

Quantified eCoaching for Resilience Training

Combining self-tracking and persuasive eCoaching to train employees' capacity for resilience: identification of values and requirements with stakeholders

APPENDICES

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Contents

<u>Appendices Chapter 2</u>		3
Appendix 1	<u>Search Query</u>	3
Appendix 2	<u>Overview of persuasive eCoaching components</u>	6
Appendix 3	<u>Summary of included publications</u>	11
Appendix 4	<u>Key components and their specific design for effects on health outcomes, usability and/or adherence.</u>	22
 <u>Appendices Chapter 4</u>		 27
Appendix 1	<u>Online survey used for the stakeholder identification</u>	27
Appendix 2	<u>Topic list used during the semi-structured interviews</u>	34
Appendix 3	<u>Pitch, goals and topic list used during focus groups</u>	37
Appendix 4	<u>Results of the online survey for the stakeholder identification</u>	40
 <u>Appendices Chapter 5</u>		 42
Appendix 1	<u>Sense-IT and Resilience Navigator app description according to CONSORT guidelines</u>	42
Appendix 2	<u>Interview scheme Resilience Navigator app</u>	49
Appendix 3	<u>Summary table of results</u>	51
 <u>Appendices Chapter 6</u>		 56
Appendix 1	<u>Description of the BringBalance app according to the CONSORT guideline on reporting eHealth</u>	56
Appendix 2	<u>Post-test survey</u>	62
Appendix 3	<u>Scores on the utility of the elements of BringBalance for the reflection process</u>	92
Appendix 4	<u>Summary table of the stimulators and stagnating factors for reflection per phase of reflection</u>	95

Appendices Chapter 2

Appendix 1 – Search query

Pubmed:

("quantified self" OR self-track* OR wearable* OR "activity tracker" OR "wireless body area network" OR "body sensor network" OR "motion sensor" OR accelerometer OR pedometer OR "step counter" OR "smart watch" OR "remote sensing technology" OR biofeedback OR "objective measure*" OR "self-monitor*" OR "health monitor*" OR "wireless technology" OR Telemonitoring OR "personal health records" OR "self-sensing" OR "lifelogging" OR "self-surveillance" OR "Personal informatics" OR "self-monitoring" OR "remote monitoring" OR "continuous monitoring" OR "ambulatory monitoring" OR "monitoring technology" OR "health monitoring" OR "continuous monitoring" OR "lifestyle monitoring" OR "physical activity monitoring" OR "sleep monitoring" OR "stress monitoring") AND ("persuasive technology" OR "telehealth" OR Telemedic* OR Telemedicine OR mHealth OR ehealth OR "computer-assisted therapy" OR "behavior change support system" OR captology OR "Persuasive computing" OR "remote consultation" OR teleconsultation OR "mobile health" OR "virtual coaching" OR "virtual consultation" OR etherap* OR "persuasive telehealth" OR "remote coaching" OR "persuasive communication") AND ("Health behavior" OR "health behaviour" OR "health promotion" OR "behavior change" OR "behaviour change" OR "behavioral change" OR "behavioural change" OR "behavior intervention" OR "behaviour intervention" OR "behavioral intervention" OR "behavioural intervention" OR "Health prevention" OR "lifestyle prevention" OR "lifestyle intervention" OR "lifestyle program" OR "lifestyle programme" OR "lifestyle change" OR "Health education" OR "behavior control" OR "behaviour control" OR "behavioral control" OR "behavioural control" OR "Health program" OR "health programme" OR "Health intervention" OR "Lifestyle modification" OR "healthy lifestyle" OR "physical activity" OR "sedentary lifestyle" OR "exercise" OR sleep OR "stress, psychological" OR "mental stress" OR "emotional stress" OR relaxation OR "relaxation therapy" OR "relaxation training")

PsycINFO:

((("quantified self" OR self-track* OR wearable* OR "activity tracker" OR "wireless body area network" OR "body sensor network" OR "motion sensor" OR accelerometer OR pedometer OR "step counter" OR "smart watch" OR "remote sensing technology" OR biofeedback OR "objective measure*" OR "self-monitor*" OR "health monitor*" OR "wireless technology" OR Telemonitoring OR "personal health records" OR "self-sensing" OR "lifelogging" OR "self-surveillance" OR "Personal informatics" OR "self-monitoring" OR "remote monitoring" OR "continuous monitoring" OR "ambulatory monitoring" OR "monitoring technology" OR "health monitoring" OR "continuous monitoring" OR "lifestyle monitoring" OR "physical activity monitoring" OR "sleep monitoring" OR "stress monitoring") AND ("persuasive technology" OR "telehealth" OR Telemedic* OR mHealth OR m-health OR ehealth OR e-health OR "computer-assisted therapy" OR "behavior change support system" OR captology

OR "Persuasive computing" OR "remote consultation" OR teleconsultation OR "mobile health" OR "virtual coaching" OR "virtual consultation" OR etherap* OR e-therap* OR "persuasive telehealth" OR "remote coaching" OR ecoaching OR e-coaching OR "persuasive communication") AND ("Health behavior" OR "health behaviour" OR "health promotion" OR "behavior* change" OR "behaviour* change" OR "behavior* intervention" OR "behaviour* intervention" OR "Health prevention" OR "lifestyle prevention" OR "lifestyle intervention" OR "lifestyle program" OR "lifestyle programme" OR "lifestyle change" OR "Health education" OR "behavior* control" OR "behaviour* control" OR "Health program" OR "health programme" OR "Health intervention" OR "Lifestyle modification" OR "healthy lifestyle" OR "physical activity" OR "sedentary lifestyle" OR "exercise" OR sleep OR "stress, psychological" OR "mental stress" OR "emotional stress" OR relaxation OR "relaxation therapy" OR "relaxation training"))

Scopus:

