



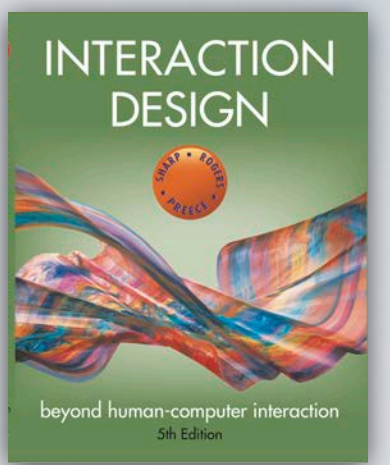
Interaction Styles

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PLAN & PURPOSE



PURPOSE & OVERVIEW

Purpose

- Identifying & comparing different **types** of **interfaces**, judging & designing novel **interaction styles**
 - [CH 7: Interfaces \(Sharp et al. 2019\)](#): interface definition and interface types
- **Construct** interaction design **prototypes** with a fidelity level that allows for their evaluation with users (LO#4)

Overview (45 + 15 + 45 min)

- [Interaction styles](#): definition, current trends & research, **PAUSE** where **IS** thinking was applied

Break (15 min)

- [Exercise](#): mindful touch

INTERACTION STYLES

INTERACTION STYLES

(1/3)

Interaction Styles

- HCI: interaction style as a **mode of interacting** based on a particular technology, explained through prototypical **interface elements** and their **behaviour** (e.g., command line)
- Interaction design exemplars (Ehn et al. 1995): applying style thinking to the design of computer applications, styles as a way of developing a **repertoire of exemplars**
- 'Labelling method' of studying style (Ylismaa 1992): evolved from specific terms like type (e.g., Gothic, Renaissance) to an analysis of artefacts in the **culture** and **value systems** that gave rise to them

