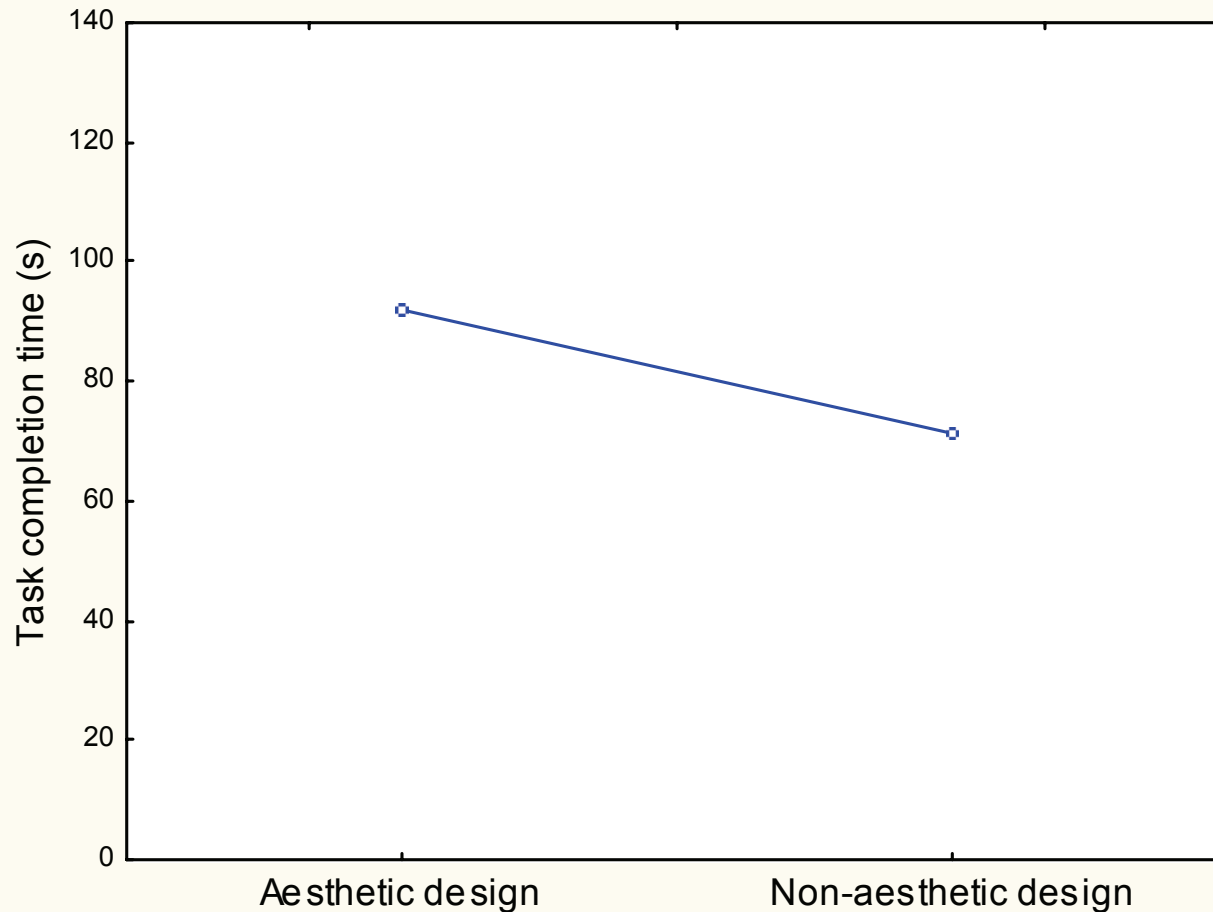
Study 3: Influence of aesthetics using computer-simulated prototypes

Study 3: Attractiveness ratings
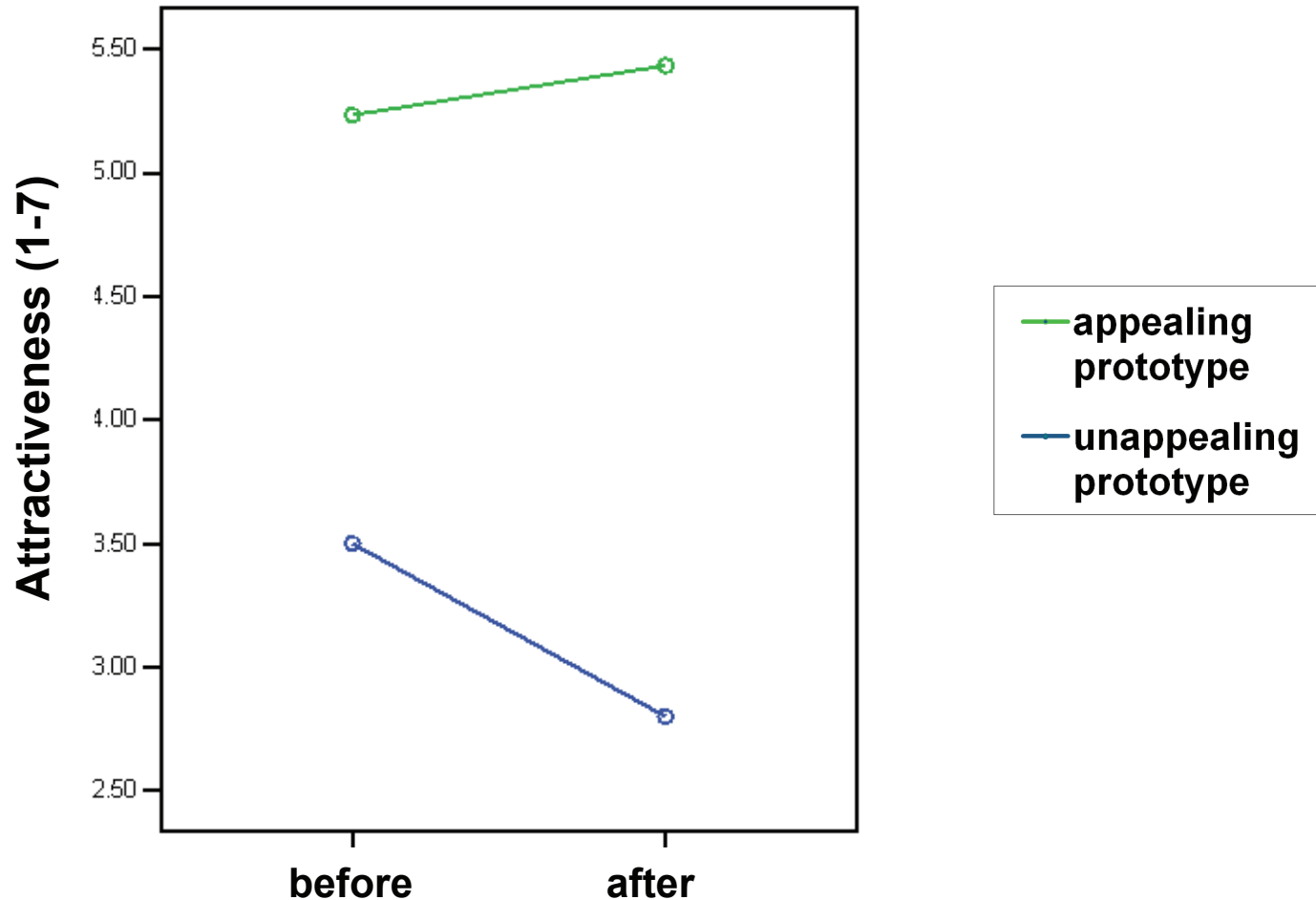
Study 3: Perceived usability
