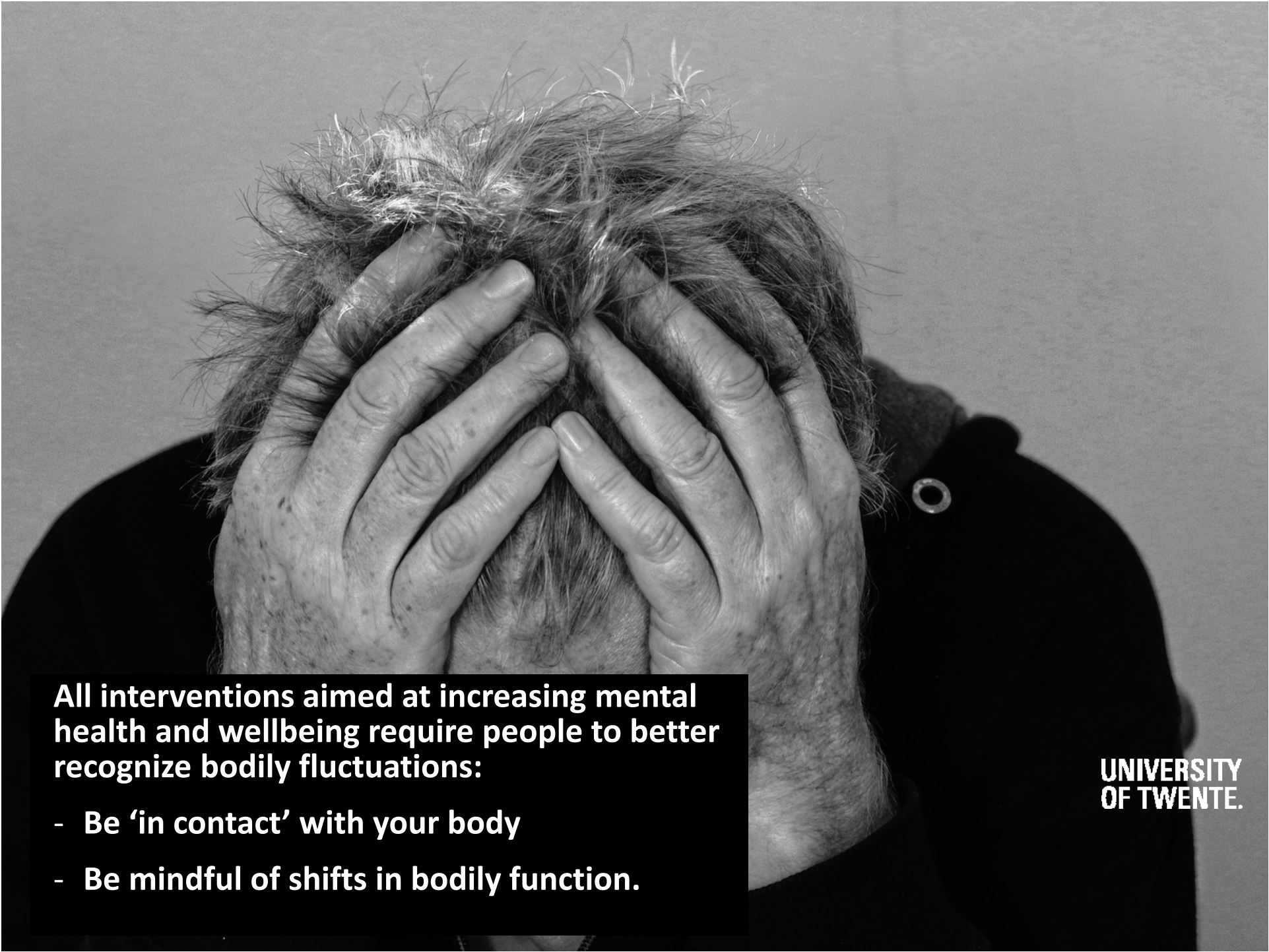




SENSE-IT PLATFORM FOR HR FEEDBACK

Matthijs Noordzij (Psychology, Health and Technology)

