Time for Break:
Understanding Information Workers' Sedentary Behavior Through a Break Prompting System

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What is a typical day for information workers like?

- American employees spend more than **8 hours** on working every day.

- Uninterrupted sedentary behavior takes up more than **80%** of work hours.
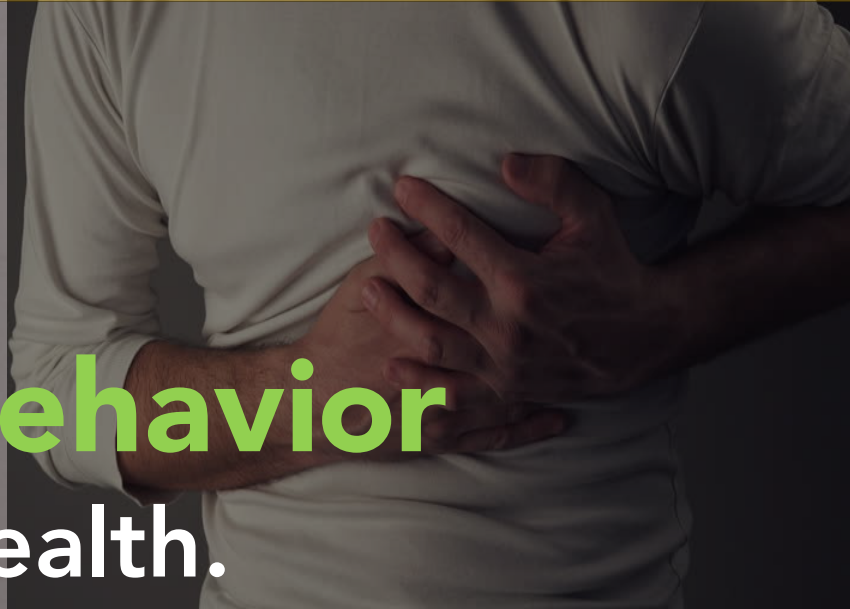
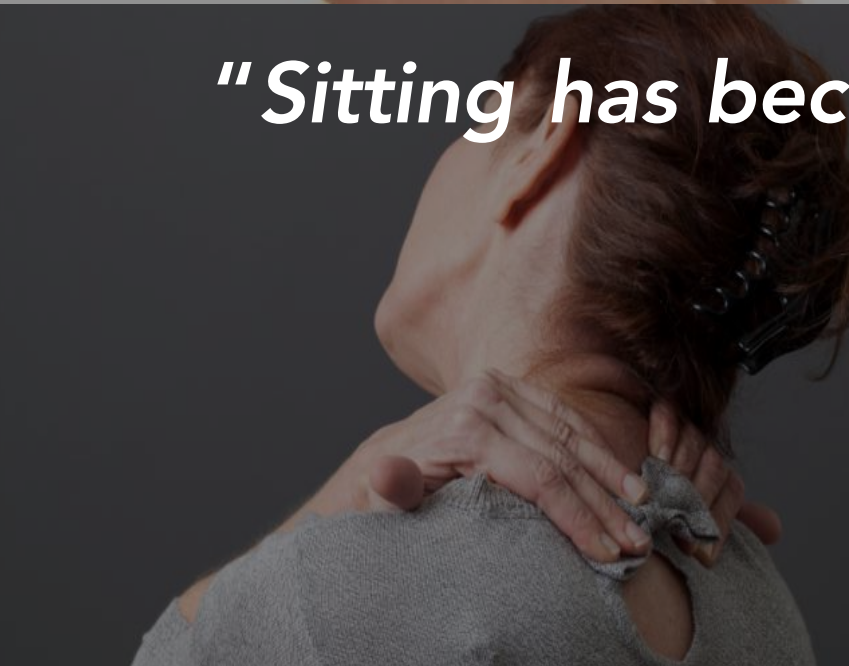[Bureau of Labor Statistics, 2016; Parry & Straker, 2013]

Diabetes

Obesity

Cardiovascular disease

Prolonged sedentary behavior is detrimental to human health.

