



Behavioral Aspects of Monitoring

**Michel Handgraaf
AMS/WUR**



Michel Handgraaf

Associate Professor at WUR

- Specialized in Behavioral Decision Making

Research focus:

- System-wide change - “How can local interventions lead to global change?”
 - Spread over Time, Place, Behavior, Social network
 - “Behavioral cost” as predictor of success

Topics and projects:

- Climate change mitigation
 - Energy projects (Positive Energy Districts, retrofitting, EV, PV, wind)
 - Building with wood (carbon capture & storage)
 - Circularity (plastic recycling, biocomposites)
- Good (impact) measurement
 - For evidence-based policy
- Sharing knowledge
 - Professional education about behavioral aspects of climate change

TAKING ACTION TO SAVE ENERGY:

Two types of actions:

- Investment (e.g., Solar Panels, Insulation)
- Curtailment (e.g. shorter showering)

Many actions are a mix of a one time investment and behavior change:

- PHEV is not always charged
- People still take the car after buying an electric bike

WHY TAKE ACTION?

- Financial (return on investment)
- Hedonic (comfort, ease of use)
- Norms (fitting in, wanting to do the right thing, status)

It is important to know why people take action!

- Combinations are possible
- Sometimes people are not fully aware of their motivations
- Money is the easiest, most convincing reason
 - not always the most important

Why monitoring matters for investment:

- Financial
 - Keeping track of savings/earnings
 - Verifying expectations
 - Tailor-made based on monitoring – Optimal savings
- Hedonic (comfort, ease of use)
 - Verifying perceptions
 - Tailor-made based on monitoring - Comfort
- Norms (fitting in, wanting to do the right thing, status)
 - Conspicuous conservation
 - Ability to make savings visible
 - 'Bragging rights'

Why monitoring matters for behavior change:

- Financial
 - Keeping track of savings/earnings
 - Cumulative effects
- Hedonic (comfort, ease of use)
 - Not changing habits is most comfortable
 - Making change fun requires monitoring/feedback
 - Must be frequent and direct (Fitbit, Prius display, Amphiro)
- Norms (fitting in, wanting to do the right thing, status)
 - Conspicuous conservation
 - Ability to make savings visible
 - 'Bragging rights'