TITLE-ABS-KEY(("quantified self" OR self-track* OR wearable* OR "activity tracker" OR "wireless body area network" OR "body sensor network" OR "motion sensor" OR accelerometer OR pedometer OR "step counter" OR "smart watch" OR "remote sensing technology" OR biofeedback OR "objective measure*" OR "self-monitor*" OR "health monitor*" OR "wireless technology" OR Telemonitoring OR "personal health records" OR "self-sensing" OR "lifelogging" OR "self-surveillance" OR "Personal informatics" OR "self-monitoring" OR "remote monitoring" OR "continuous monitoring" OR "ambulatory monitoring" OR "monitoring technology" OR "health monitoring" OR "continuous monitoring" OR "lifestyle monitoring" OR "physical activity monitoring" OR "sleep monitoring" OR "stress monitoring") AND ("persuasive technology" OR "telehealth" OR Telemedic* OR mHealth OR m-health OR ehealth OR e-health OR "computer-assisted therapy" OR "behavior change support system" OR captology OR "Persuasive computing" OR "remote consultation" OR teleconsultation OR "mobile health" OR "virtual coaching" OR "virtual consultation" OR etherap* OR e-therap* OR "persuasive telehealth" OR "remote coaching" OR "persuasive communication") AND ("Health behavior" OR "health promotion" OR "behavior* change" OR "behaviour* change" OR "behavior* intervention" OR "behaviour* intervention" OR "Health prevention" OR "lifestyle prevention" OR "lifestyle intervention" OR "lifestyle program" OR "lifestyle programme" OR "lifestyle change" OR "Health education" OR "behavior* control" OR "behaviour* control" OR "Health program" OR "health programme" OR "Health intervention" OR "Lifestyle modification" OR "healthy lifestyle" OR "physical activity" OR "sedentary lifestyle" OR "exercise" OR sleep OR "stress, psychological" OR "mental stress" OR "emotional stress" OR relaxation OR "relaxation therapy" OR "relaxation training"))

EMBASE:

((quantified) NEAR/3 (self)) OR ((Activity) NEXT (tracker)) OR Wearable* OR ((Self) NEXT (track*)) OR ((Wireless) NEXT (Body) NEXT (Area) NEXT (Network)) OR ((body) NEXT (sensor) NEXT (network)) OR ((Motion) NEXT (sensor)) OR Accelerometer OR Pedometer OR ((Step) NEXT (counter)) OR ((Smart) NEXT (watch)) OR ((Remote) NEXT (sensing) NEXT (technology)) OR biofeedback OR ((objective) NEXT (measure)) OR ((self) NEXT (monitor*)) OR ((health) NEXT (monitor*)) OR ((wireless) NEXT (technology)) OR Telemonitoring OR ((personal) NEXT (health) NEXT (records)) OR ((self) NEXT (sensing)) OR lifelogging OR ((self) NEXT (surveillance)) OR ((personal) NEXT (informatics)) OR ((self) NEXT (monitoring)) OR ((remote) NEXT (monitoring)) OR ((ambulatory) NEXT (monitoring)) OR ((continuous) NEXT (monitoring)) OR ((health) NEXT (monitoring)) OR ((lifestyle) NEXT (monitoring)) OR ((physical) NEXT (activity) NEXT (monitoring)) OR ((sleep) NEXT (monitoring)) OR ((stress) NEXT (monitoring)) OR ((monitoring) NEXT (technology))) AND (((Persuasive) NEXT (technology)) OR Telehealth OR Telemedic* OR mHealth OR eHealth OR m-health OR e-health OR ((computer) NEXT (assisted) NEXT (therapy)) OR ((Behavior) NEXT (change) NEXT (support) NEXT (systems)) OR Captology OR ((Persuasive) NEXT (computing)) OR ((remote) NEXT (consultation)) OR Teleconsultation OR ((mobile) NEXT (health)) OR ((virtual) NEXT (coaching)) OR ((virtual) NEXT (consultation)) OR ecoaching OR e-coaching OR etherap* OR e-therapy OR ((persuasive) NEXT (telehealth)) OR ((remote) NEXT (coaching)) OR ((persuasive) NEXT (communication))) AND (((Health) NEXT (behavior)) OR ((health) NEXT (behaviour)) OR ((Health) NEXT (promotion)) OR ((behavior*) NEXT (change)) OR ((behaviour*) NEXT (change)) OR ((behavior*) NEXT (intervention)) OR ((behaviour*) NEXT (intervention)) OR ((Health) NEXT (prevention)) OR ((lifestyle) NEXT (prevention)) OR ((lifestyle) NEXT (intervention)) OR ((lifestyle) NEXT (program)) OR ((lifestyle) NEXT (programme)) OR ((health) NEXT (program)) OR ((health) NEXT (programme)) OR ((lifestyle) NEXT (change)) OR ((health) NEXT (education)) OR ((behavior*) NEXT (control)) OR ((behaviour*) NEXT (control)) OR ((health) NEXT (intervention)) OR ((Lifestyle) NEXT (modification)) OR ((healthy) NEXT (lifestyle)) OR ((Physical) NEXT (activity)) OR (exercise) OR ((sedentary) NEXT (lifestyle)) OR (sleep) OR ((psychological) NEXT (stress)) OR ((mental) NEXT (stress)) OR ((emotional) NEXT (stress)) OR (relaxation) OR ((relaxation) NEXT (therapy)) OR ((relaxation) NEXT (training)))

Appendix 2 – Overview of persuasive eCoaching components

Table. Overview of persuasive eCoaching components.^a

Persuasive eCoaching component	Principle citations	Example
Primary task support	Components that support the users in “the carrying out of the user’s primary task” [9].	
Reduction	“A system that reduces complex behavior into simple tasks helps users perform the target behavior, and it may increase the benefit/cost ratio of a behavior” [9].	Setting incremental daily step goals to eventually reach the long term goal.
Tunneling	“Using the system to guide users through a process of experience provides opportunities to persuade along the way” [9].	Only when participants succeeded to reach the current daily step goal, they are provided with access to information on how to continue their progress.
Tailoring	“Information provided by the system will be more persuasive if it is tailored to the potential needs, interests, personality, usage context, or other factors relevant to a user group” [9].	The layout of a mobile applications is adjusted based on user’s gender.
Personalization	“A system that offers personalized content or services has a greater capability to persuade” [9].	Based on a user’s weight loss, the dietary recommendations will be adjusted.
Simulation	“Systems that provide simulations can persuade by enabling users to observe immediately the link between cause and effect” [9].	A graph is showing the successfully completed exercise tasks per day in relation to the increase in daily steps.
Rehearsal	“A system providing means with which to rehearse a behavior can enable people to	In a weight management intervention, video instructions are provided

