Design and Evaluation of Complex Systems for Use ‘in the Wild’

Ann Blandford
Anne Hsu
Nikki Newhouse
Aisling Ann O’Kane
Four short talks; four exemplar health challenges

- **AH**: Mobile application for reducing snack cravings
- **NN**: Online patient experience as an information resource: what does the right ‘dose’ look like?
- **AB**: Staying safe, staying well: designing to support self-management of chronic kidney disease
- **AOK**: Concealing or revealing mobile medical devices? designing for onstage and offstage presentation
Persuasive technology for overcoming food cravings and improving snack choices

Anne Hsu, Jing Yang, Yigit Yilmaz, Md Sanaul Haque, Cengiz Can, Ann Blandford
The problem of overweight

Health problems: cancer, stroke, heart disease, sleep apnea, gallstones, hyperventilation

Costs the US ~ $147 billion per year, UK ~ £3.2 billion a year

Despite many weight loss programs, ($60 billion industry), most dieters regain much of weight lost (Mann et al., 2007)
Reduce food cravings

• Food cravings extremely common, ~70% of people (Pelchat, 1997)

• Cravings causes problems with over-snacking, diet failure, binge eating, bulimia (Basdevant, Craplet, & Guy-Grand, 1993; Waters, Hill, & Waller, 2001; Wurtman, 1988; Gendall & Joyce, 2001).
Elaborated Intrusion theory of desire

(May et al., 2010; Andrade et al, 2012; Kemps et al, 2007; Harvey et al., 2005; Hamilton et al, 2013; May et al., 2004, May et al., 2012, Knauper et al, 2011)

• Cravings sustained through cognitive processes: mental imagery of sight, taste, sound, and touch

• Prediction: Alternative task that recruits similar mental resources can reduce cravings

• Many lab studies have shown imagery tasks will reduce cravings
Craving reduction imagery task

Imagine a girl with brown curls picking yellow flowers in a field
Craving reduction imagery task

Imagine a girl with brown curls picking yellow flowers in a field.
Craving reduction imagery task

Imagine a girl with brown curls picking yellow flowers in a field
Craving reduction imagery task

Imagine a girl with brown curls picking yellow flowers in a field
Craving reduction imagery task

Imagine a girl with brown curls picking yellow flowers in a field
Craving reduction imagery task

Imagine a girl with brown curls picking yellow flowers in a field

Imagery tasks shown to reduce cravings in the lab (May et al., 2010; Andrade et al, 2012; Kemps et al, 2007; Harvey et al., 2005; Hamilton et al, 2013; May et al., 2004, May et al., 2012, Knauper et al, 2011)
Design motivation: Intervention needed at moment of temptation

- Just in time delivery of craving reduction intervention
- User initiated, encourages awareness
- Tracks moments of victory that are otherwise ‘lost’
Mobile intervention: iCrave

Please Imagine
A Lion In A Zoo
For 10 seconds...

How vividly did you imagine the image?

1 2 3 4 5
No image at all
Perfectly vivid, like the real thing

Please decide what to do next...

Save for Later
Healthy Snack
Non-Healthy Snack

Undo Recent Activity
Compare to simple tracker app
One week validation study

- 26 and 27 in each condition
- Recorded events of healthy and unhealthy snacking
- Self report surveys collected before and after study
- Both likert scale and qualitative responses
iCrave reduced unhealthy snacking and overall snacking.

![Graph showing reduction in unhealthy snacks and all snacks with iCrave and tracker.](image-url)
Other Measures

• Greater ease of resisting unhealthy snacks (p=.009)
Other Measures

• Greater ease of resisting unhealthy snacks (p=.009)
• Greater vividness ratings for savings and healthy snack events (p<.0001)
Other Measures

- Greater ease of resisting unhealthy snacks $(p=0.009)$
- Greater vividness ratings for savings and healthy snack events $(p<0.0001)$
- No sig. difference in app usage between conditions $(p=0.39)$
Qualitative results: ‘savings’ moments

- “There is a loss of appetite.”
- “it made me feel like I don’t want to eat snacks.”
- “The attraction of snacks is reduced.” “Before I wanted a cookie…afterwards I felt it would be better that I did not eat a cookie.”
- “Afterwards, I felt like I could control myself.”
Qualitative results: healthy snack moments

• “Before, I wanted chocolate immediately. (Afterwards) I preferred the vegetable salad.”

• “It made me prefer healthy food.”

• “I wanted chips, but afterwards, I felt it is better to eat something healthy.”

• “After using the app, I wanted to order the healthy snack.”
Qualitative results: unsuccessful moments

• “I felt it could not help me this time.”
• “Nothing changed, both before and after using the app I still wanted chicken.”
• “It didn’t work…the feeling was the same both before and after using the app.”
Future work

- How to deliver greater rewards to offset cost of overcoming cravings?
- Can practising imagery lead to long term control over desire?
- Do cravings lessen with use of iCrave?
- How much did savings button help?
- Other tasks?
Persuasive technology for overcoming food cravings and improving snack choices

THANK YOU:
Ann Blandford (UCLIC, University College London)
Jing Yang (QMUL)
Yigit Yilmaz (QMUL)
Md Sanaul Haque (QMUL)
Cengiz Can (QMUL)

Contact: Anne Hsu (Queen Mary, University of London)
anne.hsu@qmul.ac.uk