TECHNOLOGY DRIVEN BEHAVIOUR CHANGE

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TECHNOLOGY CHANGES BEHAVIOUR

OUR BEHAVIOURS ARE MADE TANGIBLE THROUGH OUR INTERACTIONS

- Use of technology has become more ubiquitous and pervasive.

- The opportunity to affect behaviour through technology is vastly increasing.
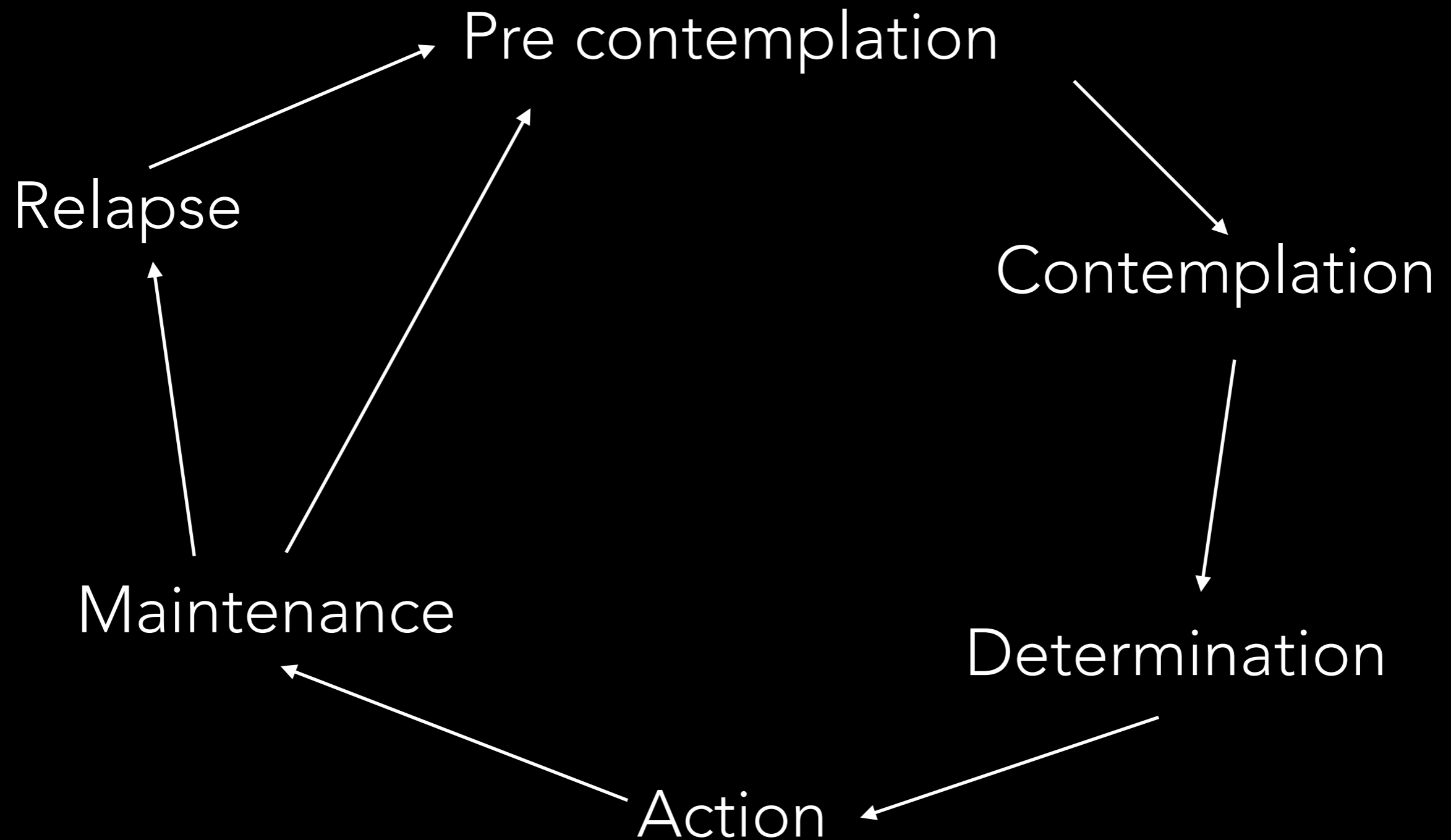
CAN WE DESIGN THESE CHANGES?