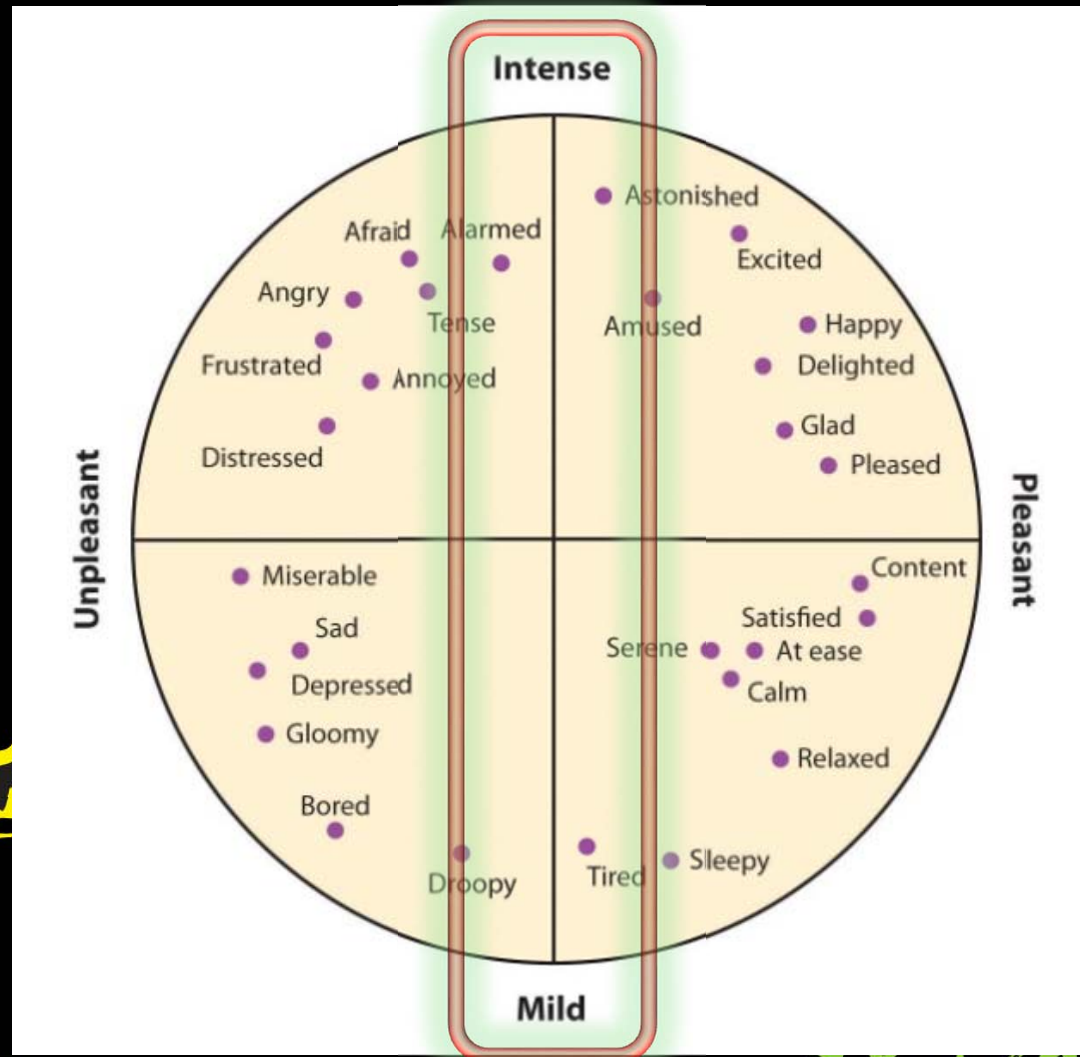




All interventions aimed at increasing mental health and wellbeing require people to better recognize bodily fluctuations:

- Be 'in contact' with your body
- Be mindful of shifts in bodily function.