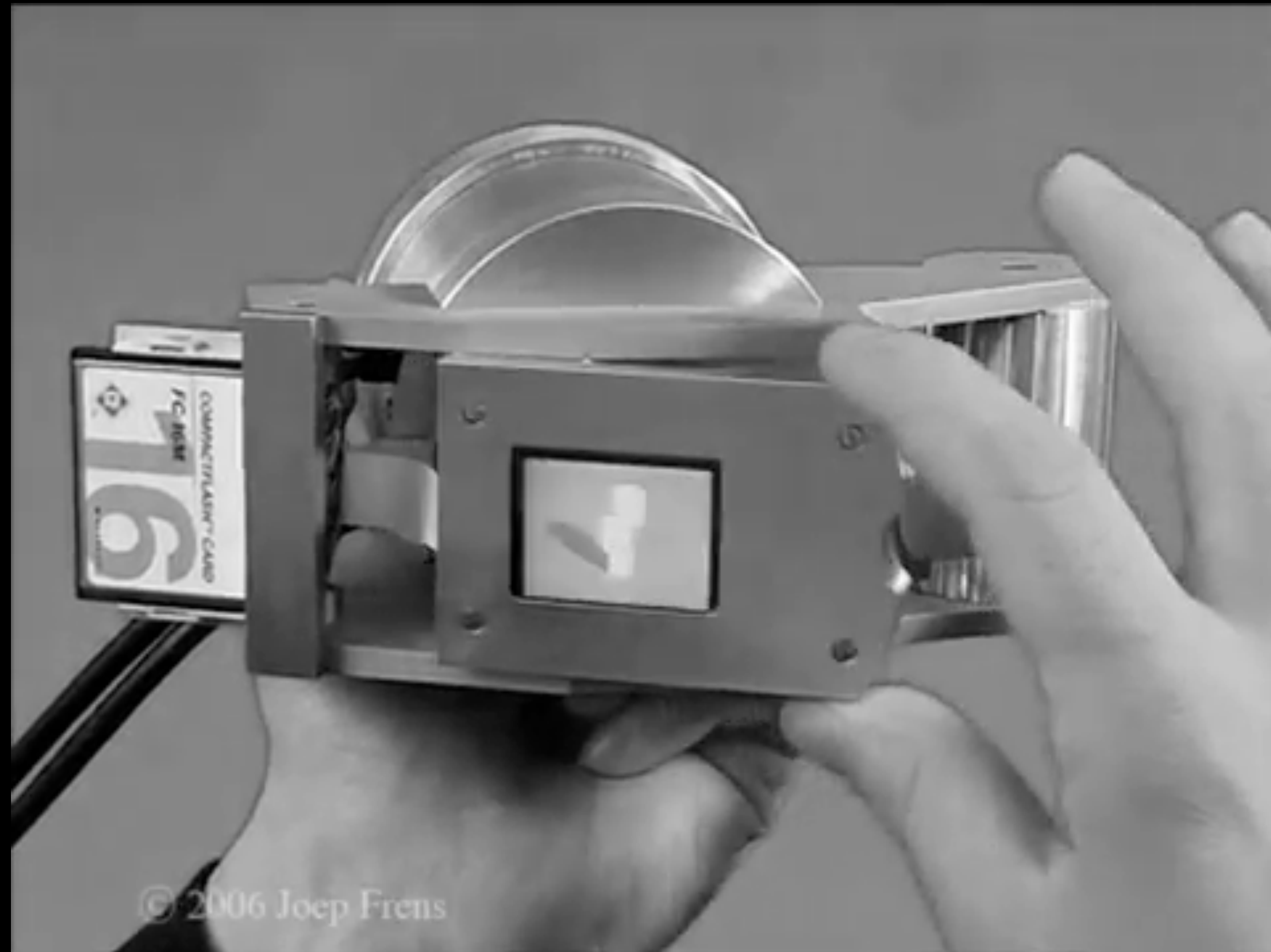
INTERACTION STYLES

(2/3)

Interaction Styles *(Øritsland and Buur, 2000)*

- Development pattern through history: functions proliferate, products get smaller and more mobile, and electronics and computing power is added, across many types of products (e.g., cameras, radios, phones)
- Arbitrary interaction: the product's **form and function** become increasingly **separated** and the interaction with the product becomes **less and less physical** as meaningful physical components are encased, replaced by electronics and become microprocessor-controlled





*Frens JW. Designing for rich interaction: Integrating form, interaction, and function.
Doctoral dissertation, Eindhoven University of Technology, 2006.*

INTERACTION STYLES

(3/3)

Interaction Styles *(Øritsland and Buur, 2000)*

- Problem: interaction designers, in their enthusiasm with new technologies, may fail to preserve or transfer **qualities of use** that were achieved with outdated technologies
- Interaction Styles: identify a common systems of **norms** concerning technology and action based in history. The philosophies, needs, and values of the **social systems** in which the products were **made** and in which interaction with them **takes place**
- Working with Interaction Styles: tracing a product's design **history**, identify eras of distinct interaction qualities (**style markers**), and use these to support the interaction design of contemporary products

EXAMPLE: DANFOSS

- Danfoss (Øritsland and Buur, 2000): manufacturer of mechatronic products (e.g., flow meters, temperature sensors and controllers)
- Interplay: between society, design and technology
- Style: not only applicable to product appearance but also to interaction

MACHINE COWBOY 1933 - 69

Society

Belief in technology
The machine cowboy era was characterized by a belief that all technology was superior to the world. This led to a focus on building technology, but by the 1950s, the product interface was in the machine and not the user.

Technology is a tool
Based on the machine cowboy technology, the machine cowboy era was characterized by a belief that technology was a tool. This led to a focus on building technology, but by the 1950s, the product interface was in the machine and not the user.

A shift in focus
The machine cowboy era was characterized by a belief that technology was a tool. This led to a focus on building technology, but by the 1950s, the product interface was in the machine and not the user.

Company Spirit

A small company
The machine cowboy era was characterized by a belief that technology was a tool. This led to a focus on building technology, but by the 1950s, the product interface was in the machine and not the user.

A local business
The machine cowboy era was characterized by a belief that technology was a tool. This led to a focus on building technology, but by the 1950s, the product interface was in the machine and not the user.

Product - VLT

Focused information
The VLT for the Machine Cowboy era was a simple machine with no feedback. The interface was a simple panel with no feedback.