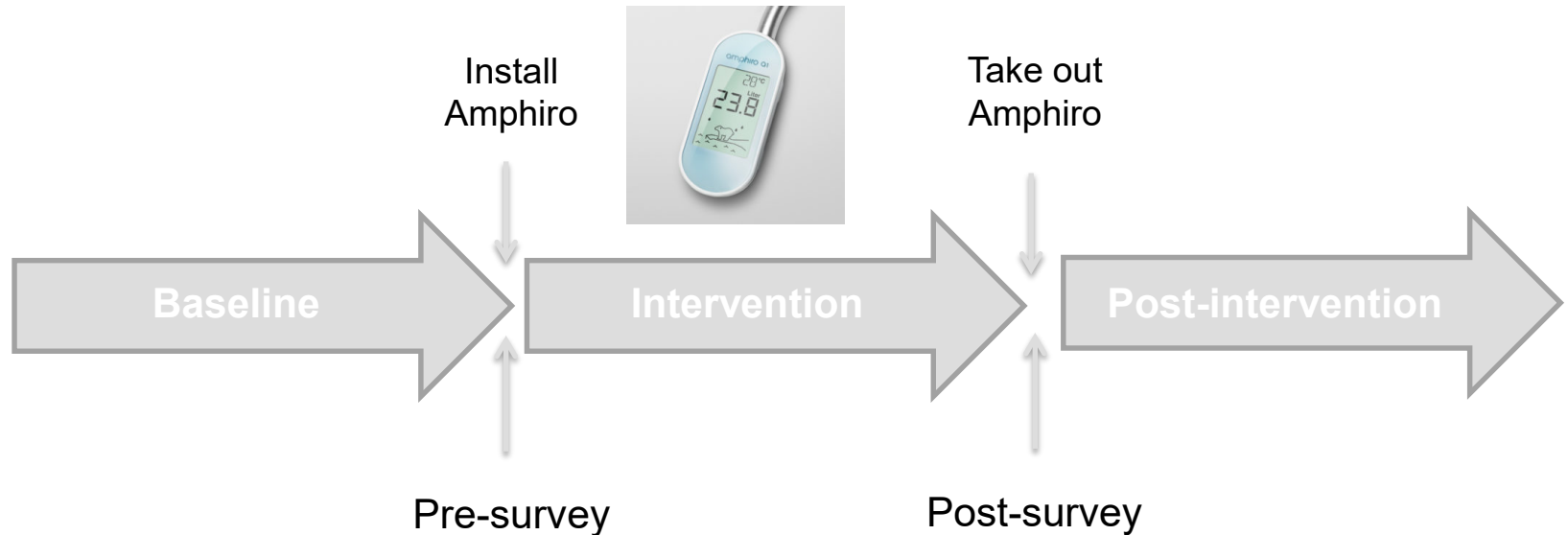
Habits

Behavior change frequently involves changing habits

- Changing habits is psychologically costly
- Changing habits is easiest in times of disruption (new house, big renovation, Covid, etc.)
- Repeated & frequent feedback is necessary for changing habits
- Feedback has to be direct (Fitbit, Prius display, **Amphiro**)
 - In the moment, during behavior
 - Concurrent
 - Easy to understand
 - Detailed enough
 - motivating

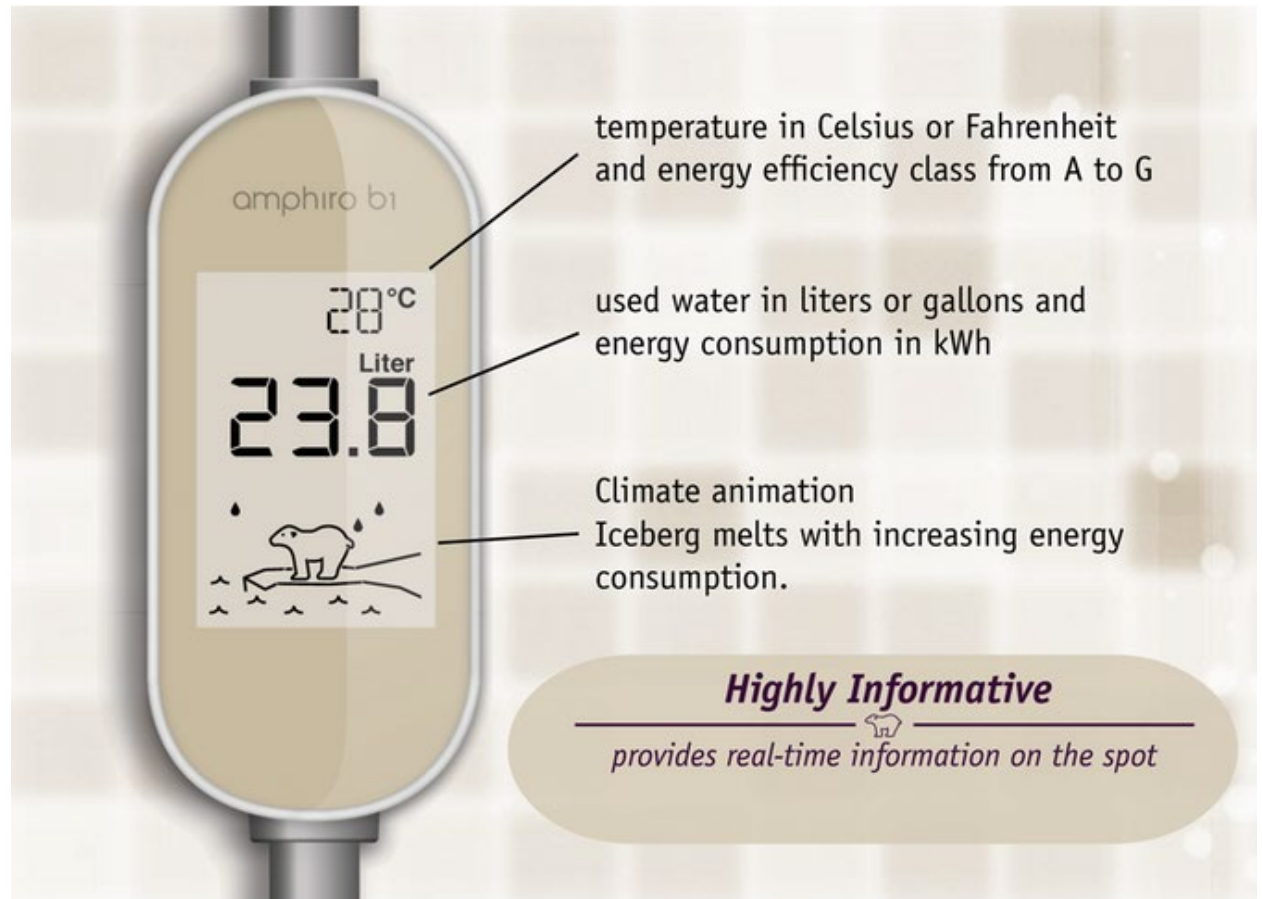
AMPHIRO@STUDENT HOTEL

- 92 participants ($M_{age} = 19.58$, $SD_{age} = 1.92$, 52.2% female)