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‘Window of tolerance’ (Ogden & Minton, 2000)



A R O U S A L	Hyperarousal Zone	Hypervigilant, hyperdefensive, hyperactive, disorganized movement, high intensity, not “in tune” with environment, impulsive, takes physical risks, often seeks sensory stimulation; emotions: rage, panic, terror
	<hr/>	
	Window of Tolerance*	↑
		Playful, eye contact, organized movement, initiates and follows through, spontaneous, good contact with others, aware and responsive to environment; broad range of emotions and may include: anger, fear, joy, sadness, disgust
		↓
	Hypoarousal Zone	Flat affect, low energy, unresponsive, low vitality and energy, difficult to reach, little facial expression, passive, “spacey,” poor eye contact; emotions tend towards helplessness, hopelessness, and despair

What might
happen
because
arousal goes
outside the
WoT



SOME FACTS TO REMEMBER / NOT FORGET:

Existing treatment approaches in mental health primarily consist of psycho-education, (cognitive) behavioural therapy [CBT], and pharmacological treatment.

A central component for most interventions aimed at emotion or aggression regulation is to train people to have more awareness of their body (Goldstein et al., 1987; Robertson, Daffern, & Bucks, 2012). The premise is that by recognizing (strong) physiological responses and/or changes, in time an opportunity for self-regulation might become available to avoid conflict, self harm and/or aggressive behaviour.

The current state of the art of body awareness is that people have to recognize these signals subjectively, by introspectively paying attention to certain nonverbal cues such as increased breathing or increased heart rate. They might also have to reflect on whether this is because of mental or physical causes.

AN IDEA:

These physical signals are easy to miss subjectively in a situation that contains stressors that demand attention and evoke conditioned responses, especially in individuals with mental health problems.

Ambulatory, real-time monitoring and feedback on bodily changes through wearable technology might provide an additional, objective tool, which would not be distracted by external circumstances and at the very least does alert the user of significant bodily changes.

CURRENT SMARTWATCHES AND ACTIVITY TRACKERS CAN BE OF (SOME) HELP?

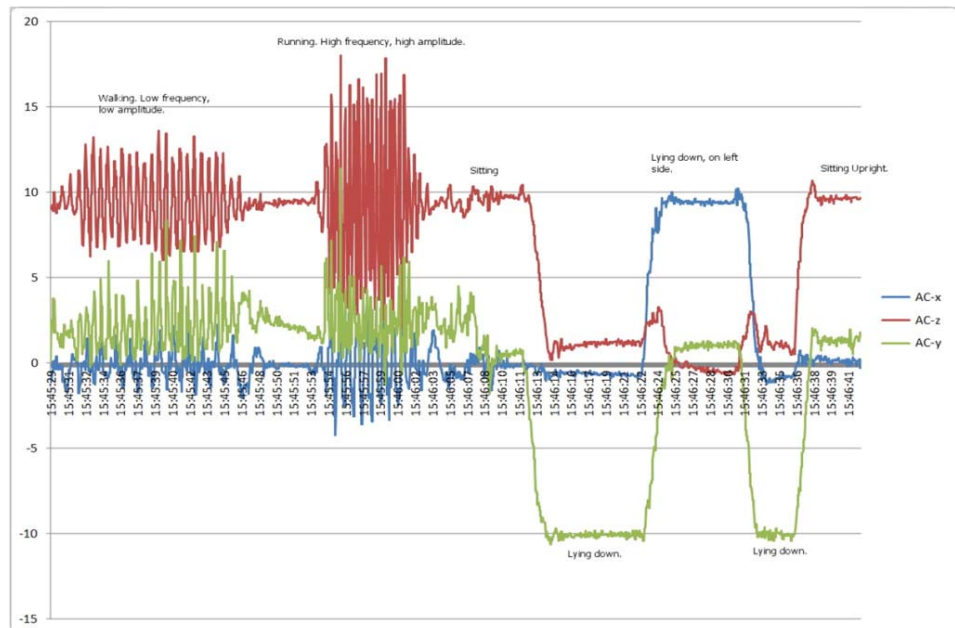
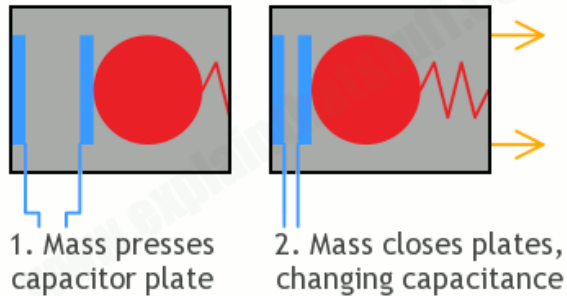


ACCELEROMETRY

- Accelerometers are sensors which measure the accelerations of objects in motion along reference axes.