Instant feedback
The VLT for the Machine Cowboy era was a simple machine with no feedback. The interface was a simple panel with no feedback.

Bare-bones functionality
The VLT for the Machine Cowboy era was a simple machine with no feedback. The interface was a simple panel with no feedback.

Awareness of user's language
The VLT for the Machine Cowboy era was a simple machine with no feedback. The interface was a simple panel with no feedback.

Technology

Enough usability
The machine cowboy era was characterized by a belief that technology was a tool. This led to a focus on building technology, but by the 1950s, the product interface was in the machine and not the user.

A few buttons and knobs
The machine cowboy era was characterized by a belief that technology was a tool. This led to a focus on building technology, but by the 1950s, the product interface was in the machine and not the user.

A simple design
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A simple feedback
The machine cowboy era was characterized by a belief that technology was a tool. This led to a focus on building technology, but by the 1950s, the product interface was in the machine and not the user.

**LOW COSTS
LOGIC
REFINED MATERIALS
RICH FEEDBACK
REDUCED SIZE
ANALOG
CONTROL
STANDARDIZATION
INCREASED FUNCTIONALITY**

ANALOG PROFESSIONAL 1970 - 79

Society trends

Society trends
The 1970s brought many changes to the world. The machine cowboy era was characterized by a belief that technology was a tool. This led to a focus on building technology, but by the 1950s, the product interface was in the machine and not the user.

**UNEMPLOYMENT CRISIS
INTERNATIONALISM AWARENESS
GROWTH CONSUMERISM
ENVIRONMENTALISM OPTIMISM
LACK OF WORKERS COLD WAR**

Company spirit

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The 1970s brought many changes to the world. The machine cowboy era was characterized by a belief that technology was a tool. This led to a focus on building technology, but by the 1950s, the product interface was in the machine and not the user.

**EXPANSION MASS PRODUCTION
SOCIETY INFLUENCE UNIONISM
NEW STRUCTURE**

VLT product generations

Product generations
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**SIMPLICITY PRECISION SAFETY
USER CONTROL LOGIC HIDDEN
EXPERIMENTATION SETTINGS**

Technology

Technology
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**LOW COSTS
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DIGITAL HACKER 1980 - 94

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AUGMENTED MOLLY 1995 -

Society

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**OPPORTUNITY FEAR
FRAGMENTATION NETWORK
TRANSPARENCY
AUGMENTATION**

EXAMPLE: NOKIA

- [Phones \(Cheng and Buur, 2004\)](#): developing a tangible user interaction concept for mobile phones of the future
- [Interaction style periods](#): four distinct periods based on 130 years of general telephone development history, plus 20 years of history of Nokia mobile phones

The image displays a grid of 12 panels, each representing a different era of telephone interaction. The panels are organized into four columns and three rows, with a central vertical axis labeled 'COMMUNITY', 'HANDS & SKILLS', 'KNOWLEDGE', and 'TECHNOLOGY & DESIGN'.