	change their attitudes or behavior in the real world” [9].	on how to cook a low-fat meal.
Dialogue support	Components “related to implementing computer-human dialogue support in a manner that helps users keep moving towards their goal or target behavior” [9].	
Praise	“By offering praise, a system can make users more open to persuasion” [9].	Participants receive a praise message when they reach their weekly weight-loss goal.
Rewards	“Systems that reward target behaviors may have great persuasive powers” [9].	Participants can collect coins when they completed an exercise and return them into discounts for fruit and vegetables.
Reminders	“If a system reminds users of their target behavior or usage of the system, the users will more likely achieve their goals” [9].	The system reminds the participant to upload their weekly accelerometer data into the system.
Suggestion	“System offering fitting suggestions will have greater persuasive powers” [9].	A user receives a message suggesting to take the bicycle to work instead of the car.
Similarity	“People are more readily persuaded through systems that remind them of themselves in some meaningful way” [9].	The system sends out reminders at convenient moments in time for the user.
Liking	“A system that is (visually) attractive for its users is likely to be more persuasive” [9].	The system provides a weekly funny fact struggles with physical activity behavior change.
Social role	“If a system adopts a social role, users will more likely use it for persuasive purposes” [9].	A virtual coach greets the person before they start the coaching session of a mobile application.
System credibility support	Components that support the design “to be more credible and thus more persuasive.” [9]	

Trustworthiness	“A system is viewed as trustworthy will have increased powers of persuasion” [9].	A mobile applications, that collects personal health data by means of a wearable device, makes a promise that the data will not be shared with third parties.
Expertise	“A system that is viewed as incorporating expertise will have increased powers of persuasion” [9].	When the system provides suggestions for weight loss, it provides links to dietary protocols.
Surface credibility	“People make initial assessments of the system credibility based on a firsthand inspection” [9].	No or only limited commercial advertisements are provided within a mobile phone application.
Real-world feel	“A system that highlights people or organization behind its content or services will have more credibility” [9].	Including contact information of the organization of development in a mobile intervention.
Authority	“A system that leverages roles of authority will have enhanced powers of persuasion” [9].	Provision of information in a mobile application about development in collaboration with health care professionals.
Third-party endorsement	“Third-party endorsements, especially from well-known and respected sources, boost perceptions on system credibility” [9].	This mobile application is approved as an eHealth intervention by the RVZ (The Council for Public Health and Health Care)
Verifiability	“Credibility perceptions will be enhanced if a system makes it easy to verify the accuracy of site content via outside sources” [9].	Links are provided to the original source of the content used in the mobile application
Social support	Components in the design that “motivates users by leveraging social influence” [9].	
Social support in general	The system motivates the user by leveraging social influence which cannot be placed under specific components such as social learning	Users are able to share information about their jogging routes without knowing the goal behind it: obtaining recognition, social learning or maybe

	or social facilitation as the goal of the specific social support component is unknown.	just see that others are performing the behavior along with them (social facilitation).
Social learning	“A person will be more motivated to perform a target behavior if (s)he can use a system to observe others performing the behavior” [9].	A user presents the activities he/she performed which has led to obtainment of a physical activity goal.
Social comparison	“System users will have a greater motivation to perform the target behavior if they can compare their performance with the performance of others” [9].	The average number of steps taken from a user with similar characteristics can be observed and compared with the user’s own average number of steps.
Normative influence	“A System can leverage normative influence or peer pressure to increase the likelihood that a person will adopt a target behavior” [9].	Before and after pictures are presented of people who succeeded to lose weight.
Social facilitation	“System users are more likely to perform target behavior if they discern via the system that others are performing the behavior along with them” [9].	A blog can be posted on an online platform where people can find others with similar goals.
Cooperation	“A system can motivate users to adopt a target attitude or behavior by leveraging human beings’ natural drive to co-operate” [9].	When 90% of a group reached their step goal that they, the whole group receives virtual rewards.
Competition	“A system can motivate users to adopt a target attitude or behavior by leveraging human beings’ natural drive to compete” [9].	Users will be ranked within a group of users based on their steps taken to observe who has performed the most physical activity during a week.
Recognition	“By offering public recognition for an individual or group, a system can increase the likelihood that a	Users can post their accomplishment and receive “likes” from other users.

	person/group will adopt a target behavior” [9].	
Other		
Goal-setting	A system can motivate users to perform the target behavior by setting goals (both short and long term). It sets the focus and, by means of self-tracking data, users can objectively see how they progress.	By means of self-tracking data, a daily step goal will be set for the user with 10% increase of the average steps per day from the past week.
Educational coaching	A system can provide knowledge about the target behavior and causes and effects which could persuade the user in performing the target behavior.	A video explains why it is important for office workers to perform a few minutes of moderate physical activity per hour.
Feedback	The system provides feedback which cannot be placed under specific components such as personalization, praise, or suggestions.	A feedback message is send after participants upload self-tracking data into the system notifying that the data is received.

^a Principles are cited from the article by Oinas-Kukkonen and Harjumaan [9] with exception of the components social support in general, goal-setting, educational coaching and feedback. These four components are added for the purpose of this review study.

Appendix 3 – Summary of included publications

Table. Summary of included publications.

Study number	Evaluating effectiveness on:	Study characteristics
Study 1	Health outcomes	<p>Title: mHealth Physical Activity intervention: A Randomized Pilot Study in Physically Inactive Pregnant Women</p> <p>Authors (year): Choi et al. (2015) [36]</p> <p>Study design: pilot RCT</p> <p>Objective: To test a 12-week mobile health (mHealth) physical activity intervention for feasibility and potential efficacy.</p> <p>Participants: women between 10 and 20 weeks of gestation and with a sedentary lifestyle (n=30)</p> <p>Country: United States</p> <p>Effectiveness: low effective</p> <p>Blended coaching: no</p>
Study 2	Health outcomes and adherence	<p>Title: A Novel Diabetes Prevention Intervention Using a Mobile App A Randomized Controlled Trial With Overweight Adults at Risk</p> <p>Authors (year): Fukuoka et al. (2015) [59]</p> <p>Study design: RCT</p> <p>Objective: To examine the feasibility and efficacy of a diabetes prevention intervention combined with a mobile app and pedometer in overweight adults at risk for type 2 diabetes.</p> <p>Participants: overweight adults with diatebes type 2 (n=60)</p> <p>Country: United States</p> <p>Effectiveness: high effective</p> <p>Blended coaching: yes</p>
Study 3	Health outcomes	<p>Title: Effectiveness of a smartphone application to promote physical activity in primary care: the SMART MOVE randomised controlled trial</p> <p>Authors (year): Glynn et al. (2014) [60]</p> <p>Study design: RCT</p> <p>Objective: To evaluate the effectiveness of a smartphone application (app) to increase physical activity in primary care.</p> <p>Participants: active Andriod smartphone user aged 16 years and older (n=90)</p>