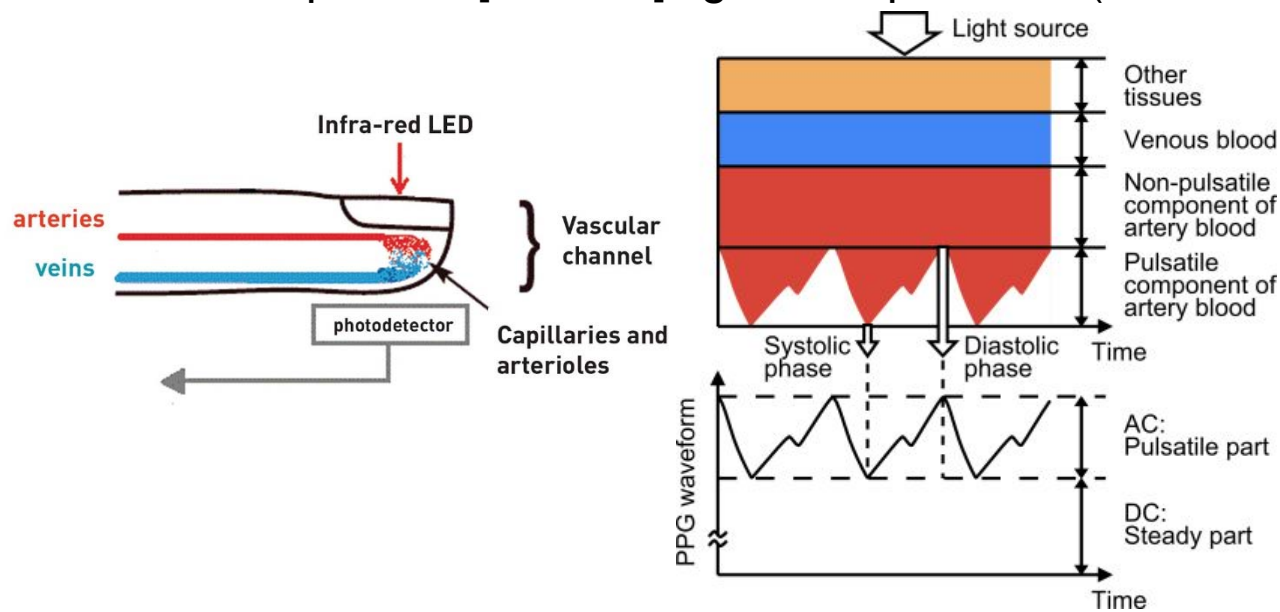
Capacitive accelerometer

www.explainthatstuff.com



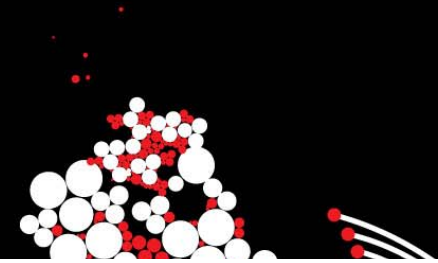
PHOTOPLETHYSMOGRAPHY (PPG)

- 'PPG detects the Blood Volume Pulse by measuring the relative absorption of [infrared] light over perfused ('doorbloed') skin.'



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Your complete health partner



Breathe better, sleep better

Our breathing sensors offer useful insights for improving your sleep.



Real-time tension awareness

Know when you are getting tense and take action before symptoms occur



Your virtual health coach

Health Tags track your calories, steps, heart rate and remind you to be active.



Daily Fitness and Stress Tracking

With help from Elevate™ wrist-based heart rate technology®, vivoactive 3 Music lets you monitor key aspects of your fitness and stress to show how your body responds under various circumstances. For example, it's able to estimate your VO2 max and fitness age, important indicators of your physical fitness that can often improve over time with regular exercise. It also tracks your heart rate variability (HRV), which is used to calculate and track your stress level. vivoactive 3 Music can make you aware when physical or emotional sources cause your stress level to rise so you can find a way to relieve the pressure.