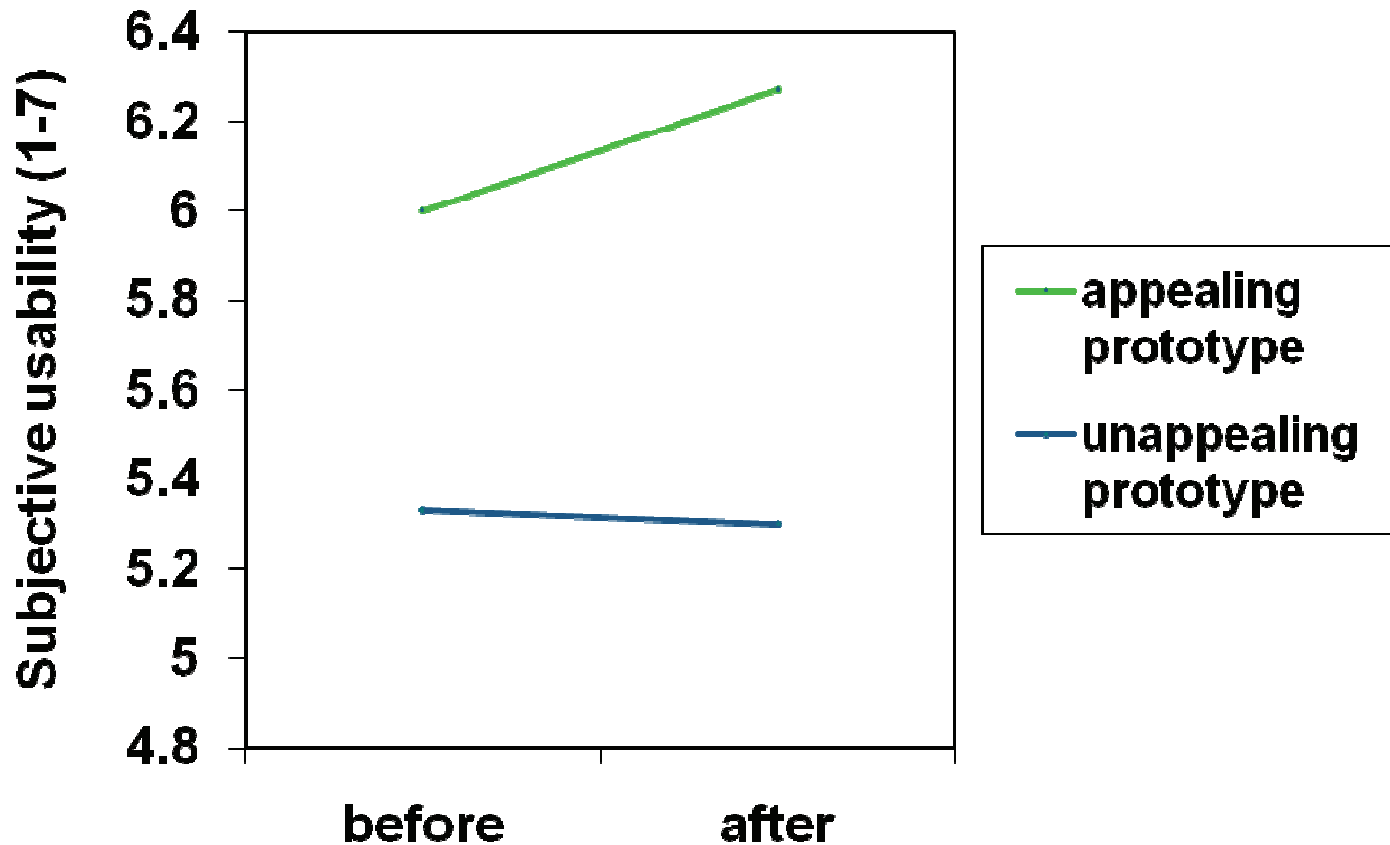
Study 3: Task completion time
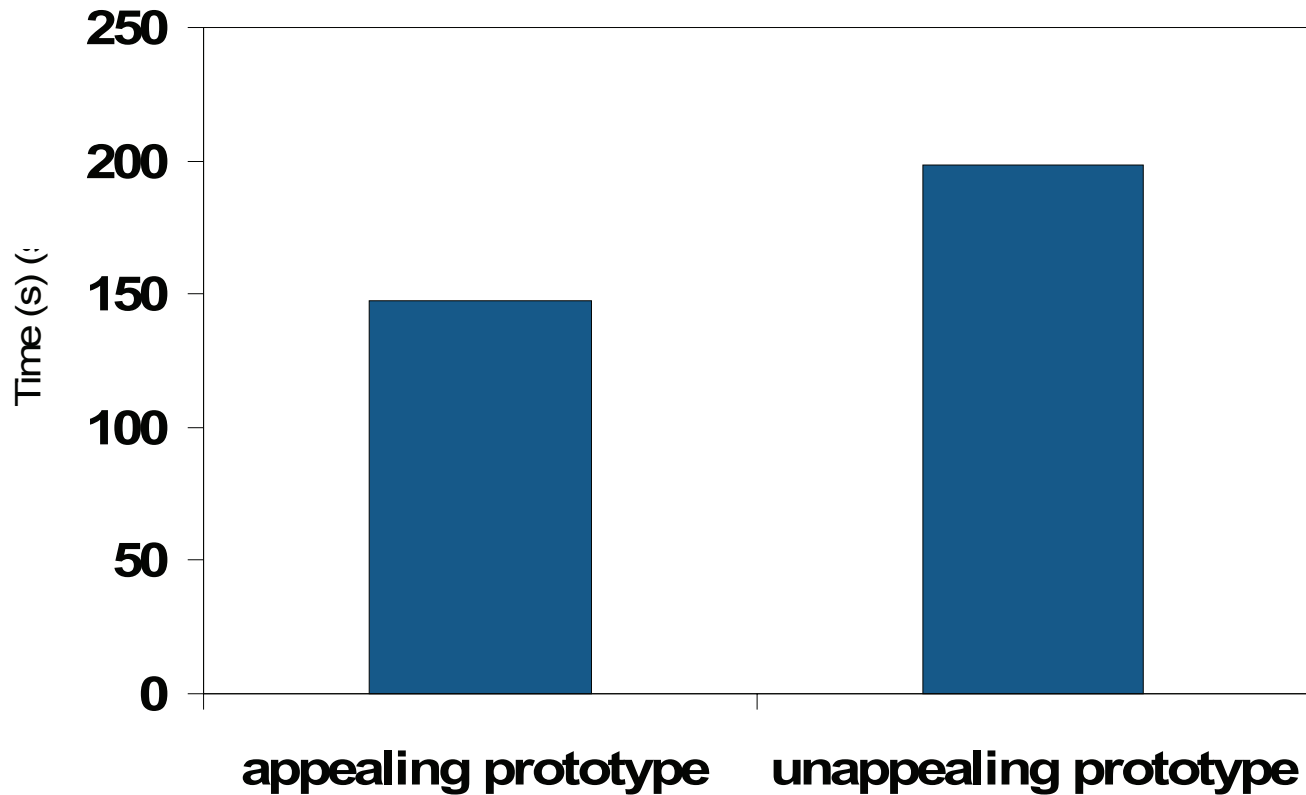
Study 4: Influence of observer presence in usability laboratory

1 observer

3 observers

No observer