"Sitting has become the smoking of our generation."

Repetitive injury

Hypertension

All-cause mortality

Even regular physical activities **cannot** fully compensate for the harm caused by prolonged sedentary behavior.

[Bankoski et al., 2011; Biswas et al., 2015]

Information Workers: Challenge to Break Prolonged Sedentary
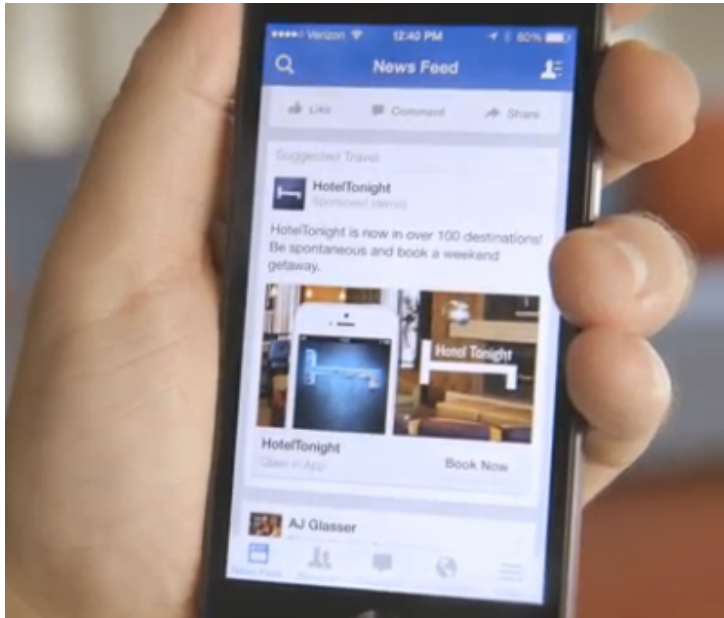