-
- Originally designed together with Therapists, Borderline Personality disorder patients and Usability Experts
 - Affordable
 - Based on the android / WearOS platform
 - Compliant with the new data law
 - Suitable for research and design projects
 - Focuses on heart rate changes in low movement scenarios

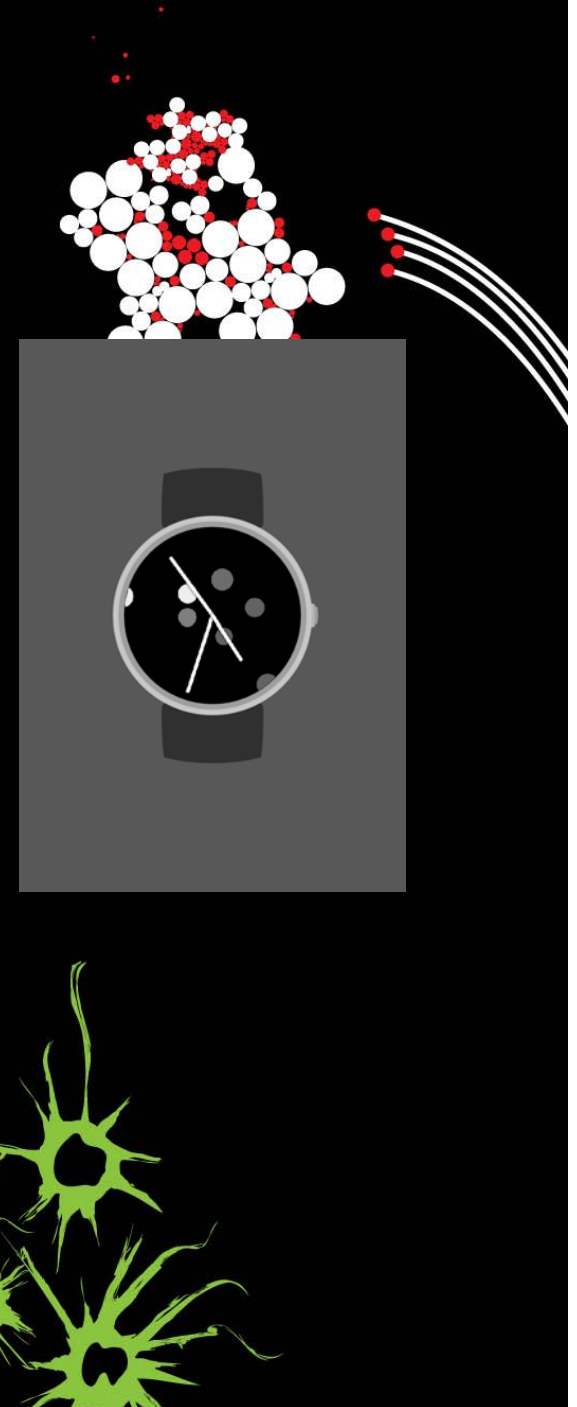
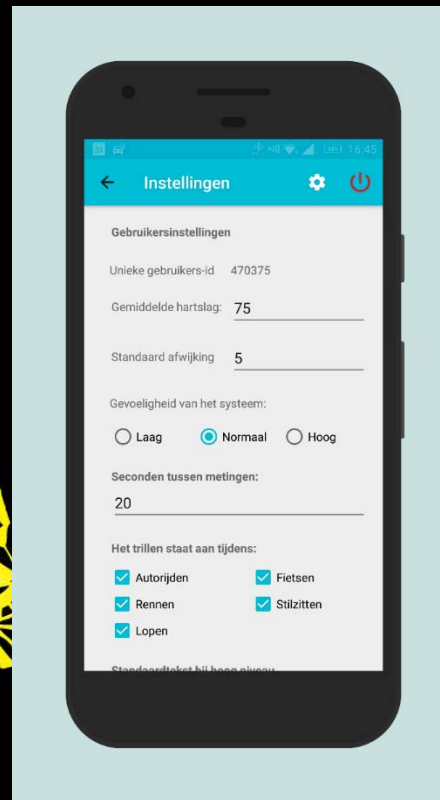
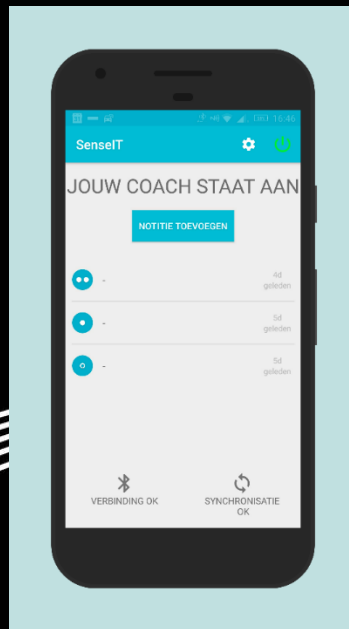