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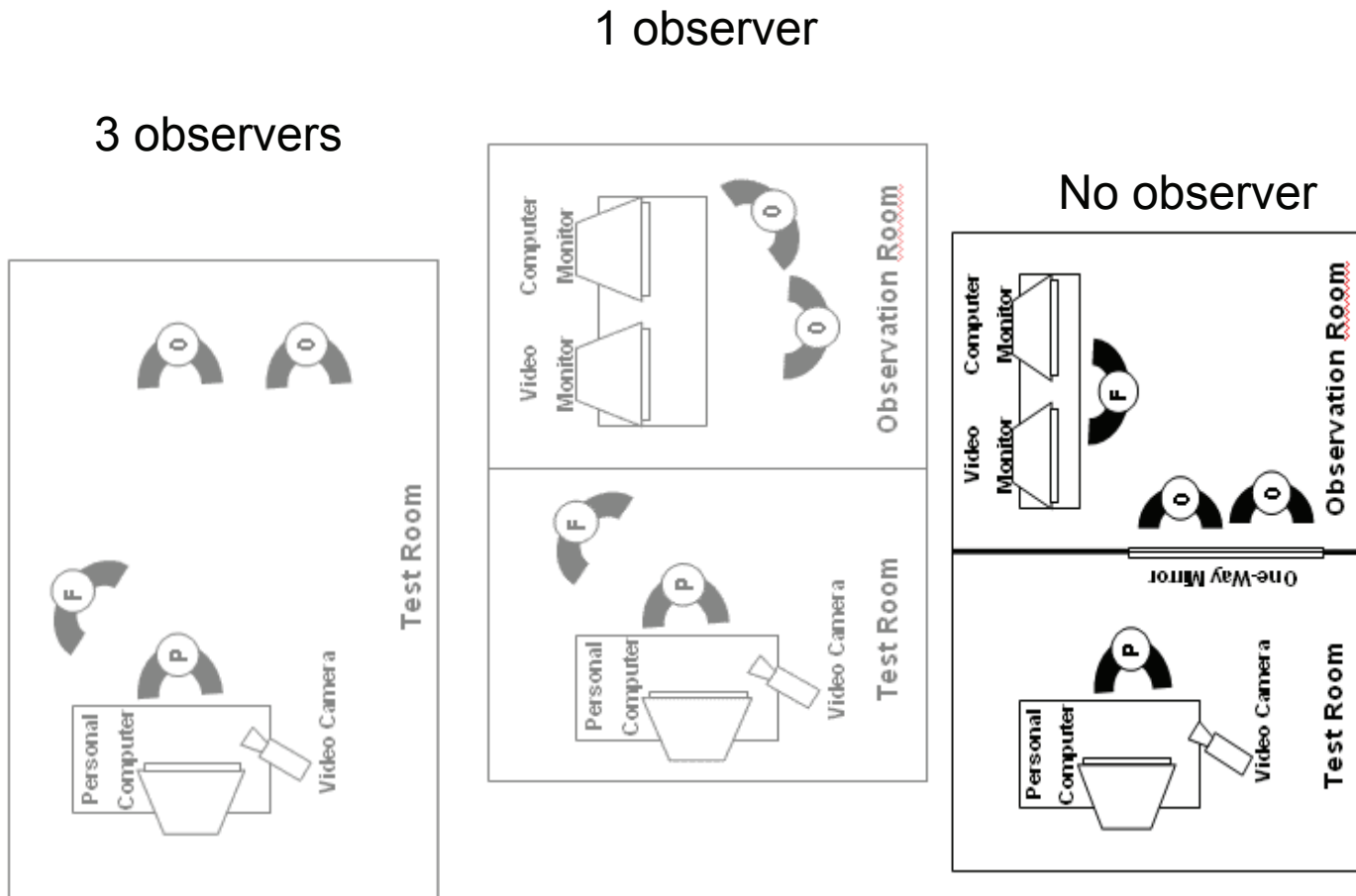
Study 4: Valence of emotion
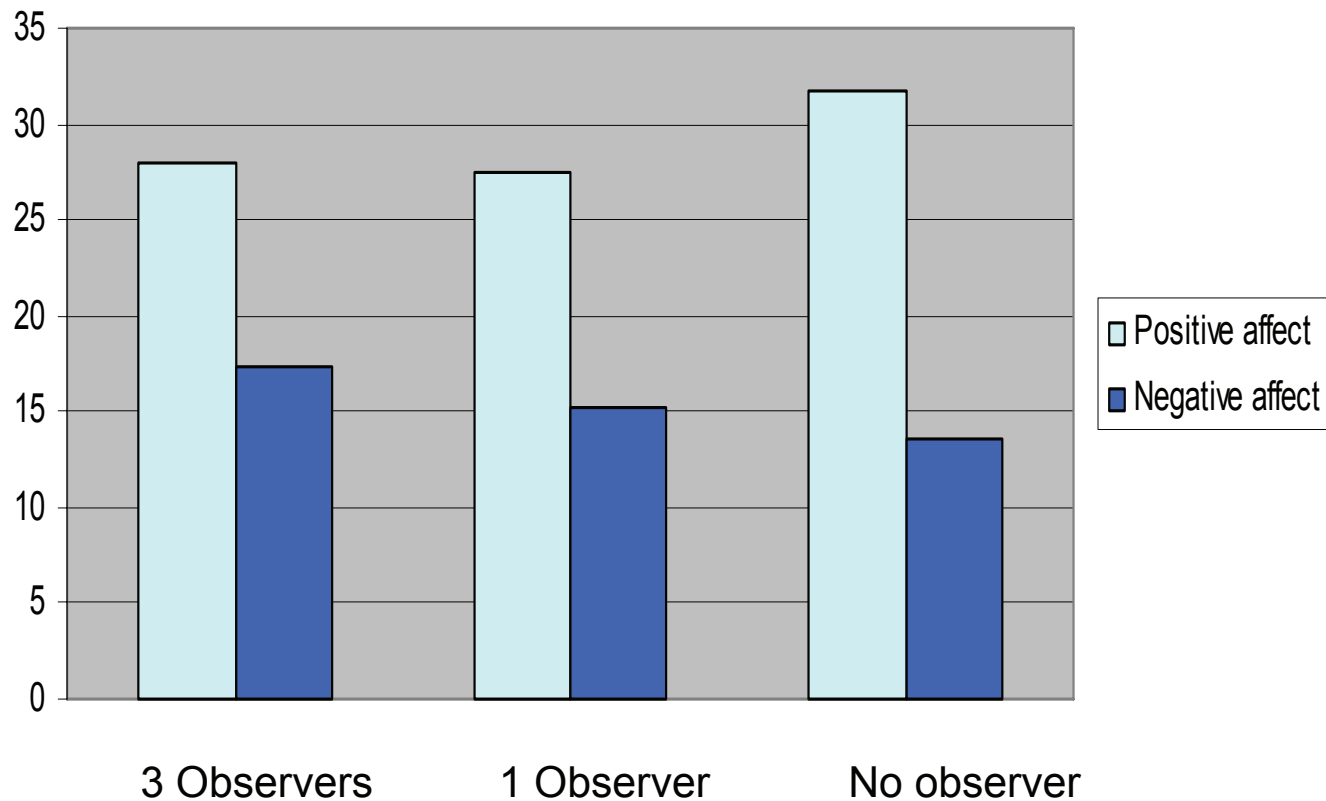
Study 4: Performance
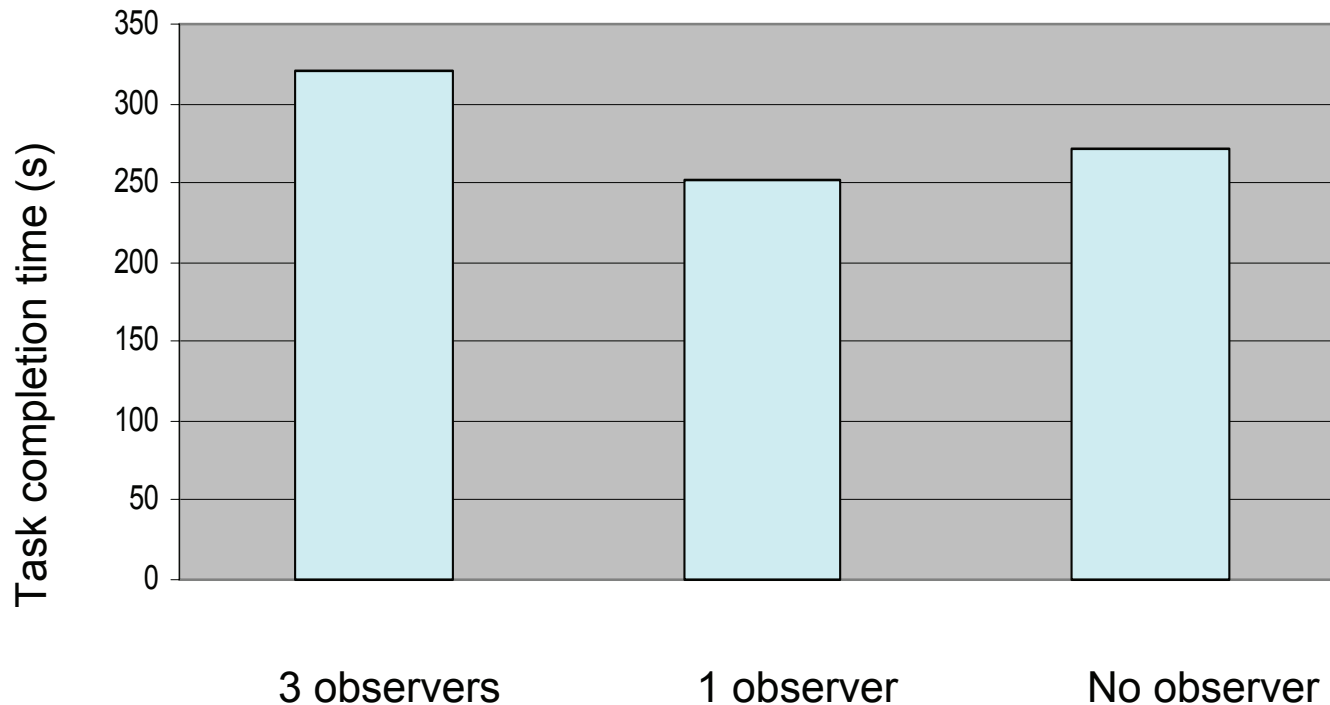