		<p>Country: West of Ireland</p> <p>Effectiveness: high effective</p> <p>Blended coaching: no</p>
Study 4	Health outcomes	<p>Title: A Life-Style Physical Activity Intervention and the Antibody Response to Pneumococcal Vaccination in Women</p> <p>Authors (year): Long et al. (2013) [43]</p> <p>Study design: RCT</p> <p>Objective: To assess whether a life-style physical activity intervention improved antibody response to a pneumococcal vaccination in sedentary middle-aged women.</p> <p>Participants: sedentary woman between 35 to 65 years old (n=89)</p> <p>Country: United Kingdom</p> <p>Effectiveness: low effective</p> <p>Blended coaching: yes</p>
Study 5	Health outcomes and adherence	<p>Title: Effects of a Web-Based Personalized Intervention on Physical Activity in European Adults: A Randomized Controlled Trial</p> <p>Authors (year): Marsaux et al. (2015) [44]</p> <p>Study design: 4-arm RCT</p> <p>Objective: To evaluate the effect of different levels of individually tailored advice on physical activity.</p> <p>Participants: adults not following a prescribed diet or adults without altered nutrition requirements because of a medical condition (n=1607)</p> <p>Country: The Netherlands</p> <p>Effectiveness: high effective</p> <p>Blended coaching: yes</p>
Study 6	Health outcomes	<p>Title: Cell Phone Intervention for You (CITY): A Randomized, Controlled Trial of Behavioral Weight Loss Intervention for Young Adults Using Mobile Technology</p> <p>Authors (year): Svetkey et al. (2015) [51]</p> <p>Study design: RCT</p> <p>Objective: To determine the effect on weight of two mobile technology-based (mHealth) behavioral weight loss interventions in young adults.</p> <p>Participants: overweight/obese participants aged between 18- to 35-year-olds (n=365)</p> <p>Country: United States</p> <p>Effectiveness: ineffective</p>

		Blended coaching: no
Study 7	Health outcomes and adherence	<p>Title: A telerehabilitation intervention for patients with Chronic Obstructive Pulmonary Disease: a randomized controlled pilot trial</p> <p>Authors (year): Tabak et al. (2013) [52]</p> <p>Study design: pilot RCT</p> <p>Objective study: First, to investigate the effects of a telerehabilitation intervention on health status and activity level of patients with COPD, compared to usual care. Second, to investigate how patients comply with the intervention and whether compliance is related to treatment outcomes.</p> <p>Participants: patients with a clinical diagnosis of Chronic Obstructive Pulmonary Disease (n=34)</p> <p>Country: The Netherlands</p> <p>Effectiveness: low effective</p> <p>Blended coaching: no</p>
Study 8	Health outcomes and usability	<p>Title: An Adaptive Physical Activity Intervention for Overweight Adults: A Randomized Controlled Trial</p> <p>Authors (year): Adams et al. (2013) [31]</p> <p>Study design: RCT</p> <p>Objective study: To test an adaptive intervention for PA based on Operant and Behavior Economic principles and a percentile based algorithm.</p> <p>Participants: overweight and inactive adults between 18 and 65 years old (n=20)</p> <p>Country: United States</p> <p>Effectiveness: high effective</p> <p>Blended coaching: no</p>
Study 9	Health outcomes and usability	<p>Title: Automated interventions for multiple health behaviors using conversational agents</p> <p>Authors (year): Bickmore et al. (2013) [34]</p> <p>Study design: 4-arm RCT and qualitative: semi-structured interviews</p> <p>Objective study: To test an automated health counselor agent which was designed to promote both physical activity and fruit and vegetable consumption through a series of simulated conversations with users on their home computers.</p> <p>Participants: adults somewhat motivated to change health behavior (precontemplation or contemplation phase) (n=122)</p>

		<p>Country: United States</p> <p>Effectiveness: ineffective</p> <p>Blended coaching: no</p>
Study 10	Health outcomes and usability	<p>Title: The Effectiveness of Mobile Phone-Based Care for Weight Control in Metabolic Syndrome Patients: Randomized Controlled Trial</p> <p>Authors (year): Oh et al. (2015) [47]</p> <p>Study design: RCT</p> <p>Objective: To evaluate the effect of SmartCare services on weight loss compared to the effects of existing outpatient treatments in obese patients.</p> <p>Participants: obese patients with metabolic syndrome (n=422)</p> <p>Country: South Korea</p> <p>Effectiveness: high effective</p> <p>Blended coaching: yes</p>
Study 11	Health outcomes and usability	<p>Title: Effectiveness of a web-based, computer-tailored, pedometer-based, physical activity intervention for adults: A cluster randomized controlled trial</p> <p>Authors (year): Compernelle et al. (2015) [38]</p> <p>Study design: RCT and survey</p> <p>Objective study: To evaluate the effectiveness of a computer-tailored, pedometer-based, PA intervention in working adults.</p> <p>Participants: Dutch-speaking “white-collar” employees between 18 and 65 years old (n=274)</p> <p>Country: Belgium</p> <p>Effectiveness: high effective</p> <p>Blended coaching: no</p>
Study 12	Health outcomes, usability, and adherence	<p>Title: Medium-Term Effectiveness of a Comprehensive Internet-Based and Patient-Specific Telerehabilitation Program With Text Messaging Support for Cardiac Patients: Randomized Controlled Trial</p> <p>Authors (year): Frederix et al. (2015) [40]</p> <p>Study design: RCT and qualitative: interviews</p> <p>Objective: To assess the medium-term effectiveness of an Internet-based, comprehensive, and patient-tailored telerehabilitation program with short message service (SMS) texting support for cardiac patients.</p> <p>Participants: cardiac rehabilitation patients (n=140)</p> <p>Country: Belgium</p> <p>Effectiveness: high effective</p>