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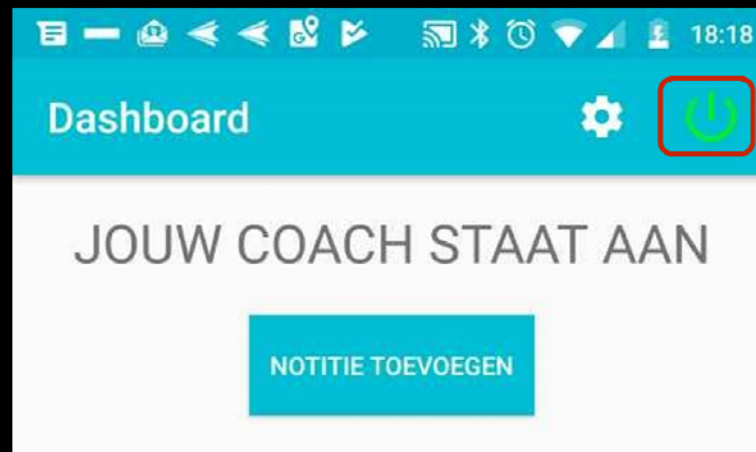
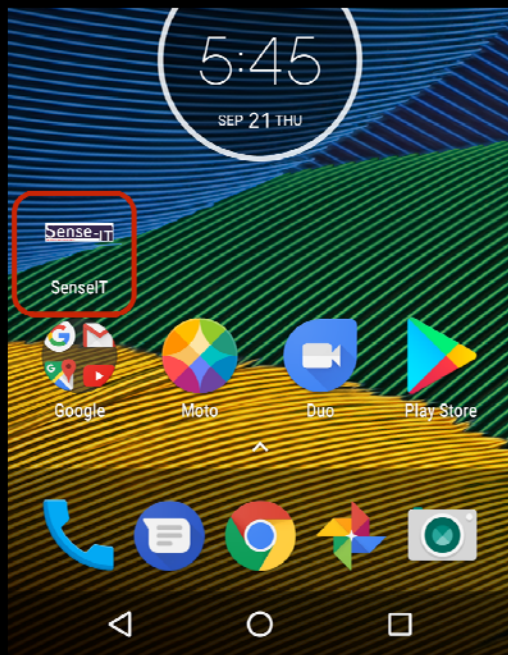
FULLY CUSTOMISABLE

SENSE-IT PLATFORM



Hands on practice!

1. Open the Sense-IT app on the smartphone
2. Turn on coaching
3. (The watch should vibrate now)



Please inflate your
balloon





Please inflate your
balloon

... Now, go sit on it!