- Column 1 (1870s-1930s):**
 - OUR TOWN:** Focuses on community interaction. Includes text: "The concept that someone would buy the telephone to chat was simply inconceivable at that time." and "OUR TOWN: When (Business) Woman (operator) sits the upper class Public places (banks, factory, hospitals, doctor) Control: Spans A tool for business use Predecessor - a piece of craftsmanship Shared: one 3 minute phone call Very few phones."
 - THE GRINDER:** Focuses on hands and skills. Includes text: "Big Movements working Machines Dependent on Operator More than 2 hands No visual feedback Subscribers stand in front of the phone, one hand holding the receiver, the other hand turning the crank. Tells the operator whom the subscribers connected to. The connection is managed by the operator." and "More than 2 hands".
 - MAGIC CONNECTOR:** Focuses on knowledge. Includes text: "A single action: Generate a signal A single function: Signaling and routing 3 minute phone call Don't answer storms" and "Complexity employees who installed the unit in one's home would introduce the handling of the phone, any safety precautions, and share the secrets of engaging this Magic invention."
 - INDULGENT NOVELTIES:** Focuses on technology and design. Includes text: "Clocks the handle to generate an electrical signal sent to the mechanical switch, who connected the call. Mechanical bells ring with an incoming call. Bell is infrastructure rather, phone bells were strung with each new customer. Each phone was 'hard' from the phone company to use." and "Classified western boxes with metal accents Big and Heavy Not Reusable".
- Column 2 (1920s-1980s):**
 - ROUTINE CALLER:** Focuses on hands and skills. Includes text: "Click worker" and "The hand that is doing the work".
 - KNOWLEDGE:** Focuses on knowledge. Includes text: "Knowledge" and "The hand that is doing the work".
 - TECHNOLOGY & DESIGN:** Focuses on technology and design. Includes text: "Technology & Design" and "How does it work?".
- Column 3 (1970s-1990s):**
 - LIFE CHATTER:** Focuses on hands and skills. Includes text: "Life Chatter" and "Click worker".
 - KNOWLEDGE:** Focuses on knowledge. Includes text: "Knowledge" and "The hand that is doing the work".
 - TECHNOLOGY & DESIGN:** Focuses on technology and design. Includes text: "Technology & Design" and "How does it work?".
- Column 4 (1980s-2000s):**
 - INFORMATION EXPLORER:** Focuses on hands and skills. Includes text: "The hitchhiker" and "The hand that is doing the work".
 - KNOWLEDGE:** Focuses on knowledge. Includes text: "The Telephone on a Pedestal" and "The hand that is doing the work".
 - TECHNOLOGY & DESIGN:** Focuses on technology and design. Includes text: "Technology & Design" and "How does it work?".

EXAMPLE: BOOKS

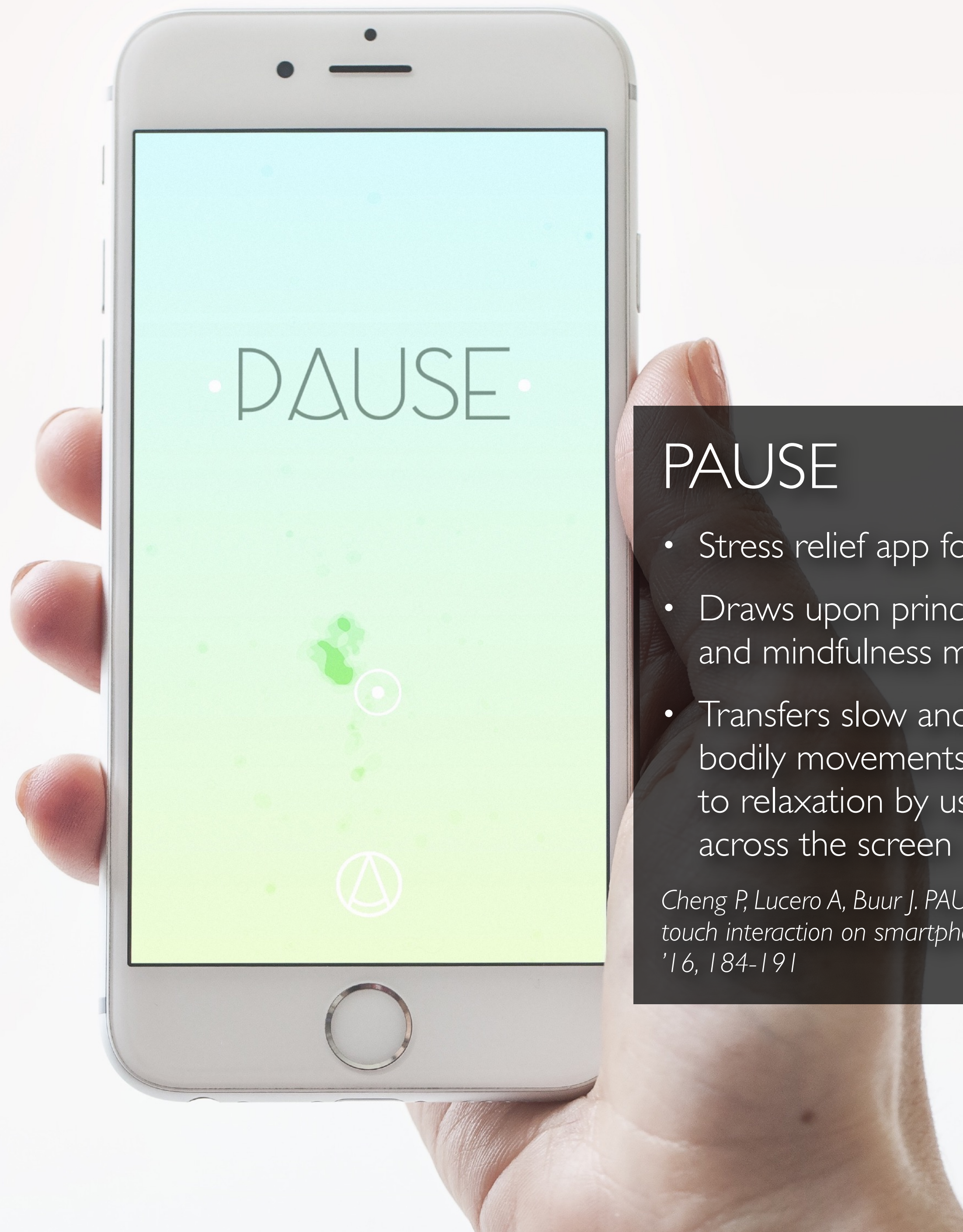
- Society: how were books, writing and reading regarded in society?
- Interaction: how did people 'use' books? What did you do together?
- Format: what did books look like? Where were they stored?
- Technology: how were books produced and distributed?