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Study 4: Heart rate variability
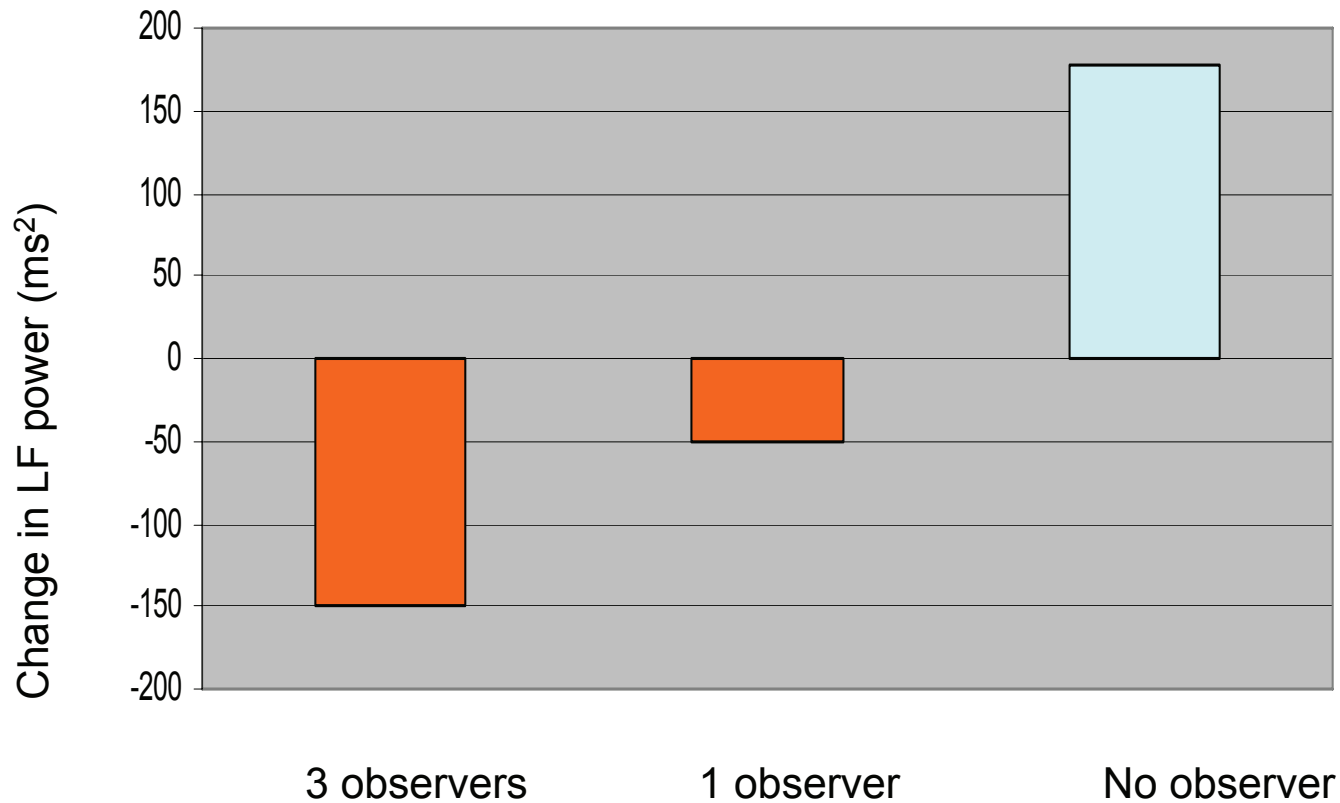
Study 5: Influence of culture and product price
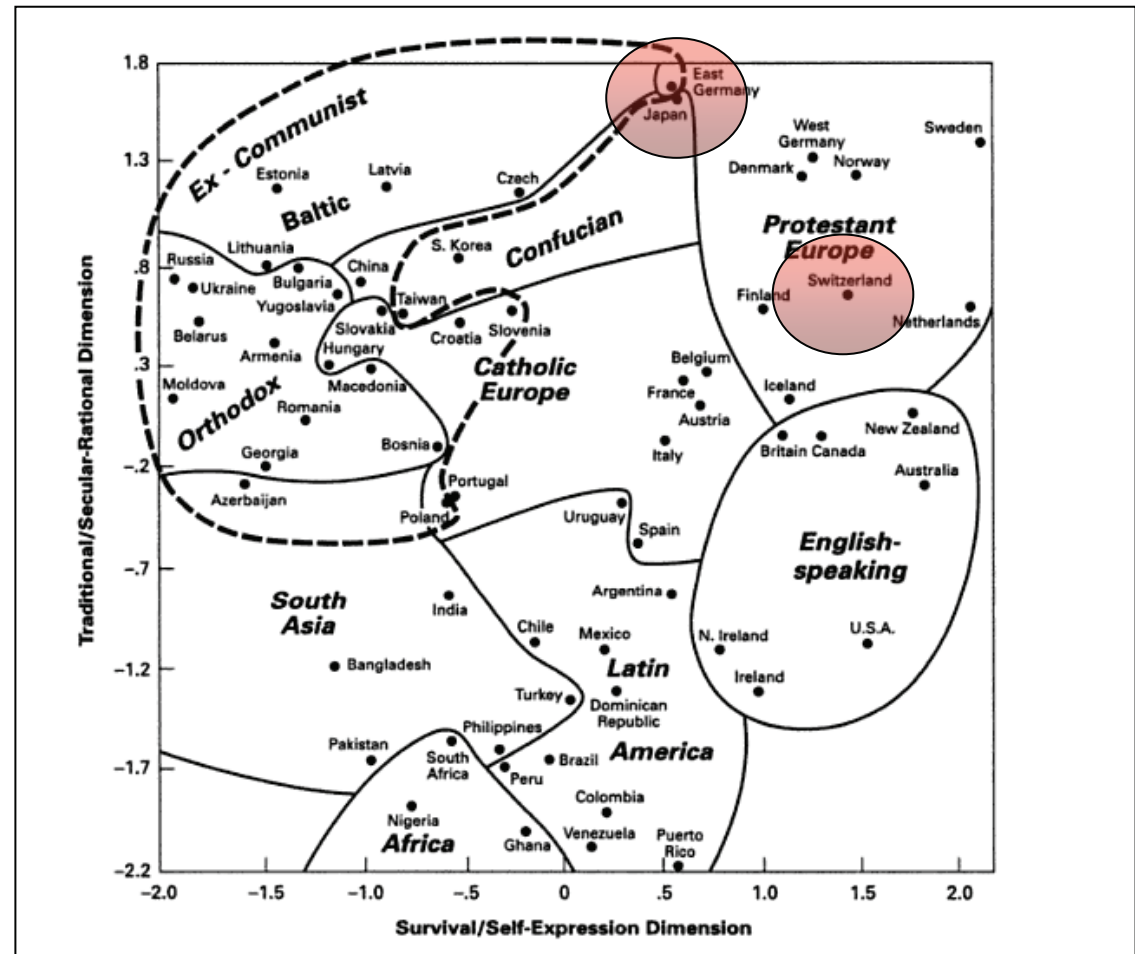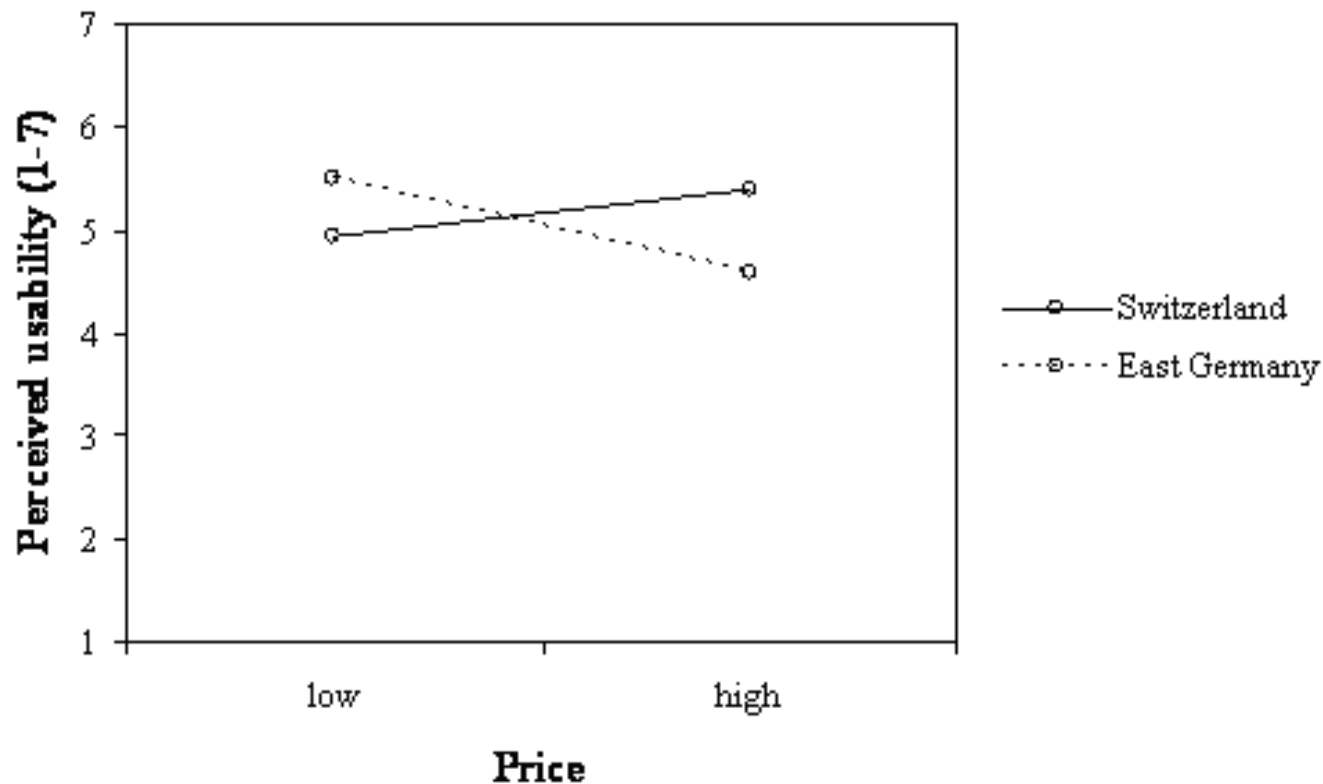