THEORY OF PLANNED BEHAVIOUR

"Attitudes toward the behavior, subjective norms with respect to the behavior, and perceived control over the behavior are usually found to predict behavioral intentions"
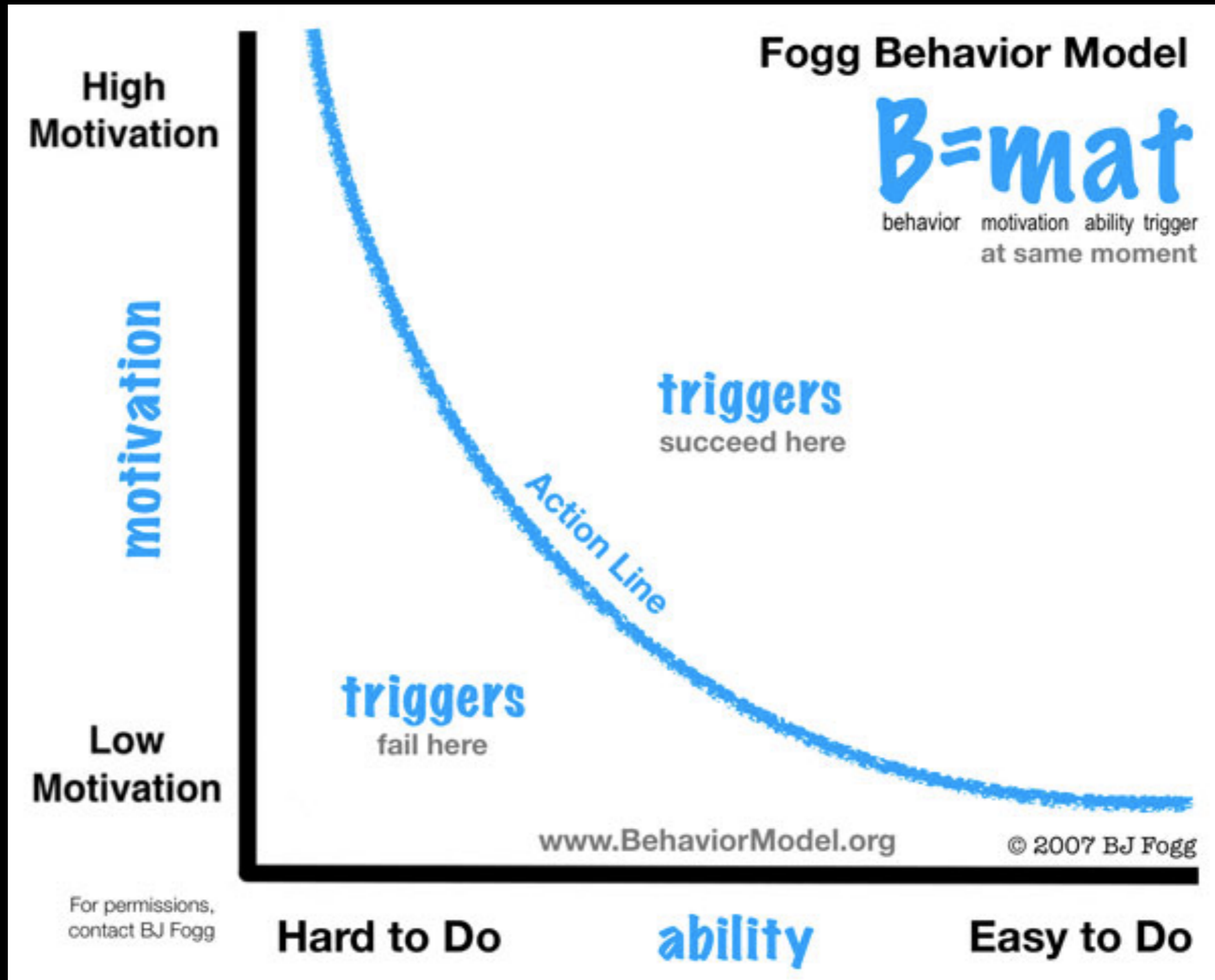
Ajzen, Icek (1991). "The theory of planned behavior". Organizational Behavior and Human Decision Processes 50 (2): 179–211