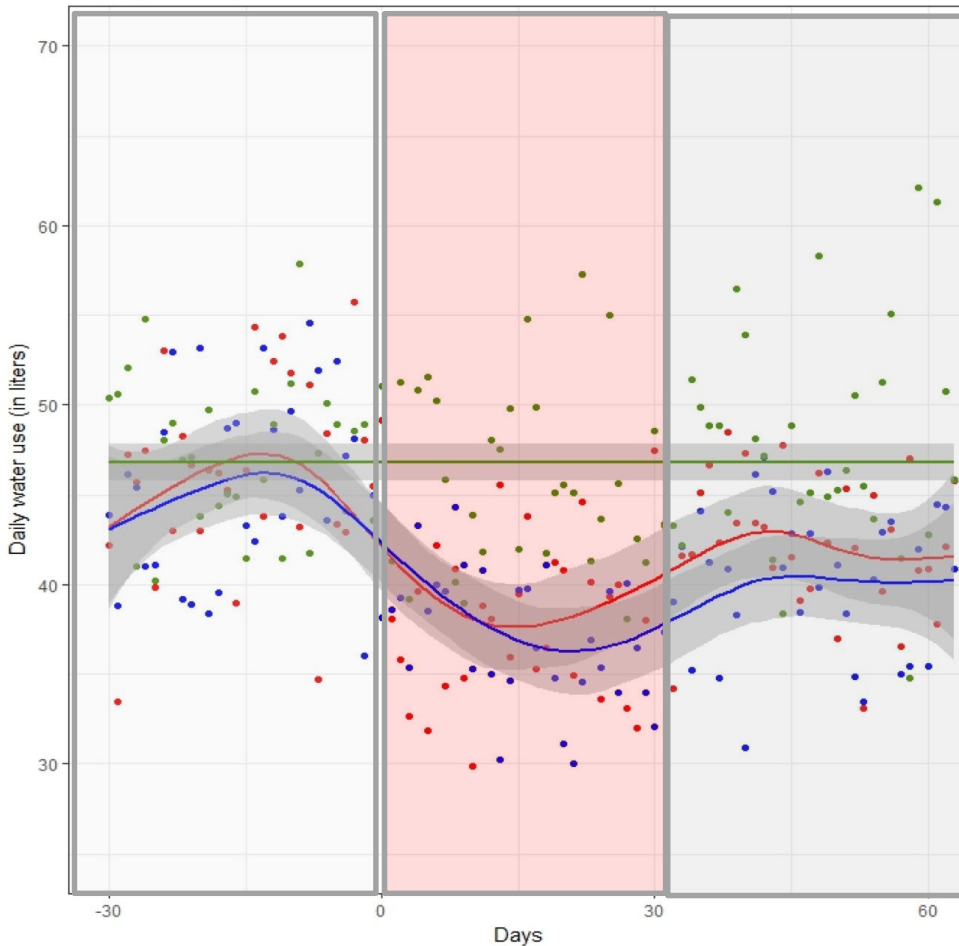
REAL-TIME FEEDBACK

- Amphiro device



RESULTS – WATER USE

Water Use



Participants significantly reduce their water use from baseline to:

Feedback period (-17%)

Post-intervention period (-10%)

Condition
— How
— Why
— Control



AMSTERDAM INSTITUTE FOR
ADVANCED METROPOLITAN SOLUTIONS

Engineering the future city.

michel.handgraaf@wur.nl



Overall impact of an intervention should not be ignored

- Positive side-effects
 - Increase in motivation for consistency
 - Transfer to other domains (saving energy on home, now also on transportation)
 - Transfer to other places
 - Saving energy at home, also at work
 - Transfer to other people
 - Saving energy as parents also influences children
- No negative side effects
 - Licensing
 - After doing good, I'm allowed something bad
 - Rebound
 - Behavior becomes cheaper
 - Savings are spent on other things