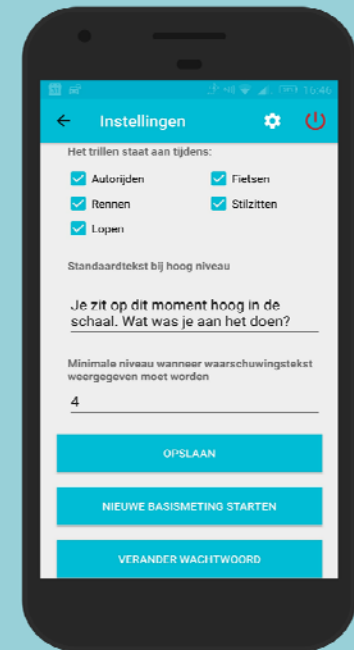
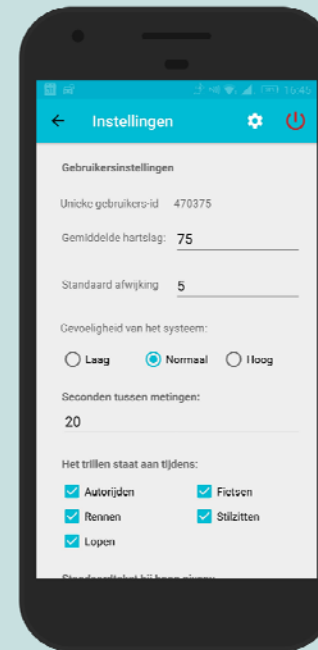
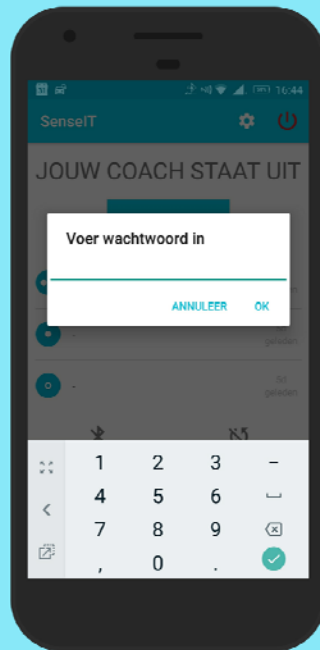
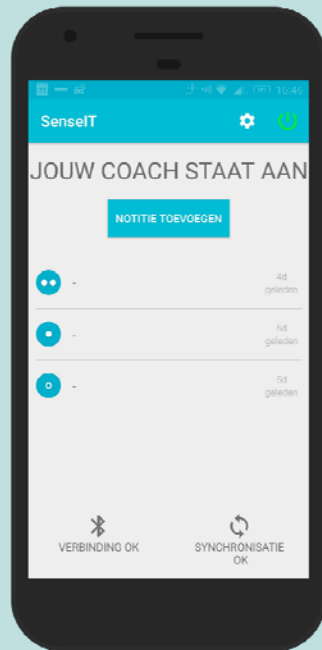
(Try to not let it explode)



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Hands on practice!

Take a look at the mobile app



Personas



- Professional athlete
- Excellent physical stamina
- Quite temperamentful
- Overall good control over stress and emotions

A



- School-teacher
- Goes to school by bike, eats healthily
- Uptight, strained
- Poor control over stress and low emotional awareness

B



- Office clerk
- Addicted to sports...on tv
- Likes laying down on the couch
- Quite easy-going
- Reasonable control over stress and has average emotional awareness

C

Assignment

- Adjust the Sense-IT for each persona.
Fill in the estimated heartrate data and adjust the settings so that it best matches each persona.
(You can use the forms handed out)

- Next: apply the settings that (you think) would best fit your own profile
- Again, use the forms handed out
- Also apply the settings in the app! *(if you're wearing one of the smartwatches)*
- Discuss whether you would want different settings for different situations.

REACTIONS FROM PATIENTS WITH BORDERLINE PERSONALITY DISORDER

“It provides an opportunity to focus on moments of physiological calmness”

“By adding this feature, the therapeutic goal to reach or maintain an overall lower state of arousal is supported by the app”

“I actually don’t want to give it back to you!”

PROJECTS USING THE SENSE-IT PLATFORM

- Aiming for the improvement of emotional awareness in patients with severe borderline personality disorder (UT, Scelta GGNet)
- Biofeedback in forensic ambulant care: research into the feasibility and effectiveness of real-time biofeedback to reduce problems in aggression (VUMC, UT)
- Early signaling and regulating of stress with a wearable device to reduce incidents in residential youthcare (Pluryn, UT)
- Timing of experience sampling and eCoaching for stress management and resilience training and the value of self-tracking measurements on emotional arousal for awareness on stress and resilience (UT, Menzis, Hanze University).
- Acceptance and potential clinical added value of Sense-IT in forensic psychiatric patients with autism spectrum disorder and/or intellectual disability: a proof-of-concept study (De Boog, UT).



IMPACT: TO SCIENCE AND SOCIETY.

- A stable platform to, for the first time, systematically design and research biofeedback, anywhere and anytime.
- Improve treatments in healthcare today by adding personalized biofeedback insight, and just in time physiologically triggered interventions.

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