THE TRANSTHEORETICAL MODEL

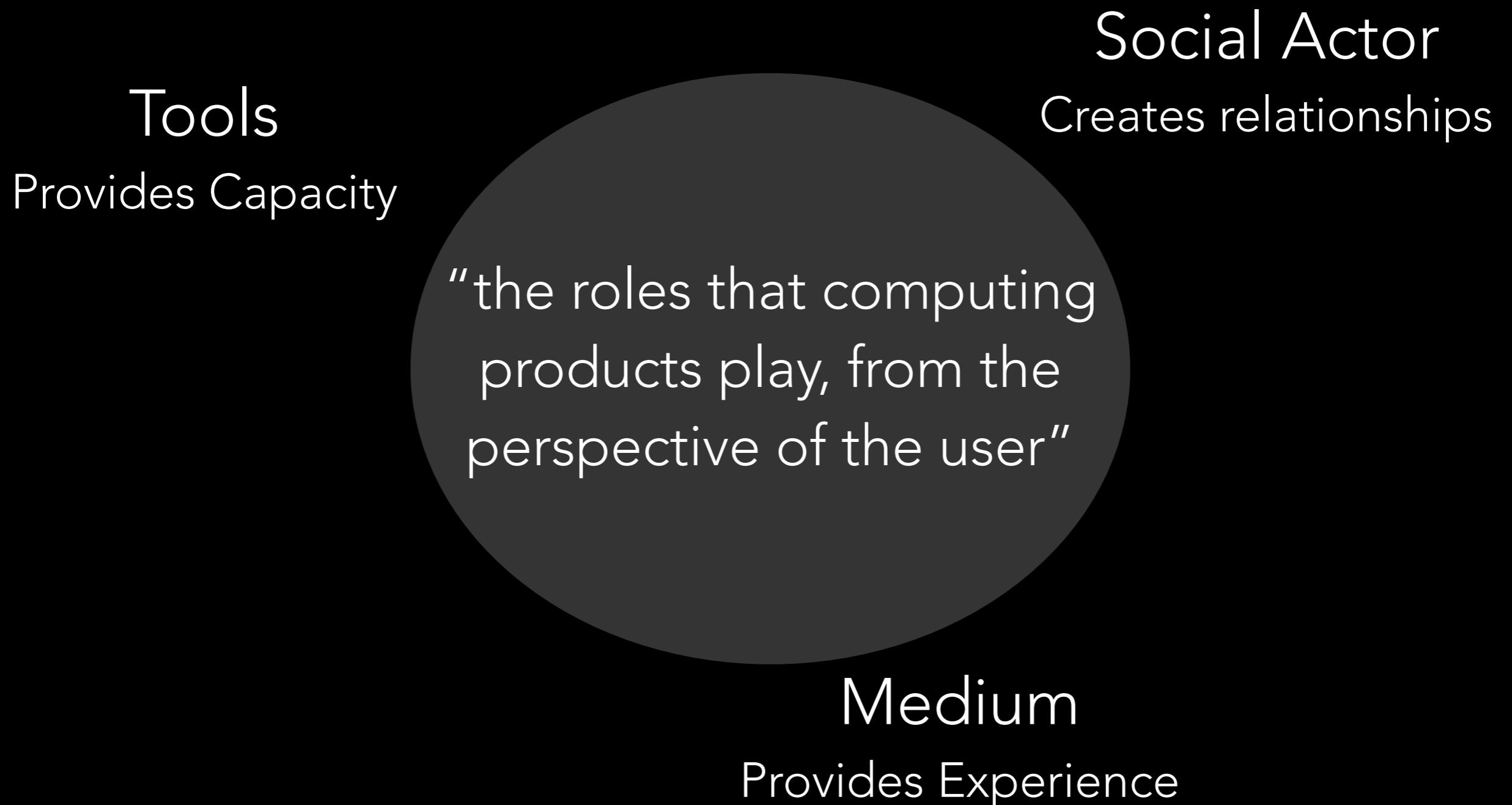Pre contemplation

Relapse

Contemplation

Maintenance

Determination

Action

Prochaska, J.O. and DiClemente, C.C. (1984). The transtheoretical approach: Crossing the traditional boundaries of therapy. Melbourne, Florida: Krieger Publishing Company.

B.J. FOGG
CAPTOLOGY

Fogg Behavior Model

B=mat
behavior motivation ability trigger
at same moment

High Motivation

motivation

triggers
succeed here

Action Line

triggers
fail here

Low Motivation

www.BehaviorModel.org

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Hard to Do   **ability**   **Easy to Do**

B.J. FOGG
THE FUNCTIONAL TRIAD

Tools

Provides Capacity

Social Actor

Creates relationships

"the roles that computing products play, from the perspective of the user"

Medium

Provides Experience

TOOLS FOR CHANGE

TOOLS TO INFLUENCE OUR BEHAVIOUR

Provide a simple path to the desired outcome:

- That path supports a desired behaviour.

- Resists undesirable behaviours.

Should we resist undesirable outcomes/behaviours?

