Operator Traits and Adaptation Styles for a Co-Adaptive System

Caroline Harriott
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Challenge: “One size fits all” fits no one

Increasing software complexity impacts necessary training time
Goal: A Co-Adaptive System

Making the powerful approachable
Background: Existing Gaps in Adaptive Software Human-Computer Interaction Research

**Gaps**
- Comparing human performance between adaptation & baseline
- Adaptive Software Strategies (e.g., Amditis et al., 2006; Gajos et al., 2006; Kühme, 1993)

**Existing Research**
- Performance differences by trait for adaptation types
- Effect of stable user traits on usage of adaptation (e.g., Gajos & Chauncey, 2017)
Study: Do adaptation styles affect task performance?

Task: Image Editing, using ImageMagick

Control

Limit choices

Big Buttons (BB)

Suggest

Highlighting (HL)

Automate

Macro (MA)
Study Design & Participants

**Within-subjects design**
- Blocks of 2 tasks per condition
- 4 conditions (order counterbalanced)
- Minimal training on interface

**Dependent Variables**
- Efficiency: Time per required task step
- Usability: System Usability Scale
- Trust: Buy-in survey

**Independent Variables**
- Need for cognition (NFC)
- Extraversion
- Dispositional Trust
- Locus of Control
- Neuroticism
- Openness to new experiences

**28 participants:**
- Gender distribution: 11M, 17F
- Age range: 18-55
Results: Adaptation Styles Produce Differing Performance, Reactions

Do adaptation styles affect task performance? Yes.

F(1, 222) = 19.5, p < 0.001

Do traits affect interaction with adaptation styles? Yes.
Applications: Co-adaptive Software Can Ease Increasing Burden on the Warfighter

Ex: Mission Planning Software

Ex: Predator Ground Control Station

Warfighter use of complex feature rich tools will increase as technology advances
Ongoing & Future Work

• In-depth testing of more advanced adaptations
  • How much can an adaptation help users?
  • Do traits affect size of performance change?
• Currently creating co-adaptive version of online data collection game, Dr. Data

Play Dr. Data: https://chcidata.com/
Thank you!

Contributors:
Meredith Cunha, PI
Ryan Brill
Dr. Krysta Chauncey
Sara Garver
Brian Kimerer
Dr. Zahar Prasov
Dr. Kelly Sprehn

Contact:
Dr. Caroline Harriott
Research Engineer
Draper
617-258-4473
charriott@draper.com