Keep working

or
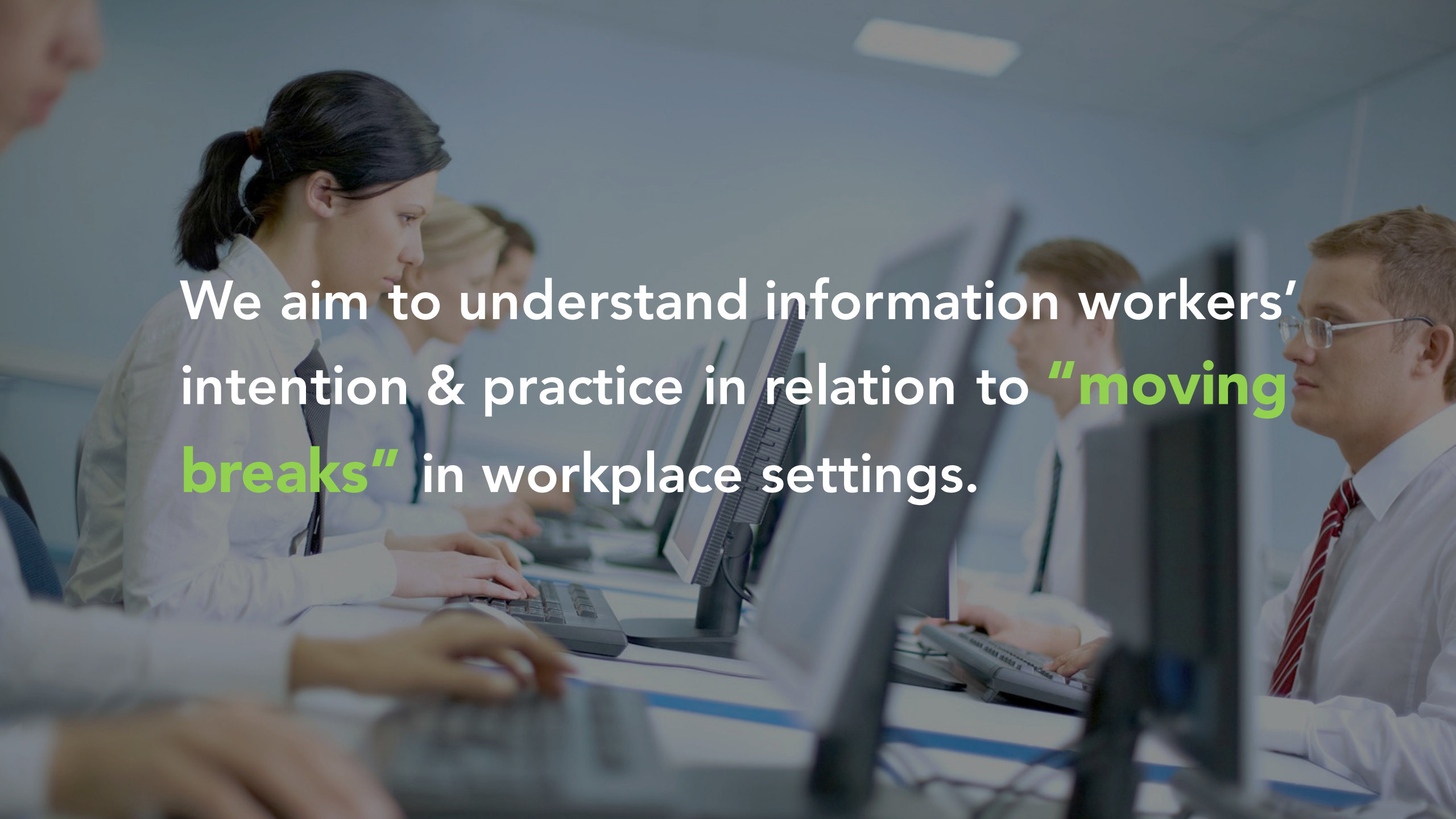
Take breaks

"Breaks" in Workplace

"Moving Breaks" in Our Context

We aim to understand information workers' intention & practice in relation to "moving breaks" in workplace settings.

Research Questions

- RQ1: Information workers' **intended work** & **break duration** and their **actual practices**

- RQ2: **Reasons** and **contexts** around information workers' break-taking **intentions** & **practices**

- RQ3: The **habit strength** and **self-regulation** relate to information workers' break-taking intentions & practices

Habit Strength & Self-Regulation: Why they matter?

Habit strength: the automaticity level of the target behavior

e.g., "taking moving breaks during work hour is something I do without having to consciously remember."

Self-regulation: the ability to develop, implement, and keep a plan of performing the target behavior

e.g., "I have trouble making up my mind about taking moving breaks during work hours."

[Verplanken & Orbell, 2003; Brown, 1999]

Time for Break

A desktop-based prompting system as a **data collection tool**, to capture people's **situated responses** on their break-taking intentions & behavior in an exploratory study.

Time for
Break

Time for Break

Actual break duration

Intended break duration

Response latency
Respond to the prompt
("yes" or "no")

Set up **work duration**

Settings - Time for Break

Time for Break Settings

Please set how long you want to work (in minutes) before being reminded that it is time for a break. Then, check that your internet connection is working and click OK.

30   minute(s)

OK   Reset

Time for Break Reminder

You've been working for 30 minutes. How about standing up or taking a walk?

○ Yes, great idea!

○ No, I can't right now.

Yes. I'd like to stand up or take a walk for

5   minute(s).

OK   Reset

No. I do not want to stand up or take a walk because

I'm finishing up a paper.

OK   Reset

The **reason** for not taking a break

Time for Break

Design rationale as a **data collection tool**

- **Autonomy:** self-set work duration, freedom to take a break or not

- **Minimal influence on current behavior:** no feedback, neutral wording

- **Minimal distraction:** easy to dismiss, avoid prompting during typing

Time for Break

Study Procedure

Participants: 25 (18 female) information workers (age range: 24 to 60), spent > 6 hours sitting with computers per weekday.