INTERACTION WITH TECHNOLOGY IS GUIDED BY AFFORDANCES

Aaron Sloman

http://www.cs.bham.ac.uk/research/projects/cogaff/talks/sloman-dagstuhl09.pdf

SLANTY DESIGN

Slanty design passively resists certain behaviours
Effective but very hard to achieve
They are static

Beale., R. (2007) Slanty design. Commun. ACM 50(1):21-24.

STROPPY TECHNOLOGIES

Stroppy Technologies are active and dynamic.

They can actively affect selected behaviours:
- resist the undesirable
- support the desirable

They can adapt to the dynamics of more complex human behaviours.

Cowan, B.R., Bowers, C. P., Beale, R. & Pinder, C. (2013) The stroppy kettle: an intervention to break energy consumption habits. In Human Factors in Computing Systems (CHI EA '13). ACM, New York, NY, USA, 1485-1490

MEDIUM FOR CHANGE

USING MEDIA TO PROVIDE EXPERIENCE

Explore cause and effect relationships:

- Poor behaviours cause bad things to happen

- Good behaviour cause nice things to happen

Technology can provide a safe environment to explore these relationships without significant repercussions.

GAMES

Gamification of real-world contexts can be powerful.

It allows players to cause and effect unimpeded.

There are possible positive and negative effects.

Bad press - mainly due to unintended affects on behaviour.

But what if we design for behaviour change?

Student Switch-Off, Neil Jennings

Funk JB, Baldacci HB, Pasold T, et al. Violence exposure in real-life, video games, television, movies, and the Internet: is there desensitization? J Adolesc 2004;27(1):23–39. - See more at: http://www.shiftdesign.org.uk/video-games-behaviour-change/#sthash.ve2UJFw3.dpuf

Gentile DA, Anderson CA, Yukawa S, et al. The effects of prosocial video games on prosocial behaviors: international evidence from correlational, longitudinal and experimental studies. Pers Soc Psychol Bull 2009;35(6):752–63

EXPLORING CAUSE AND EFFECT

- Causality must be clear and apparent.

- Timing is critical.

- It only has to be perceived.

- Correlation is just as effective.

ATTACH A NEW POSITIVE EFFECT TO A DESIRABLE BEHAVIOUR

- Reward a good behaviour.

- Punish bad behaviour?

- Rewards / Punishment must be consistent and persistent.

THE INFORMATION GAP

SMART METERS

- Smart meters have been shown to be effective (5-10%)

- Less effective in the long term

- "Information on its own has a poor track record in achieving energy conservation."
  S.Darby

Darby, S. (2006) The effectiveness of feedback on energy consumption: A review for DEFRA of the literature on metering, billing and direct displays. Technical report, Environmental Change Institute, University of Oxford

Foster, D., Lawson, S., Blythe, M., & Cairns, P. (2010) Wattsup?: motivating reductions in domestic energy consumption using social networks. Proc. 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries (NordiCHI '10). ACM, New York, NY, USA, 178-187.

THE QUANTIFIED SELF
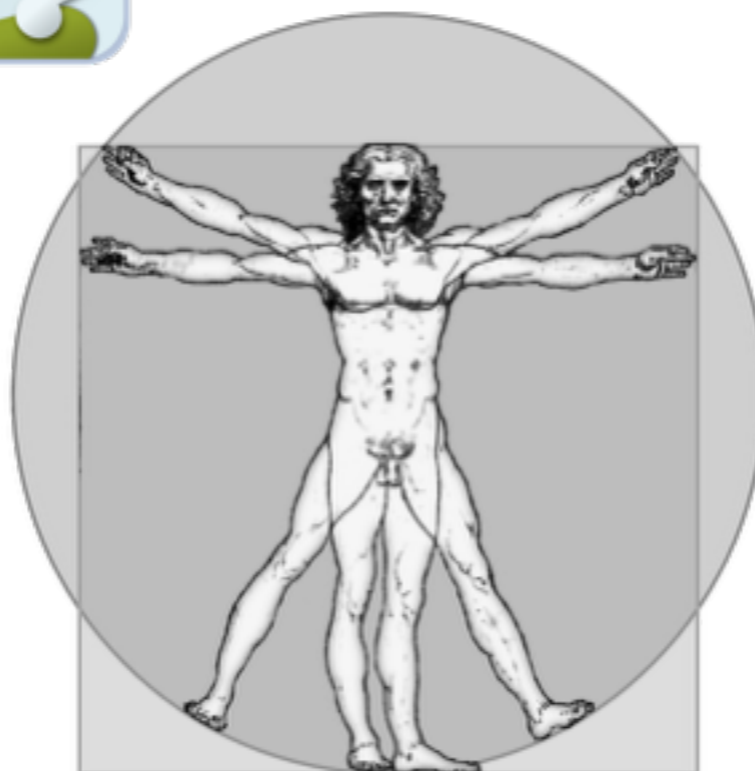
COGNITIVE LOAD

The data challenge

- Its cheap to gather data.