		Blended coaching: no
Study 13	Health outcomes and usability	<p>Title: Physical Activity Loyalty Cards for Behavior Change A Quasi-Experimental Study</p> <p>Authors (year): Hunter et al. (2013) [42]</p> <p>Study design: two-arm quasi-experimental design and survey</p> <p>Objective: To investigate the effectiveness of financial incentives to encourage adults to undertake more PA, measured using a novel objective PA tracking system.</p> <p>Participants: employees in a workplace setting (n=406)</p> <p>Country: Northern Ireland</p> <p>Effectiveness: ineffective</p> <p>Blended coaching: no</p>
Study 14	Health outcomes and usability	<p>Title: Automated Personalized Feedback for Physical Activity and Dietary Behavior Change With Mobile Phones: A Randomized Controlled Trial on Adults</p> <p>Authors (year): Rabbi et al. (2015) [48]</p> <p>Study design: RCT, survey, and qualitative: semi-structured interviews</p> <p>Objective: To investigate the technical feasibility of implementing an automated feedback system, the impact of the suggestions on user physical activity and eating behavior, and user perceptions of the automatically generated suggestions.</p> <p>Participants: participants motivated to self-monitor and improve their fitness (n=17)</p> <p>Country: United States</p> <p>Effectiveness: high effective</p> <p>Blended coaching: no</p>
Study 15	Health outcomes, usability, and adherence	<p>Title: Daily Text Messaging for Weight Control Among Racial and Ethnic Minority Women: Randomized Controlled Pilot Study</p> <p>Authors (year): Steinberg et al. (2013) [50]</p> <p>Study design: pilot RCT</p> <p>Objective: First, to evaluate the feasibility of a text messaging intervention for weight loss among predominantly black women. Second, to evaluate the effects of the intervention on weight change relative to an education control arm.</p> <p>Participants: predominantly black and obese women (n=50)</p> <p>Country: United States</p>

		<p>Effectiveness: high effective</p> <p>Blended coaching: no</p>
Study 16	Health outcomes, usability, and adherence	<p>Title: The Efficacy of a Daily Self-Weighing Weight Loss Intervention Using Smart Scales and E-mail</p> <p>Authors (year): Steinberg et al. (2013) [62]</p> <p>Study design: RCT and survey</p> <p>Objective: To examine the impact of a weight loss intervention that focused on daily self-weighing for self-monitoring as compared to a delayed control group among 91 overweight adults.</p> <p>Participants: overweight adults (n=91)</p> <p>Country: United States</p> <p>Effectiveness: high effective</p> <p>Blended coaching: no</p>
Study 17	Health outcomes and usability	<p>Title: Wearable Sensor/Device (Fitbit One) and SMS Text-Messaging Prompts to Increase Physical Activity in Overweight and Obese Adults: A Randomized Controlled Trial</p> <p>Authors (year): Wang et al. (2015) [56]</p> <p>Study design: RCT and survey</p> <p>Objective: First, to test the effects on PA level of a technology-based intervention that delivered simple prompts using SMS text messaging in conjunction with the Fitbit One for self-monitoring. Second, to examine the usability and effects of a wearable device/sensor (the Fitbit One) on PA levels.</p> <p>Participants: Overweight and obese adults who were interested in increasing their PA (n=67)</p> <p>Country: United States</p> <p>Effectiveness: high effective</p> <p>Blended coaching: no</p>
Study 18	Usability	<p>Title: A Persuasive and Social mHealth Application for Physical Activity: A Usability and Feasibility Study</p> <p>Author (year): Al Ayubi et al. (2014) [32]</p> <p>Study design: qualitative: think-aloud method and in-depth semistructured interviews</p> <p>Objective: First, to identify whether the system is usable and accepted by users. Second, to reveal other issues in the deployment of this technology that contribute to an informed preparation for clinical trials.</p> <p>Participants: participants aged 24-45 (n=14)</p> <p>Country: United States</p>

		Blended coaching: no
Study 19	Usability	<p>Title: Dutch young adults ratings of behavior change techniques applied in mobile phone apps to promote physical activity: A Cross-sectional Survey</p> <p>Authors (year): Belmon et al. (2015) [33]</p> <p>Study design: survey</p> <p>Objective: First, to explore young adults' opinions regarding BCTs (including self-regulation techniques) applied in mobile phone physical activity apps. Second, to examine associations between personality characteristics and ratings of BCTs applied in physical activity apps.</p> <p>Participants: Dutch healthy young adults (n=179)</p> <p>Country: The Netherlands</p> <p>Blended coaching: did not describe an intervention</p>
Study 20	Usability and adherence	<p>Title: Patients' experiences of using a smartphone application to increase physical activity: the SMART MOVE qualitative study in primary care</p> <p>Authors (year): Casey et al. (2014) [35]</p> <p>Study design: qualitative: semi-structured interviews</p> <p>Objective: To explore patients' views and experiences of using smartphones to promote physical activity in primary care.</p> <p>Participants: active Android smartphone user aged 16 years and older (n=12)</p> <p>Country: West of Ireland</p> <p>Blended coaching: did not describe an intervention</p>
Study 21	Usability	<p>Title: Development of a Weight Loss Mobile App Linked With an Accelerometer for Use in the Clinic: Usability, Acceptability, and Early Testing of its Impact on the Patient-Doctor Relationship</p> <p>Authors (year): Choo et al. (2016) [37]</p> <p>Study design: survey and observational (app usage data)</p> <p>Objective: To evaluate the usability and acceptability of a newly developed mobile app linked with an accelerometer and its early effects on patient-doctor relationships.</p> <p>Participants: obese individuals between 20-70 years (n=30)</p> <p>Country: South Korea</p> <p>Blended coaching: yes</p>
Study 22	Usability and adherence	<p>Title: Opportunities and Challenges for Smartphone Applications in Supporting Health Behavior Change: Qualitative Study</p>