PAUSE

Smartphones

- Discussions on stress and distraction as a negative influence of mobiles
- Digital detox: finding balance between our digital and physical life
- Q: *could an interaction style that is optimised for efficient data manipulation be adding to the stress?*

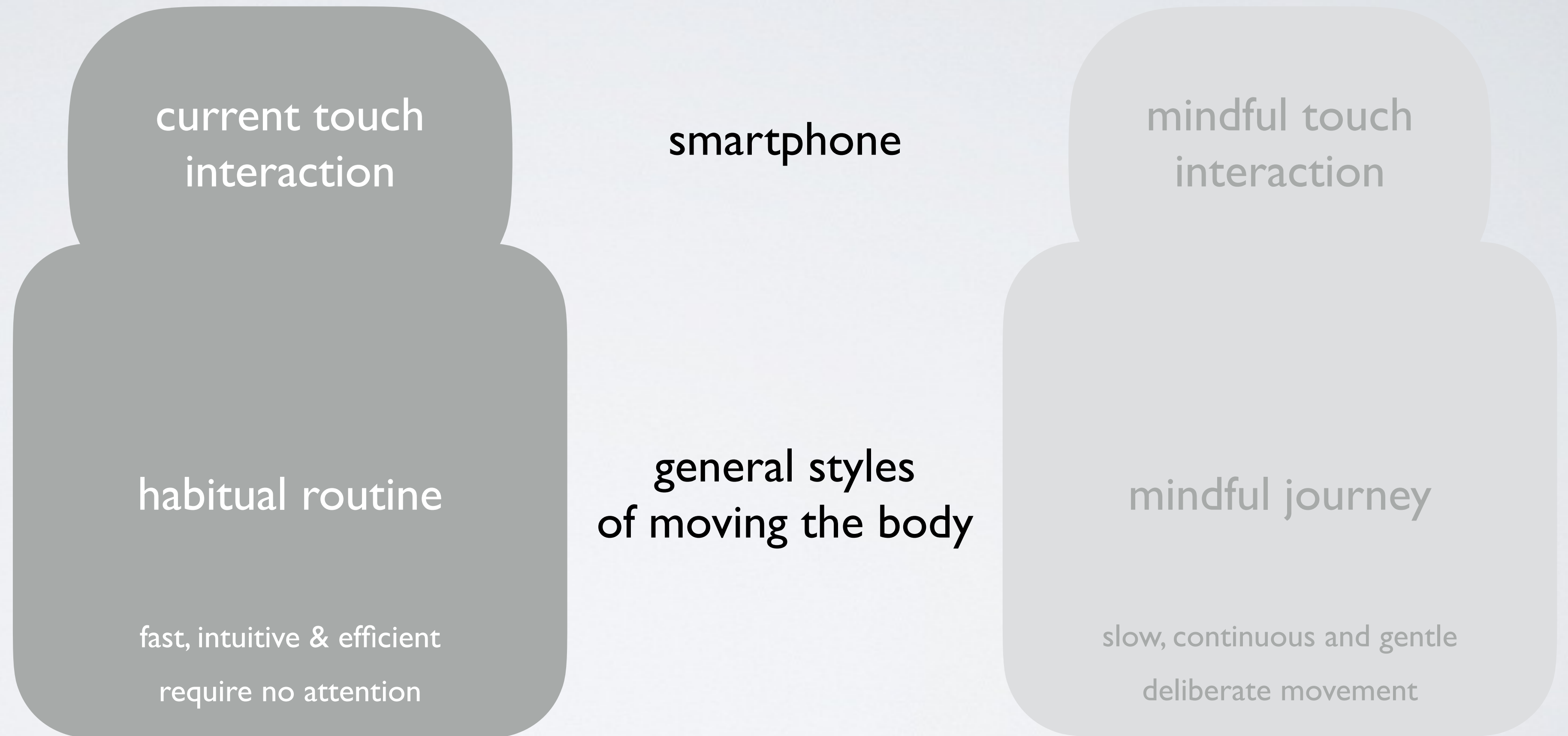


PAUSE

- Stress relief app for smartphones
- Draws upon principles from Tai Chi and mindfulness meditation