- Its costly to interpret meaning.

Things that can help:

- Data visualisation

- Utilise pre-attentive processing

AMBIENT DEVICES

- Ambient signals can help use perform low cost information filtering.

- David Rose, MIT media lab

- Spawned startup - Ambient Devices

- Provides ambient feedback of household energy consumption.

AMBIENT FEEDBACK

Ambient Orb.

The Power Aware cord.

Anton Gustafsson and Magnus Gyllenswärd. 2005. The power-aware cord: energy awareness through ambient information display. In CHI '05 Extended Abstracts on Human Factors in Computing Systems (CHI EA '05). ACM, New York, NY, USA, 1423-1426.

SOCIAL PERSUASION

SOCIAL NORMS

- A shared understanding of what is appropriate behaviour.

- Form within groups.

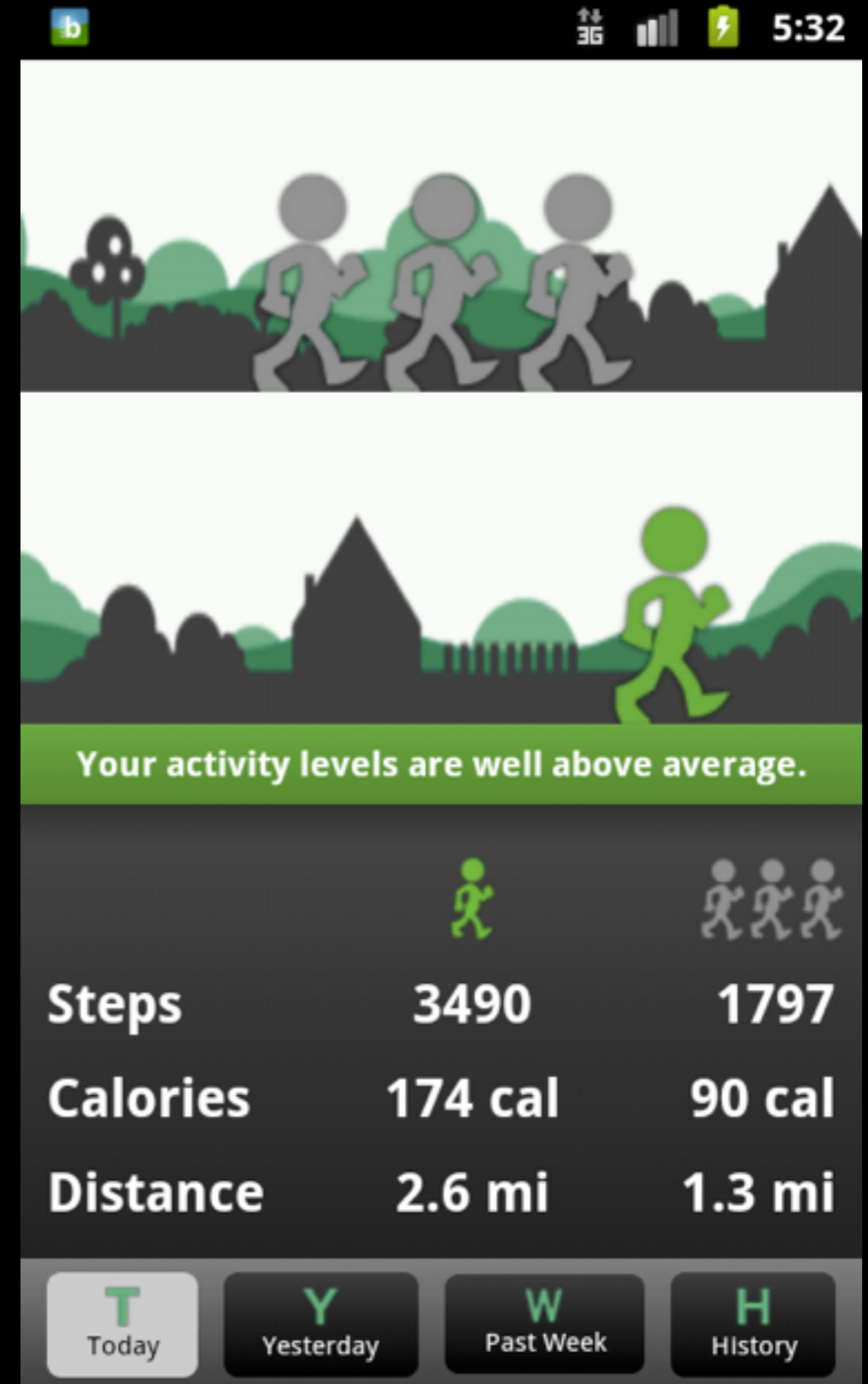- Can be adopted by and transferred between groups.