		<p>Author (year): Dennison et al. (2013) [58]</p> <p>Study design: qualitative: focus groups</p> <p>Objective: To explore young adults' perspectives on apps related to health behavior change.</p> <p>Participants: university students and staff (n=19)</p> <p>Country: United Kingdom</p> <p>Blended coaching: did not describe an intervention</p>
Study 23	Usability and adherence	<p>Title: Utility and Efficacy of a Smartphone Application to Enhance the Learning and Behavior Goals of Traditional Cardiac Rehabilitation</p> <p>Authors (year): Forman et al. (2014) [38]</p> <p>Study design: survey and observational (app usage data)</p> <p>Objective: To study the feasibility and utility of Heart Coach on an iPhone, iPad, or iPod Touch (Apple, Inc, Cupertino, CA) as an adjunct to traditional clinic-based Cardiac Rehabilitation.</p> <p>Participants: staff (n=3) and patients (n=26) at South Shore Hospital's Cardiac Rehabilitation program</p> <p>Country: United States</p> <p>Blended coaching: yes</p>
Study 24	Usability	<p>Title: PREDIRCAM eHealth Platform for Individualized Telemedical Assistance for Lifestyle Modification in the Treatment of Obesity, Diabetes, and Cardiometabolic Risk Prevention: A Pilot Study (PREDIRCAM 1)</p> <p>Authors (year): Gonzalez et al. (2013) [41]</p> <p>Study design: survey</p> <p>Objective: To assess the viability of the platform.</p> <p>Participants: volunteers aged 38 ± 15 years with average skills on computer usage and no important comorbidities (n=15)</p> <p>Country: Spain</p> <p>Blended coaching: no</p>
Study 25	Usability and adherence	<p>Title: What features do Dutch university students prefer in a smartphone application for promotion of physical activity? A qualitative approach</p> <p>Author (year): Middelweerd et al. (2015) [61]</p> <p>Study design: qualitative: focus group</p> <p>Objective: To explore Dutch students' preferences regarding a PA application (PA app) for smartphones.</p> <p>Participants: Dutch university students aged 18-25 (n=30)</p> <p>Country: The Netherlands</p> <p>Blended coaching: no</p>

<p>Study 26</p>	<p>Usability and adherence</p>	<p>Title: Tracking Health Data Is Not Enough: A Qualitative Exploration of the Role of Healthcare Partnerships and mHealth Technology to Promote Physical Activity and to Sustain Behavior Change</p> <p>Authors (year): Miyamoto (2016) [45]</p> <p>Study design: qualitative: focus groups</p> <p>Objective: To understand potential users' views of mHealth technology, the role this technology may have in promoting individual activity goals aimed at improving health, and the value of integrating mHealth technology with traditional health care.</p> <p>Participants: working adults from an academic institution mostly with an age between 45-54 years (groups included 8-12 participants and the confirmatory group contained three participants)</p> <p>Country: United States</p> <p>Blended coaching: did not describe an intervention</p>
<p>Study 27</p>	<p>Usability and adherence</p>	<p>Title: A Text-Messaging and Pedometer Program to Promote Physical Activity in People at High Risk of Type 2 Diabetes: The Development of the PROPELS Follow-On Support Program</p> <p>Authors (year): Morton et al. (2015) [46]</p> <p>Study design: developing prototype and qualitative: focus groups and telephone interviews</p> <p>Objective: To develop the PROPELS follow-on support program and evaluate acceptability and feasibility.</p> <p>Participants: participants aged ages 39-79 years in phase 2 (n=15), participants aged 52-78 years in phase 3 (n=20), and participants from phase 2 and 3 in phase 4 (n=11)</p> <p>Country: United Kingdom</p> <p>Blended coaching: yes</p>
<p>Study 28</p>	<p>Usability</p>	<p>Title: Identifying preferences for mobile health applications for self-monitoring and self-management: Focus group findings from HIV-positive persons and young mothers.</p> <p>Authors (year): Ramanathan et al. (2013) [49]</p> <p>Study design: qualitative: focus groups</p> <p>Objective: To inform the design of an adaptable mobile health application we aimed to identify the dimensions and range of user preferences for application features by different user groups.</p> <p>Participants: Two populations of mobile phone users: people living with HIV (n=29); and young mothers (n=24)</p>

		<p>Country: United States</p> <p>Blended coaching: did not describe an intervention</p>
Study 29	Usability	<p>Title: The spinal stenosis pedometer and nutrition lifestyle intervention (SSPANLI): development and pilot</p> <p>Authors (year): Tomkins-Lane et al. (2015) [53]</p> <p>Study design: pilot observational study and qualitative interviews</p> <p>Objective: To develop and pilot an e-health intervention aimed at increasing physical activity and decreasing fat mass in people with lumbar spinal stenosis.</p> <p>Participants: overweight or obese individuals with lumbar spinal stenosis (LSS) (n=9)</p> <p>Country: Canada</p> <p>Blended coaching: yes</p>
Study 30	Usability	<p>Title: A Mobile Phone App to Stimulate Daily Physical Activity in Patients with Chronic Obstructive Pulmonary Disease: Development, Feasibility, and Pilot Studies</p> <p>Authors (year): Vorrink et al. (2016) [55]</p> <p>Study design: developing prototype, survey, and qualitative: focus groups</p> <p>Objective: To develop an eHealth intervention that will support patients with COPD to improve or maintain their DPA after pulmonary rehabilitation.</p> <p>Participants: healthy adults (n=10) (phase 1), persons with COPD aged >40 years, living independently and completed rehabilitation (phase 2: n=3, phase 3: n=7), independent respiratory nurses (n=10) and physiotherapists (by phone) (n=2) who work with COPD patients (phase 3)</p> <p>Country: The Netherlands</p> <p>Blended coaching: yes</p>
Study 31	Usability	<p>Title: Development of an Evidence-Based mHealth Weight Management Program Using a Formative Research Process</p> <p>Author (year): Waterlander et al. (2014) [57]</p> <p>Study design: Online survey and qualitative: focus groups and phone interviews</p> <p>Objective: To develop an evidence-based mHealth weight management program (Horizon) using formative research and a structured content development process.</p> <p>Participants: participants in three focus groups (n=20), in phone interviews (n=5), and the online survey (n=120)</p> <p>Country: New Zealand</p> <p>Blended coaching: no</p>

Study 32	Usability	<p>Title: The Development of a Mobile Monitoring and Feedback Tool to Stimulate Physical Activity of People With a Chronic Disease in Primary Care: A User-Centered Design</p> <p>Authors (year): Van der Weegen et al. (2013) [54]</p> <p>Study design: developing prototype, survey, and qualitative: semi-structured interviews</p> <p>Objective: To investigate the user requirements for a tool to stimulate physical activity, embedded in primary care practice.</p> <p>Participants: people with COPD or type-2 diabetes (n=15), their primary care professionals (n=16), and several experts</p> <p>Country: The Netherlands</p> <p>Blended coaching: yes</p>

Appendix 4 – Key components and their specific design for effects on health outcomes, usability and/or adherence.