Pre-study Activities

- Questionnaire (habit strength, self-regulation)
- Setup (Installation, study Instruction)

Field deployment Study (3 weeks)

Participants set work duration on *Time for break* and receive prompts every day

Post-study Activities

- Questionnaire (habit strength, self-regulation)
- Semi-structured interview (optional)

Data Analysis

Quantitative Data

linear & logistic multilevel modeling:

- Everyday work duration
- Response & response latency
- Intended & actual break duration

paired t-test:

- Pre & post-study habit strength & self-regulation

Qualitative Data

Bottom-up thematic analysis:

- Motivation to take moving breaks
- Reasons for not taking a break
- Interview scripts (context around break-taking intentions & behavior)

Result Highlights

General Usage

374 entries of work duration settings

total prompts: **1599**

"Yes" responses: 642 (40%)

"No" responses: 542 (34%)

Ignored prompts: 415 (26%)
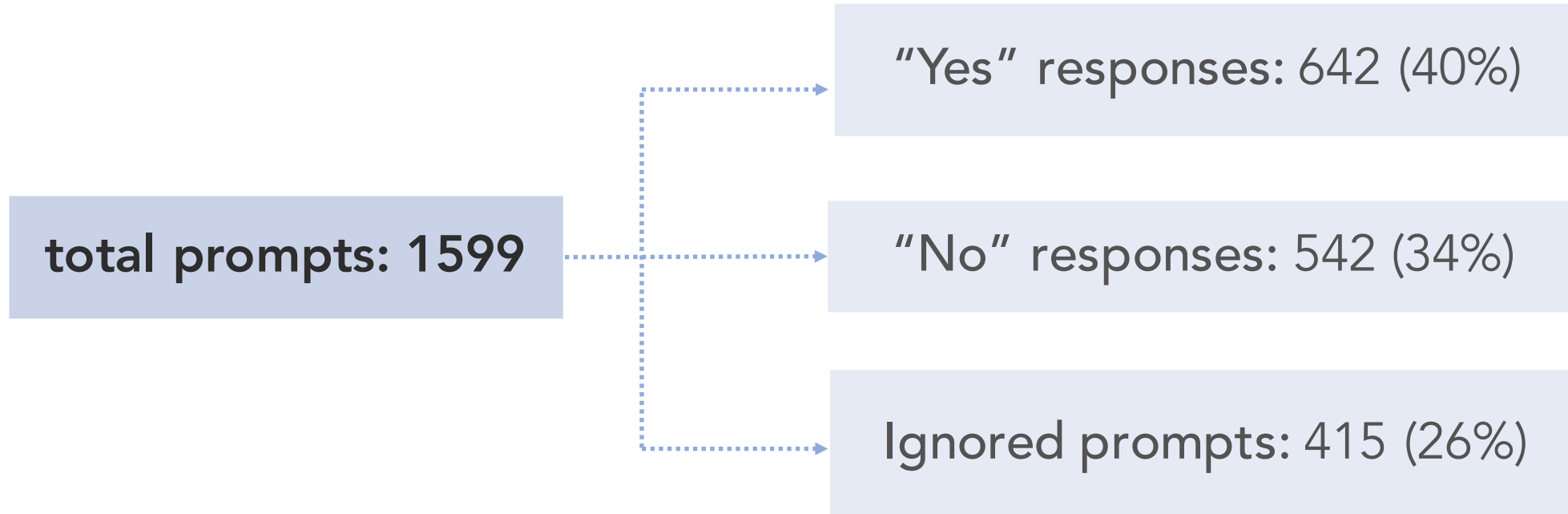
Work Duration Preferences

- **Work duration** was consistent at within-subjects level (ICC = .7).

- 13 participants ended up setting **60 minutes** as their work duration.

  "I pushed it to 60 [minutes], and that generally speaking became manageable." (P11)

  "It's easier to keep track on it by hour, kind of in my head without tracking the icon." (P19)

  ICC: intra-class correlation

Break-taking Intentions & Habit Strength

- Participants with stronger **pre-study habit strength** responded "yes" more often (*OR = 1.30, p = .029*).

- Participants with consistent **intended break duration** increased their **post-study habit strength** more (*b = -1.34, p = .04*).