TIDY STREET

BIRD, J. AND ROGERS, Y. (2010) THE PULSE OF TIDY STREET: MEASURING AND PUBLICLY DISPLAYING DOMESTIC ELECTRICITY CONSUMPTION. WORKSHOP ON ENERGY AWARENESS AND CONSERVATION THROUGH PERVASIVE APPLICATIONS (PERVASIVE 2010).

BACTIVE

- Mobile application that passively monitors physical activity.

- Uses accelerometer to measure footsteps.

- Groups users with other of similar demograph.

- Provides direct comparison of users performance with average performance of group.

- 151 participants. 64% increase in walking.

- No evidence that social norms had effected this increase.

Harries, T., Eslambolchilar, P. and Rettie, R. (2012) CHARM Research Summary 4: bActive: quantitative analysis. Behaviour and Practice Research Group, Kingston University. Available at http://www.projectcharm.info/

HUMANS MAKE RATIONAL DECISIONS ABOUT THEIR ACTIONS.

CHANGING BEHAVIOUR
REQUIRES A
CHANGE IN ATTITUDE

AN ATTITUDINAL APPROACH

Many (most) behaviour change theories rely on a desire or motivation to change behaviour.

This is potentially good news - we can't be forced to change our behaviour.

However evidence shows that…

"attitude change does not always equate to behaviour change." B.J. Fogg

The relationship between attitude and behaviour is complex.

RATIONALITY VIEWED AS AN OPTIMISATION PROBLEM

"a person can be said to be computationally rational when the strategies that they choose maximize subjective utility given constraints imposed by their information processing architecture and experience"

Howes, A., LewisR. L., & Vera, A. (2009) Rational adaptation under task and processing constraints: Implications for testing theories of cognition and action. Psychological Review, Vol 116(4), Oct 2009, 717-751.)

"MOST OF THE TIME WHAT WE DO IS WHAT WE DO MOST OF THE TIME.

SOMETIMES WE DO SOMETHING NEW"

TOWNSEND, D. J., & BEVER, T. G. (2001). SENTENCE COMPREHENSION: THE INTEGRATION OF HABITS AND RULES. CAMBRIDGE, MA: MIT PRESS.

A habit is a learnt behaviour that:

- is frequently repeated

- has a high degree of automaticity

- is performed in response to stable contextual cues

'Automatic' = without conscious awareness

Orbell, S. and Verplanken, B., 2010. The automatic component of habit in health behavior: habit as cue-contingent automaticity. Health Psychology, 29 (4), pp. 374-383.

DIALOG HABITS

IMAGE SELECTOR

- An Android application.

- Remote push dialogs to devices.