Table. Key components and their specific design for effects on health outcomes, usability, and/or adherence.

Key component	Design of component	Pattern observed for effect on health outcomes (H), usability (U), and/or adherence (A)	Based on results from study..
Persuasive eCoaching			
Reduction	1. Include reduction	H + U	H: 32, 39, 41, 49, 51, 60, 63 U: 36, 46, 50, 58, 62
	2. Setting short term goals	H + U	H: 32, 39, 41, 51, 60, 63 U: 46, 58
	3. Ability to enable or disable observation of trends and patterns	U	U: 46, 47, 50, 59
	4. Provide means to perform behavior	U	U: 58, 62
Personalization	1. Include personalization	H + U	H: 32, 37, 39, 41, 45, 48, 49, 51, 53, 57, 60, 61 U: 34, 36, 50, 62
	2. Personalization of goals	H + U	H: 32, 39, 51, 60 U: 34, 46, 47, 50, 56-59
	3. Personalization of content	U + A	U: 34, 47, 57, 58 A: 46, 59, 62
	4. Personalization of multiple components	H	H: 32, 39, 41, 51, 60
	5. Ability to enable or disable observation of trends and patterns	U	U: 46, 47, 50, 59

	6. Ability to adjust technical features	U	U: 42, 47, 50, 55, 57, 59, 62
Praise	1. Include praise	H + U	H:32, 39, 51, 60 U: 42, 47, 55, 59, 62
	2. Account for gender differences	U	U: 59
Rewards	Include rewards (monetary or non-monetary incentives)	U	U: 36, 50, 62
Reminders	1. Include reminders	H + U	H: 32, 37, 44, 51, 53, 57, 60 U: 35, 42, 47, 50
	2. Reminders asking to enter/upload data into the technology	H + U	H: 51, 60 U: 47
	3. Timing and frequency of importance	U	U: 42, 47, 50, 57, 59, 62
Similarity	Connect with or complement existing behavior	U	U: 46, 49, 59
Simulation	Include simulation to observe progress	H + U	H: 37, 39, 48, 51, 53, 57, 61, 63 U: 32, 34, 35, 47, 50, 55, 59, 62
Suggestion	Include suggestion	H	H: 32, 37, 39, 45, 48, 49, 51, 53, 57, 60, 63
Social role	The technology should act as a social being to some extent	U	U: 33, 35, 62
Trustworthiness	1. Trustworthy content	U	U: 58, 59, 62
	2. Control over data sharing	U	U: 46, 50
	3. Password protection can be enabled or disabled	U	U: 50, 59
Tunneling	Provide feedback based on how well the user changed behavior	H	H: 41, 45, 63
Surface credibility	Provide a technology that is not noticed as an automated technology	U	U: 35, 57

Social support	1. Be careful with inclusion of social support (as it is rather negatively perceived among participants)	U	U: 34, 50, 59, 62
	2. To increase acceptability: provide social support via peers, friends or family	U	U: 50, 59, 62
	3. To increase acceptability: Do not use social media where everybody can observe personal results	U	U: 59, 62
Cooperation	To increase acceptability of social support: incorporate cooperation among participants to work towards a similar goal	U	U: 46, 50, 59
Competition	To increase acceptability of social support: option to compete with peers or not	U	U: 59, 62
Educational coaching	Short videos which do not require large amounts of internet/mobile data	U	U: 38, 59, 62
	Account for known knowledge by participant	U	U: 47, 58
Goal setting	1. Include goal-setting	H	H: 32, 37, 39, 41, 49, 51, 53, 60, 61, 63
	2. Use self-tracking data as input for automatic goal-setting	H	H: 32, 51, 60
	3. Personalization of goals	H + U	H: 32, 39, 51, 60 U: 34, 46, 47, 50, 56-59
	4. Monitor progress towards goals	U	U: 33-35, 47, 50, 55, 59, 62
	5. Setting short term goals	U	U: 46, 58
Feedback	1. Provide immediate, not paternalistic, short, personalized, and positive feedback	U	U: 34-36, 39, 47, 55, 57-59, 62
	2. Timing and frequency of feedback is important	U	U: 42, 47, 50, 57, 59, 62
Self-tracking			
Self-tracking	Incorporate self-tracking to increase awareness	U	U: 36, 46, 47, 49, 62
Device	Accelerometer	H	H: 37, 41, 45, 49, 53, 57

Measurement	Should capture all relevant behavioral data (e.g. besides only steps for measurement of physical activity)	U	U: 33, 55, 62
The effort by the participant	1. More effort does not seem to be a barrier	H + U	H: 32, 48, 51, 60 U: 50
	2. Automatically tracking preferred	U	U: 46, 59, 62
Summary	1. Visualization of self-tracking data is perceived appealing	U	U: 36, 55, 56
	2. Observe progress	U	U: 33-35, 47, 50, 55, 59, 62
	3. Enable personalization of layout of the displayed summary data	U	U: 55, 62
	4. Ability to enable or disable observation of trends and patterns	U	U: 46, 47, 50, 59
Validity	Valid and reliable measurements perceived important	H + U	H: 32, 39, 45 U: 46, 56, 59
Other intervention components			
Applying results from other research	Use results from other research to inform the design	H	H: 32, 39, 49, 51, 60, 61, 63
Medium	1. Deliver the intervention via a smartphone	U	U: 46, 50, 55, 58, 59, 62
	2. Able to use the intervention 24/7	U	U: 36, 47
Design testing	Problems with usages of the intervention should be eliminated during the testing phase	A	A: 36, 62
Implementation	Provision of face-to-face instructions on how to use the intervention	H + U	H: 32, 37, 39, 49, 51, 57, 61, 63 U: 42, 56
Integration of self-tracking and persuasive eCoaching	Include integration of self-tracking and persuasive eCoaching	H + U	H: 32, 37, 39, 41, 45, 48, 49, 51, 53, 61 U: 32, 34-36, 39, 42, 46, 47, 51, 54, 56, 59, 62

Blended coaching	Use automatic eHealth intervention to supplement in-person sessions	U	U: 39, 46, 47, 54, 55, 58, 59
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Appendices Chapter 4

Appendix 1 - Online survey used for the stakeholder identification.