OR: odds ratio; b: regression coefficient

Intended & Actual Break Duration

Longer **actual break duration** than **intended break duration** due to socializing.

"It's easy to get caught in the hallway and talk to somebody." (P9)

"I'm going to take a walk to make it a productive walk out of the first floor ask questions, and come back." (P11)

Why Not Taking a Break (N = 525)?

- Busy working (40.6%)
- Meeting/class (18.9%)
- Coming back from a break (15.2%)
- Close to finishing something (8.8%)
- Looking for upcoming breaks (7.9%)
- Engaged in a conversation (3.7%)
- Engaged in screen-based activity (2.5%)
- Having lunch/dinner (2.4%)

The Gap Between Motivation & Actual Practice

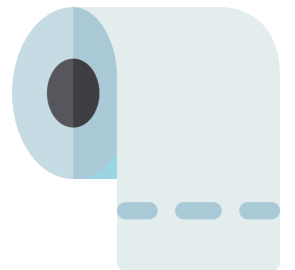Pre-study Survey: Why do you want to take moving breaks?
Lower stress, physiological needs, get refreshed from work, stay healthy

Post-study Interview: what were the cases you actually took moving breaks?
"Probably only when I had to go to the bathroom, grab coffee [or] lunch" (P20).
"Probably get up and go to the restroom." (P16)

Increased Self-Regulation, Accountability & Awareness

Increased **self-regulation** in taking moving breaks
($t(24)$ = -3.64, p = .010)

"Like 10 minutes before it's coming up, I'd wrap up work and tried to get it done faster, so I'd catch those breaks." (P6)

"I learned that I don't get up enough. I need to do better, standing up and walking away" (P10).

Design Implications

Considering Long-term Health As an Important Design Value

Long-term health *vs.* **Near-term productivity**

Support Creating Work & Break Rhythm

Consistent work schedule

Regular break routine

Promote Moving Break in Workplaces

- Stand-up meeting
- Breaks between back-to-back meetings

Future Work

Extend Time For Break into an intervention

- Accurately measure sitting & standing duration

- Incorporate productivity monitoring

- Provide effective feedback

- Identify appropriate prompting moments

Thank you!