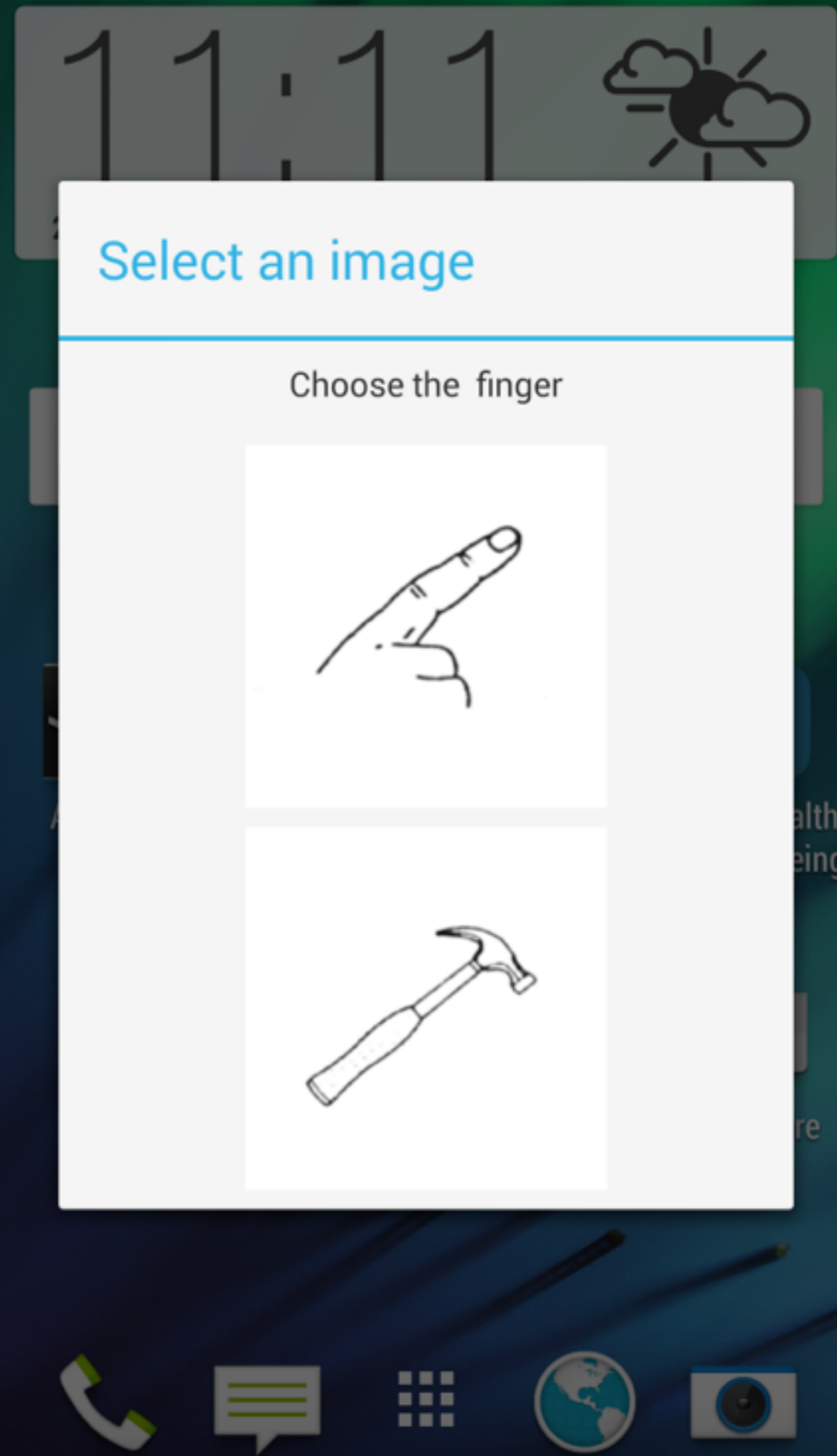- The dialog must be addressed before normal use can continue.

IMAGE SELECTOR APP

Project still ongoing… undertaking statistical analysis of results.

- \>100 participants.

- \>32,000 interactions.

- Control conditions - random images.

- Test conditions - fixed images or fixed positions.

Early results suggest that participants in the test conditions:

- developed a faster response time than those in the control condition.

- are more prone to err when presented with random images.

HOW TO INTERVENE WITH A HABIT

- TRIGGER

- ENACTING OF BEHAVIOUR

- OUTCOME

We waste £68 million a year on overfilled kettles!

How many cups of tea or coffee do you enjoy per day?

With 40% of people boiling the kettle five times a day or more, Britain's penchant for hot beverage total of £68 million in wasted energy!

The Energy Saving Trust, who looked in to the energy habits of 86,000 households, also discovere shower lasted seven and a half minutes. If we all reduced this by one minute, the people of Britain

---

NEWS UK

4 July 2013 Last updated at 04:06

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Overfilling kettles wastes £68m a year, says report

💬 COMMENTS (1005)

Three-quarters of British households overfill their kettles, wasting a total of £68m each year, an Energy Saving Trust (EST) report has suggested.

The study of 86,000 households also found the average shower lasted seven-and-a-half minutes. A minute less and £215m would be saved, the EST said.

Washing clothes at 30C and filling kettles to the required amount were among ways to save money, it added.

Some 40% of people boiled water five times a day or more, the study found

Related Stories

HABIT BREAKING STROPPY DEVICE

THE
STROPPY
KETTLE

STROPPY KETTLE V1

A prototype electrical device:

- High power (2500W)

- Used in a Kitchen!

Utilised off the shelf CE or BS certified components.