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Study 5: Pleasure as a function of price and culture
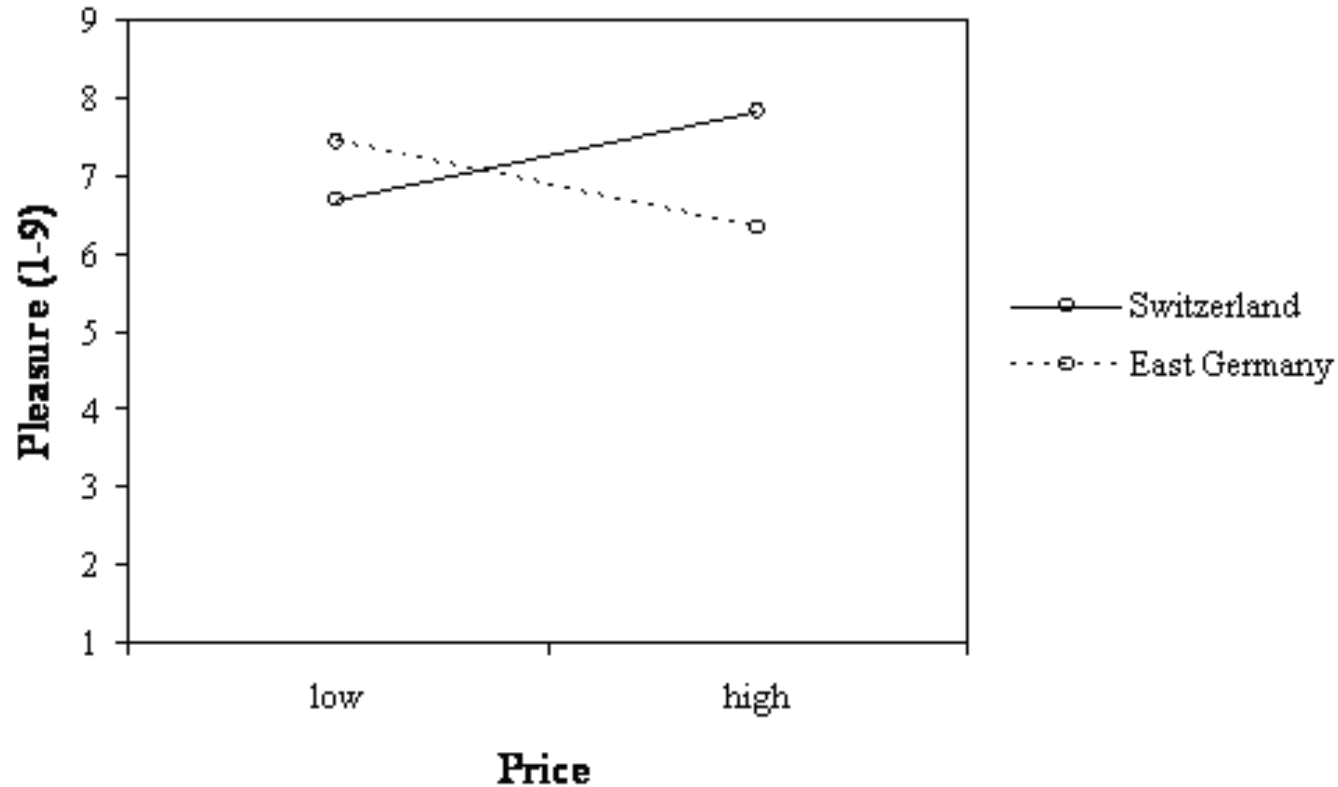
Study 5: Perceived usability as a function of price and culture