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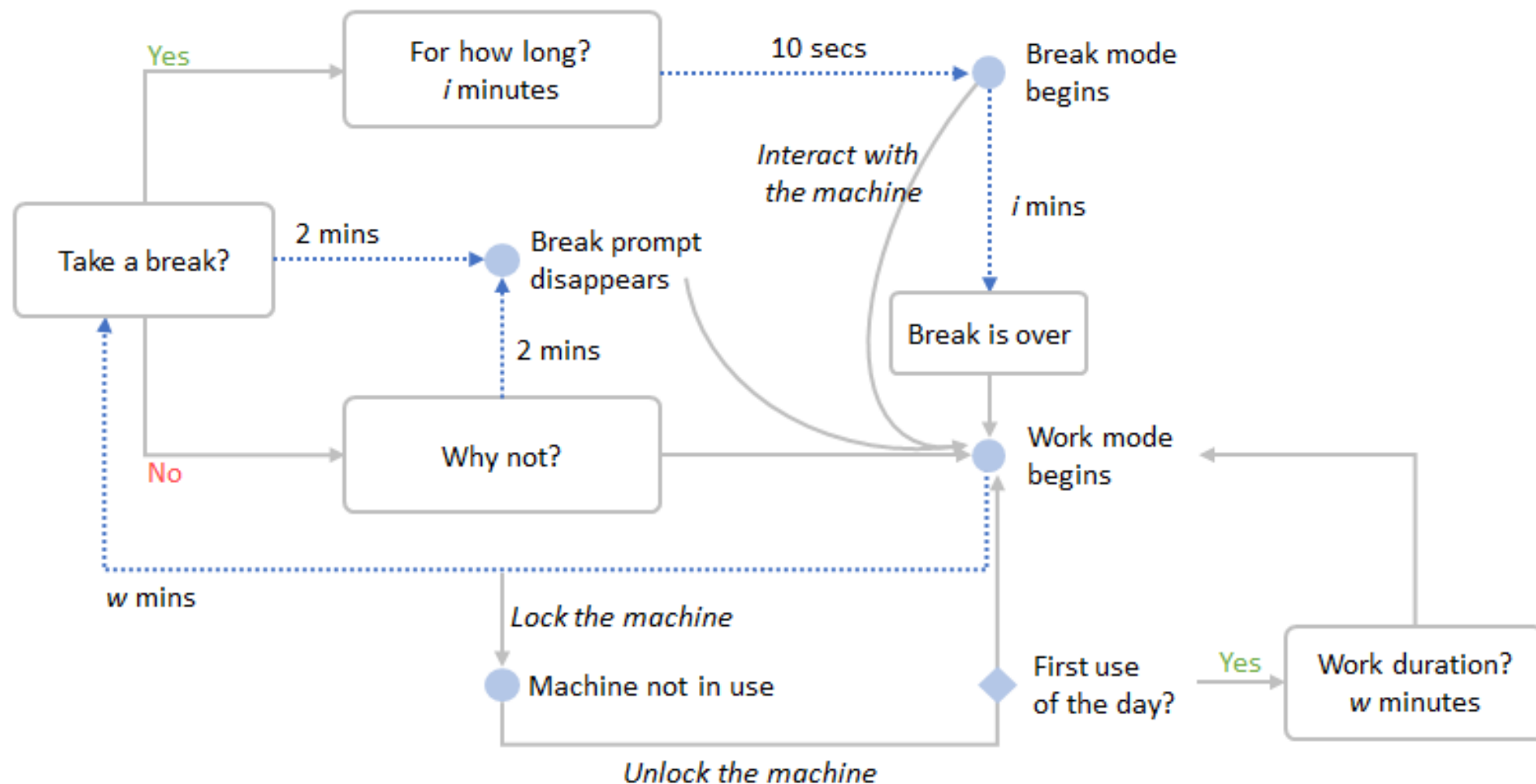
Appendix: Time for Break

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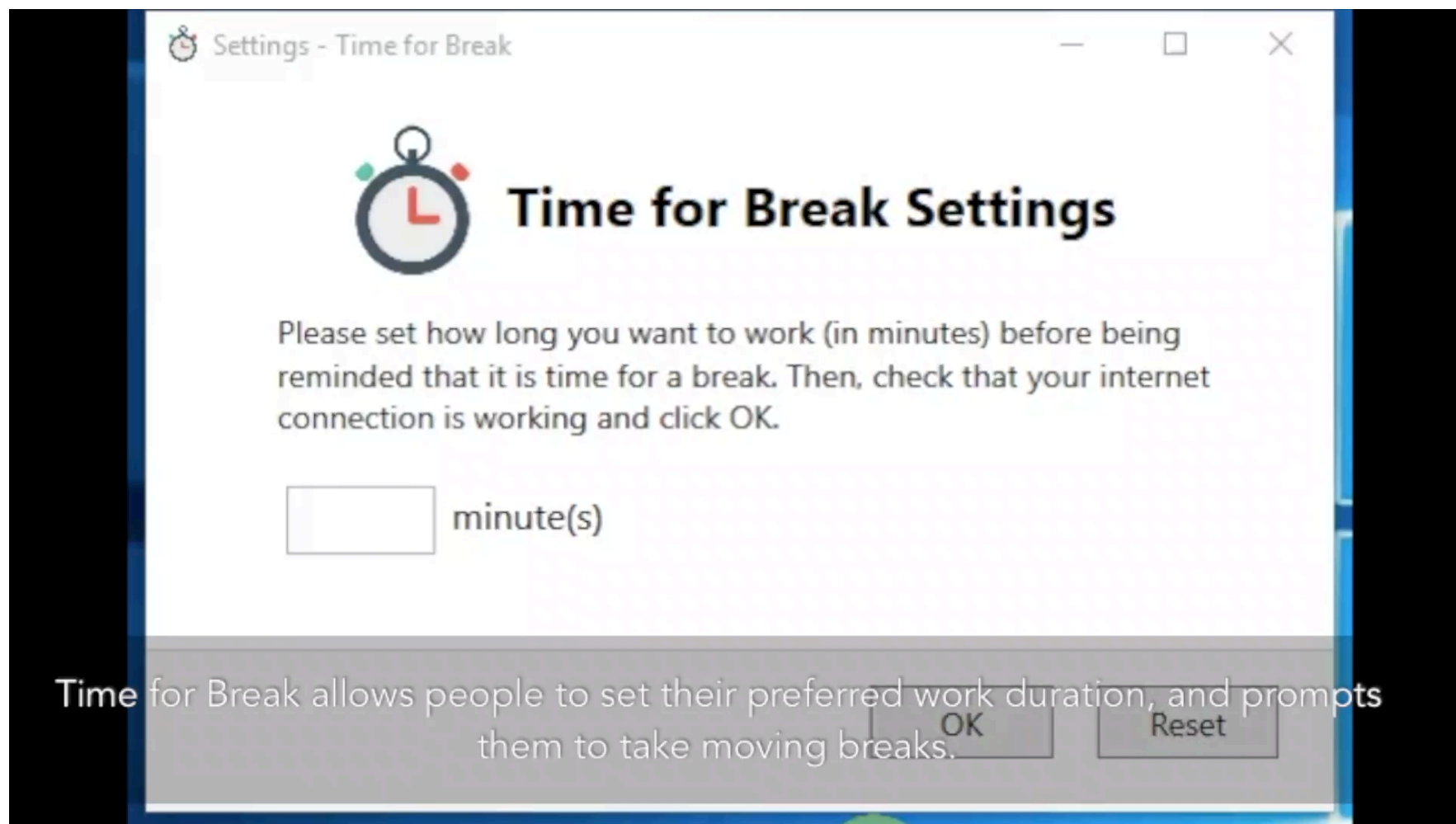
Appendix: Descriptive Statistics