- Transfers slow and continuous bodily movements to start a journey to relaxation by using your fingertips across the screen

Cheng P, Lucero A, Buur J. PAUSE: exploring mindful touch interaction on smartphones. AcademicMindtrek '16, 184-191

APPLYING INTERACTION STYLE THINKING



Design

Sensing Slow, Gentle and Continuous Movement

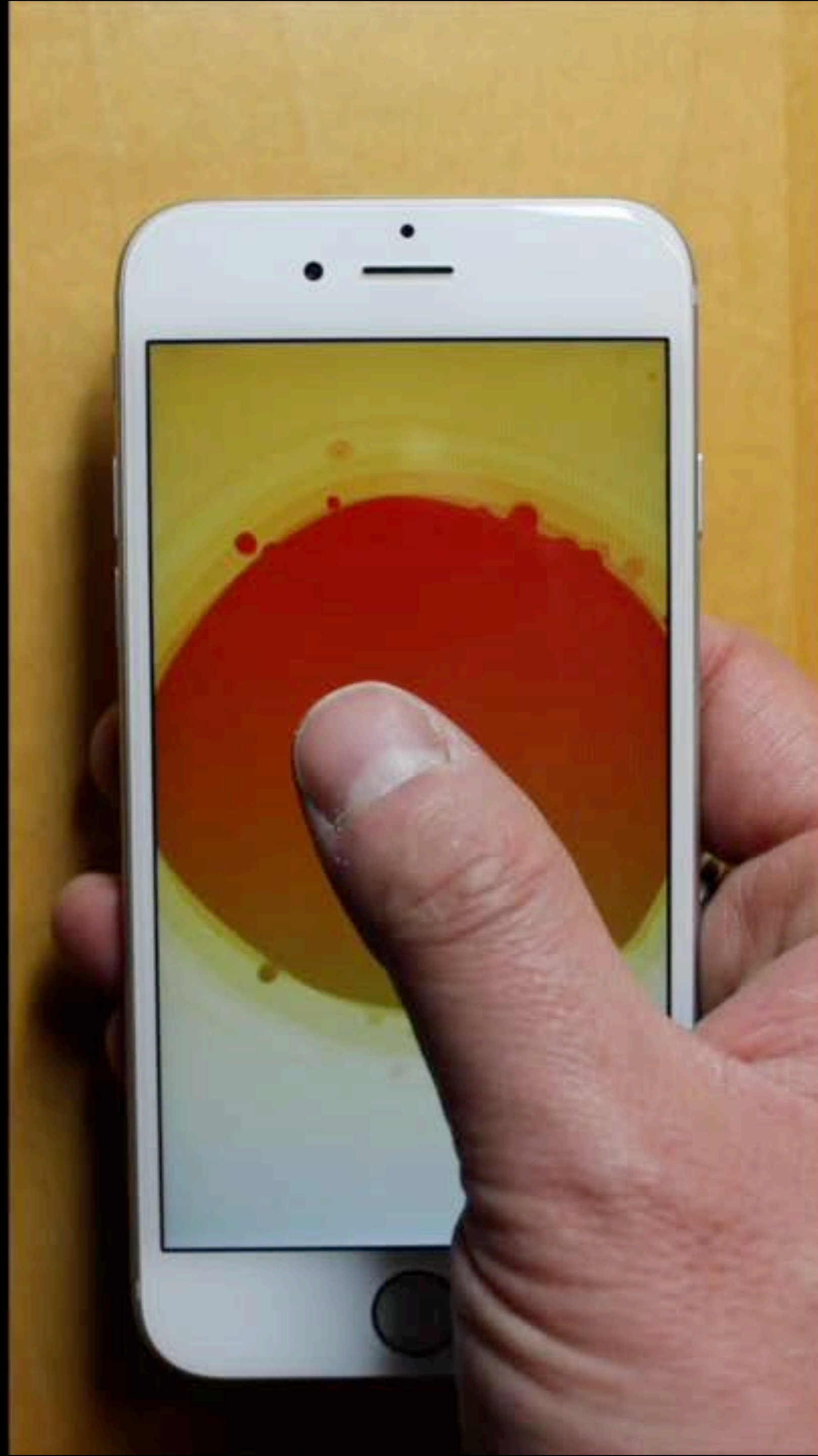
- Detected by the speed and continuity of the finger movement