Four-factor framework of contextual fidelity
(Sauer, Seibel & Rüttinger, 2009)

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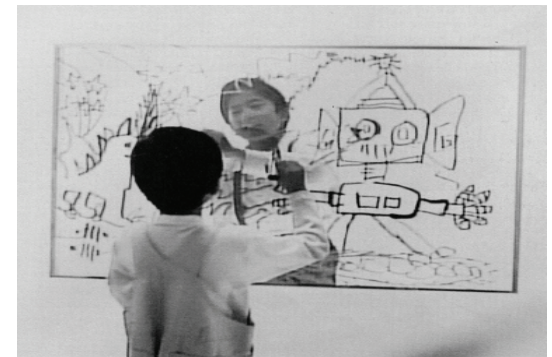**Future work**
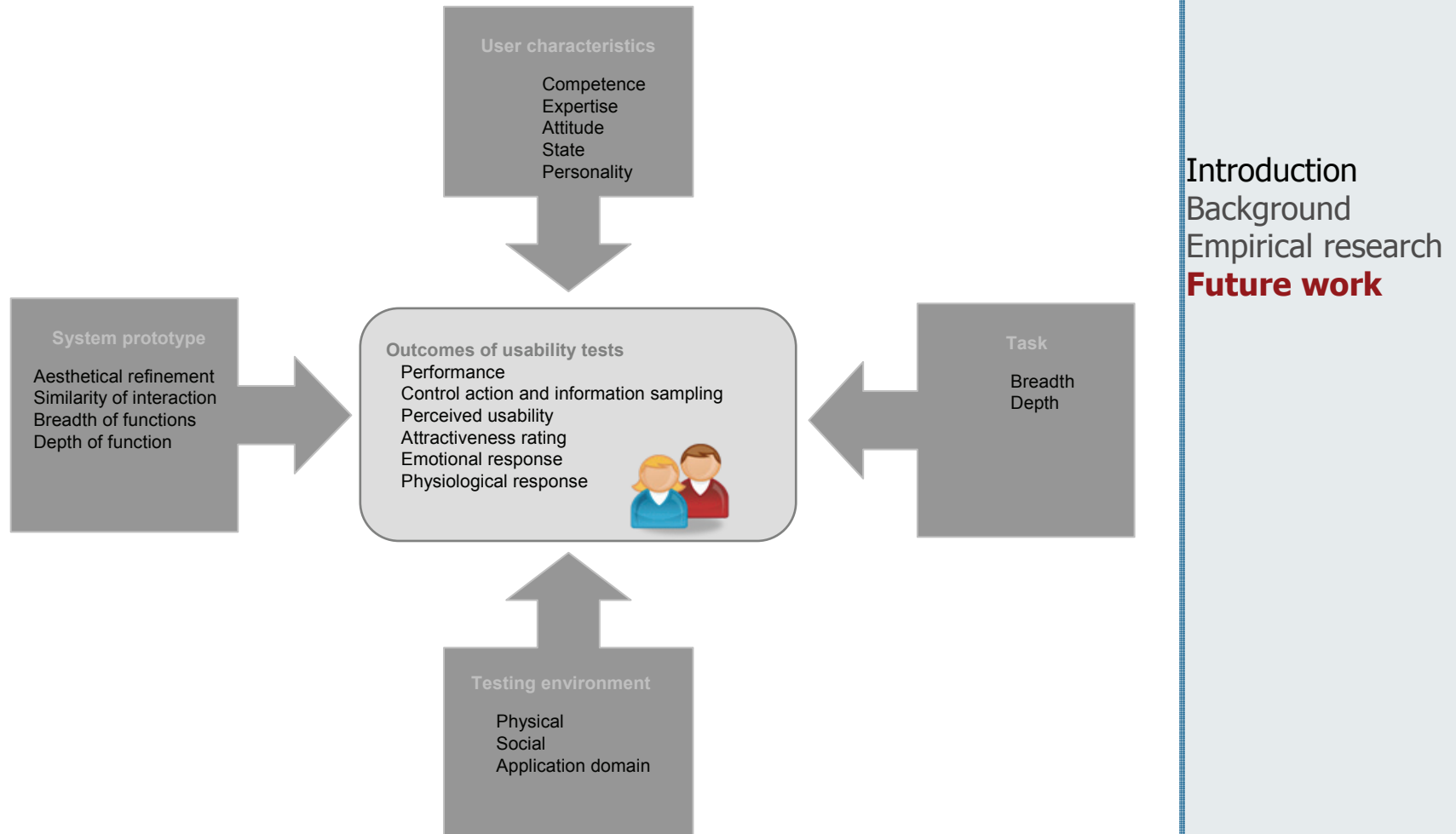