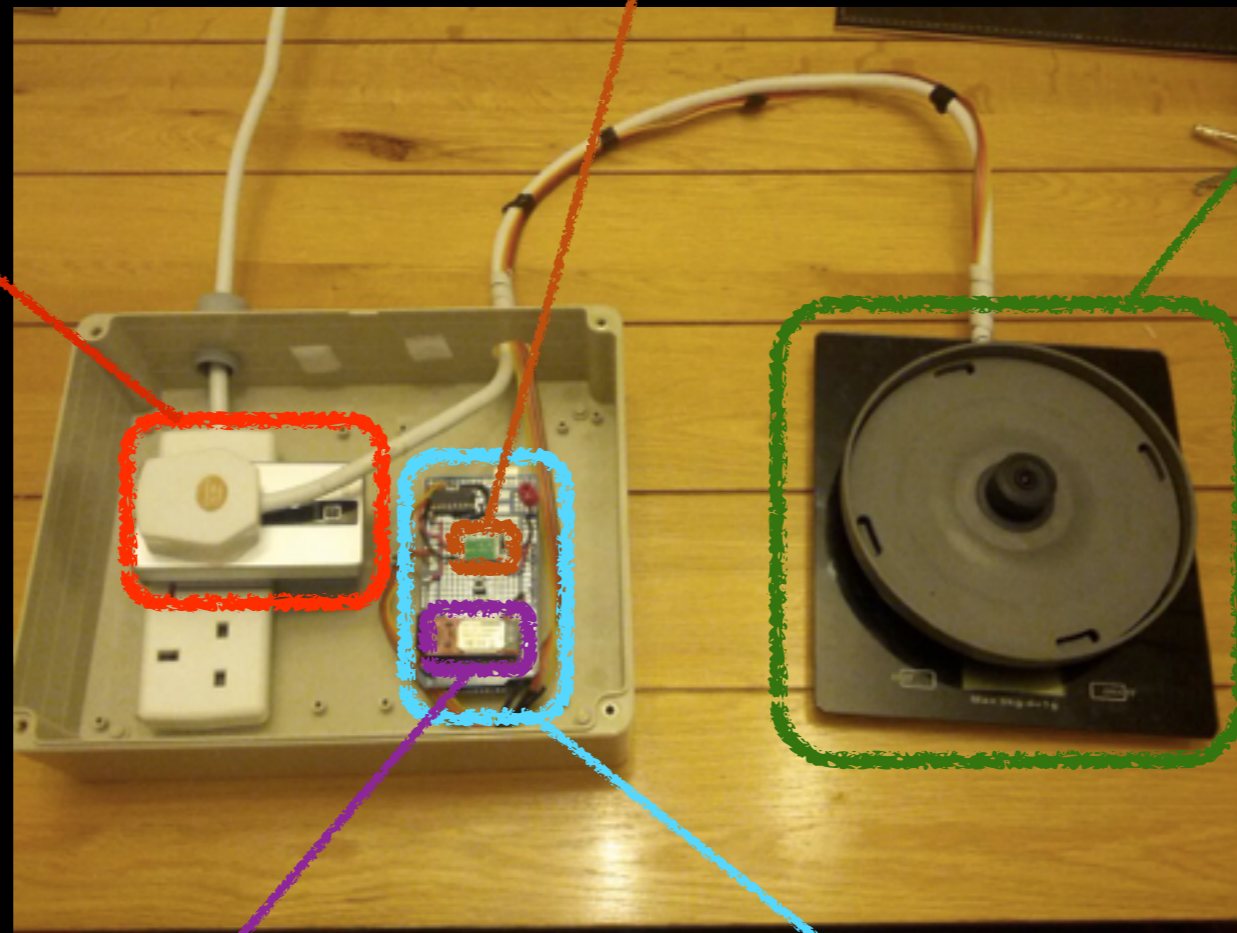Heavily dependent upon WiFi connectivity.

STROPPY KETTLE V2

Plug-through 433Mz wireless mains switch

433Mhz transmitter

Load sensor (Kitchen Scales)

Bluetooth radio communication with Android device

Arduino micro controller

LESSONS LEARNT

Behaviour change theories are exactly that.

- Human behaviours and what motivates/drives them is often more complex than a rudimentary theory can describe.

Be user centric… but not overly.

- If you want to influence someones behaviour with an intervention then they might not be the best person to inform design.

Ultimately success can only be measured by a change in behaviour.

- Subjective metrics such as attitudinal changes do not constitute confirmation of an effective behaviour change.

- Find a way to objectively measure behaviour… and keep measuring it.

THANK YOU   ?

HCI & Habits   hci.bham.ac.uk/workshops/habit/
Chris Bowers, Worc   www.worcester.ac.uk/discover/chris-bowers.html
Ben Cowan, UCD   www.ucd.ie/sils/staff/benjaminrcowan/
Charlie Pinder, Bham   www.cs.bham.ac.uk/~cxp291/
Russell Beale, Bham   www.cs.bham.ac.uk/about/people/russell