Visual Exploration to Give Meaning

- Colorful, minimalistic, soft contemporary visual style
- A random, organic bubble of air floating in water dancing with your finger

Sound

- Sweeping sound around one chord
- A repeating, soothing loop to drift away





Evaluation (1/2)

- Participants: 10 people (gender balanced), ages 21-42, handedness (9 right, 1 left), background (5 technical, 5 non-technical), all owned a laptop and mobile phone, some also a tablet (6)
- Procedure: *introduction* (10 min), *task completion* and fill out AttrakDiff questionnaires (*Hassenzahl 2004*) (10 min), *semi-structured interview* (10 min), total 30 min



Evaluation (2/2)

- Location: each session was conducted in a meeting or hotel room
- Device: PAUSE app running on an iPad Mini 3 or personal iPhone 6s
- Setup: people could sit on a comfortable chair, lounge on a Fatboy beanbag, or lie in bed
- Experimenter: observed and took pictures from a distance, participants were otherwise alone in a quiet space

Findings (1/3)

Relieving Stress

- Positive about potential to relieve stress:
 - Natural and human way to achieve a relaxed state
 - *"I felt like I was with someone, it was like a conversation and I was very relaxed. I almost slept actually."*
- Feedback & slow steady movement key:
 - *"Visual feedback was to the point."*
 - *"This ambient music makes you relax."*
- From completing a task to relaxing:
 - *"By the time you fill the screen, you are hypnotised by the movement"*
 - *"You lose track of the (bubble) itself, it's a bit hypnotizing."*

Findings (2/3)

A Slow, Continuous and Gentle Movement

- Novelty of interacting with a mobile this way:
 - *"It was different. It was the first time I interacted with this device in that way."*
- The role of this particular movement in focusing:
 - *"You got into a kind of mode, concentrated on the surface itself and the texture of the screen."*
 - *"It is part of the experience of relaxing, at a certain point you don't think about it anymore."*
- Comparison to fast, segmented, hectic gestures:
 - *"You are always hurrying up, you try to do things as fast as possible. It's a pleasurable experience."*
- Few participants missed tactile cues or feedback:
 - *"I was missing some feedback to be sure that I don't go out of the border of the display."*
 - *"I would prefer if it had a different texture."*