Measures	ICC	Mean	SD	Min (raw)	Max (raw)
Work duration	.70	69 mins	29 mins	20 mins	120 mins
Response latency	.10	23.47 secs	27.91 secs	3 secs	120 secs
Intended break duration	.13	4.42 mins	5.42 mins	1 min	60 mins
Actual break duration	.09	5.92 mins	11.88 mins	1 min	138 mins

ICC: intra-class correlation

Appendix: Habit Strength Measures

Please rate the following statements about how you take standing or moving breaks throughout the day during work hours.

"Taking breaks is something…"

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor Disagree	Somewhat agree	Agree	Strongly agree
I do frequently.	○	○	○	○	○	○	○
I do automatically.	○	○	○	○	○	○	○
I do without having to consciously remember.	○	○	○	○	○	○	○
I start doing before realizing I'm doing it.	○	○	○	○	○	○	○

[Verplanken & Orbell, 2003]

Appendix: Self-Regulation Measures

Please rate the following items based on your experience on taking standing or moving breaks during work hours.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor Disagree	Somewhat agree	Agree	Strongly agree
My break-taking behaviors during work hours is not that different from other people's.	○	○	○	○	○	○	○
I doubt I can take more moving breaks than I do now during work hours even if I want to.	○	○	○	○	○	○	○

[Brown et al., 1999]

Appendix: Self-Regulation Measures

Please rate the following items based on your experience on taking standing or moving breaks during work hours.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor Disagree	Somewhat agree	Agree	Strongly agree
I have trouble making up my mind about taking moving breaks during work hours.	○	○	○	○	○	○	○
I get easily distracted from my plans of taking moving breaks during work hours.	○	○	○	○	○	○	○

[Brown et al., 1999]

Appendix: Self-Regulation Measures

Please rate the following items based on your experience on taking standing or moving breaks during work hours.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor Disagree	Somewhat agree	Agree	Strongly agree
I am able to accomplish goals I set for myself to take more moving breaks during work hours.	○	○	○	○	○	○	○
I don't seem to learn from my previous experience in break prolonged sedentary behavior during work hours.	○	○	○	○	○	○	○

[Brown et al., 1999]