Future research

- Influence of application domain

- Interaction of aesthetics and application domain

- Influence of user characteristics
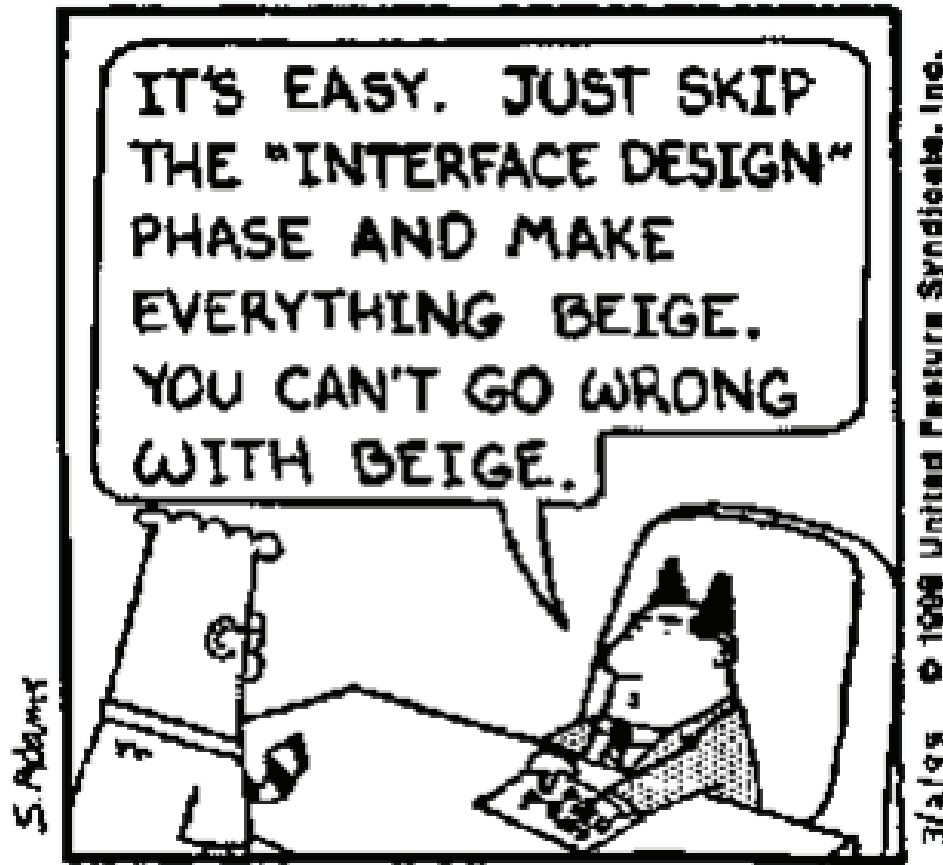
- Designing and supporting teams of users

- etc.
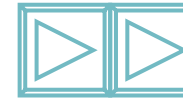
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Applications for user-centred evaluation in IM2

Many thanks!

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