Findings (3/3)

Increasing the Expressiveness of the Movement

- All explored variations of the movement:
 - Switch hands, change finger; multiple fingers, pressing harder; modify trajectory
 - *“This type of music makes you do circles, a movement that makes you sleep or relax.”*
- Half required more from the movement:
 - *“There were no expressive qualities, whether I pushed the screen.”*
 - *“It’s missing a layer, or something. Along the lines of 3D touch [on the iPhone].”*

Discussion

Mindful Touch as Interaction Style

- Rethinking touch gestures to perform usual tasks
- Turning the tapping gesture into a mindful journey: slow, continuous, barely touching, or applying pressure evenly and continuously
- Suggestions: drawing and photo apps, games, less straightforward coupling for musicians

Limitations

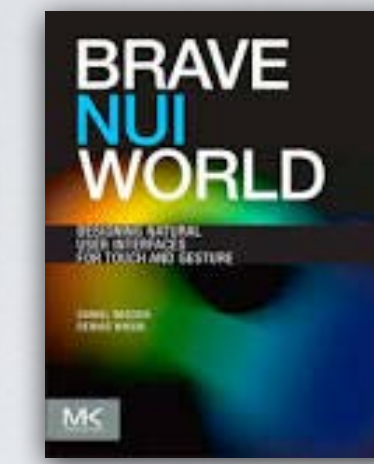
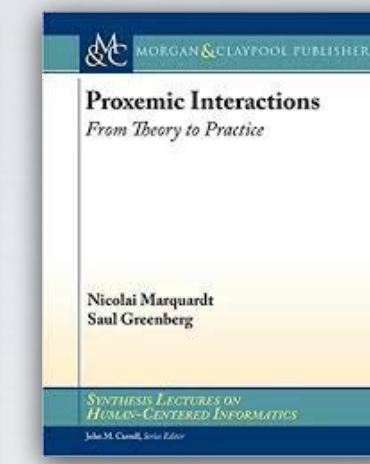
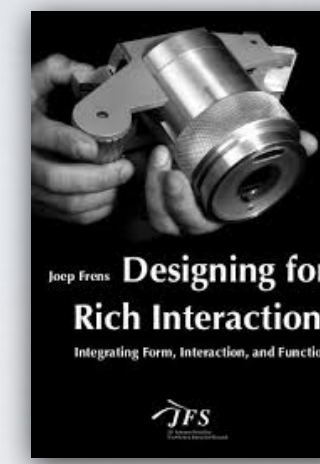
- PAUSE downloaded 500,000 times
- Stress is a serious issue, need to properly measure if the app effectively reduces stress

BREAK

SHORT EXERCISE: MINDFUL TOUCH

FURTHER READING

FURTHER READING



Books

- Frens, J. W. (2006). *Designing for rich interaction: Integrating form, interaction, and function* (Doctoral dissertation, Eindhoven University of Technology).
- Marquardt, N., & Greenberg, S. (2015). *Proxemic interactions: From theory to practice*. *Synthesis Lectures on Human-Centered Informatics*, 8(1), 1-199.
- Daniel Wigdor and Dennis Wixon. 2011. *Brave NUI World: Designing Natural User Interfaces for Touch and Gesture*. Morgan Kaufmann Publishers Inc.

Articles

- Peng Cheng, Andrés Lucero, and Jacob Buur. 2016. *PAUSE: exploring mindful touch interaction on smartphones*. *AcademicMindtrek '16*, 184-191. <https://doi.org/10.1145/2994310.2994342>
- Saul Greenberg, Nicolai Marquardt, Till Ballendat, Rob Diaz-Marino, and Miaosen Wang. 2011. *Proxemic interactions: the new ubicomp?*. *interactions* 18, 1 (January 2011), 42-50. <https://doi.org/10.1145/1897239.1897250>
- Trond Are Øritsland and Jacob Buur. 2000. *Taking the best from a company history - designing with interaction styles*. *DIS '00*, 27-38. <http://dx.doi.org/10.1145/347642.347658>

QUESTIONS?

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