Introduction

Thank you for taking the time to complete our questionnaire. This will take about 15 minutes.

If you have read the mail carefully, you can skip the following two paragraphs:

We are currently developing an eHealth application for the employee (Hanze University of Applied Sciences - University of Twente). eHealth includes all kinds of programs for promoting or supporting health via technology (in our case via a smartphone). The smartphone application will generally consist of a combination of self-tracking devices and an eCoach. Examples of self-tracking devices are the Fitbit Zip, Misfit Shine or Apple Watch. These types of devices can objectively map lifestyle factors such as physical activity and sleep of the user. On the basis of information obtained via self-tracking devices, a fully automatic eCoach (without the involvement of a human coach) can give the user personally relevant feedback at the right moment in time. The application aims to promote a healthy lifestyle among employees. We find it is important that the application fits well with the values and wishes of stakeholders in the future.

We would like to involve you as a stakeholder in the research. In order to identify the values and wishes of stakeholders, we are looking for the most important stakeholders to involve during the development of the eHealth application by means of a questionnaire. The next step in the study will be to conduct interviews with key stakeholders identified as a result of the questionnaire.

The list of stakeholders is possibly not comprehensive. There is room in the questionnaire to note stakeholders that you believe are missing*.

** The questionnaire data will be processed anonymously. When we report on the study, we will not present individual results, but only results at group level. The study was approved by the Ethics Committee of the University of Twente.*

Thank you for participating in this survey!

Het Quantified Self @Work team:

prof. dr. Lisette van Gemert-Pijnen
dr. Hugo Velthuisen
dr. Louis Polstra
dr. Martijn de Groot
dr. Hilbrand Oldenhuis
Aniek Lentferink, MSc

Question 1. To which stakeholder(s) from the list below do you think you have the best fit? Enter in the text space below the number of years that you have been active in the professional field of the relevant stakeholder.

Below, you will find a short description of each stakeholder.

1. Accountmanager
2. Labour and organisation specialist
3. Occupational health and safety services
4. Dutch Data Protection Authority
5. Company doctor
6. Business analyst / innovation expert
7. Central unions
8. Coronel Institute for Labour and Health
9. Data storage specialist
10. eHealth specialist
11. Aesthetics specialist
12. Health behavior specialist
13. Graphic designer
14. HR manager
15. Inspectorate of Social Affairs and Employment
16. Labour lawyer
17. Lifestyle coach
18. Maintenance specialist (maintenance: the long-term use of the application)
19. Marketing department
20. Participation council within an organization
21. Research team
22. Organisation in eHealth design
23. Programmer / software developer
24. Product owner
25. Self-tracking device developer
26. Usability specialist
27. Employer / supervisor
28. Employee
29. Health insurer

Stakeholder	Description
Accountmanager	Account managers are contact persons within organizations for customers. They maintain relationships with customers and ensure the purchase of the product.
Labour and organisation specialist	The labour and organisation specialist is concerned with issues about work and health, stress, sustainable employability and vitality, work pressure, fitness for work and occupational health and absenteeism.
Occupational health and safety services	An occupational health and safety services is an adviser and partner in the field of labour and health and offers service during the event of absenteeism, limiting the duration of absenteeism and preventing absenteeism.
Dutch Data Protection Authority	The Dutch Data Protection Authority is an independent body that supervises, advises, informs, and provides information about the use of personal data in accordance with the General Data Protection Regulation (GDPR).
Company doctor	A company doctor is primarily a doctor who decides whether there is a medical explanation for an employee not to fulfil his employment contract. The company doctor also formulates labour advice (limitation in hours or tasks) and in some cases the company doctor plays a role in the field of prevention and advice to the organisation.
Business analyst / innovation expert	A business analyst and innovation expert have in common that they give advice on formulating requirements for innovations and have an eye for the chances of success of the innovation on the market.
Central unions	Central unions negotiate about working conditions with the employer on behalf of the employees. Think of wages, the collective labour agreement and, for example, working hours and working conditions.
Coronel Institute for Labor and Health	An institute that focuses on the broad field of labour and health. The activities of the department are focused on the health and health care of the employee with the aim of optimal prevention of occupational diseases and promoting labour participation.
Data storage specialist	A data storage specialist has knowledge about the safe storage and easy retrieval of data.
eHealth specialist	An eHealth specialist has knowledge about the use of technology to support or improve health and healthcare.
Aesthetics specialist	A specialist with knowledge of aesthetics and pays attention during development, for example, on decoration, edge demarcation, symmetry, light, colour and harmony.
Health behavior specialist	A health behaviour specialist has knowledge about positively influencing / promoting behaviour for the benefit of health.

Graphic designer	The graphic designer develops the graphic design of the product, including layout, typography (fonts, sizes, column width, line spacing, etc.), the use of colour and the illustrations and photos.
HR manager	The human resources manager determines the personnel policy of a company and ensures that it is implemented. The HR manager is the link between management and employees.
Inspectorate of Social Affairs and Employment	The inspectorate is working on a supervision policy that prevents accidents at work, occupational diseases, absenteeism and incapacity for work as much as possible. The Inspectorate does this on the basis of risk and environmental analyses.
Labour lawyer	The labour lawyer advises organisations on matters such as employment contracts and conditions, layoffs, reorganisations, sickness and disability. In addition, the labour lawyer litigates in the event of conflicts.
Lifestyle coach	A lifestyle coach guides people in the taking on and maintaining a healthy lifestyle.
Maintenance specialist (maintenance: the long-term use of the application)	A maintenance specialist has knowledge about how an application remains interesting for the user for a longer period of time.
Marketing department	The marketing department is responsible for the promotion of the eHealth application.
Participation council within an organization	Participation councils are bodies made up of employees and influence working conditions, working relationships and the organization.
Research team	The research team are the project leaders for the development of the eHealth application. The researchers have backgrounds in eHealth, innovation, ICT, labour participation, Quantified Self, psychology and prevention and public health.
Organisation in eHealth design	Organisations in eHealth design develop technology to support or improve health and healthcare.
Programmer / software developer	A programmer is a person who writes computer software.
Product owner	Organisation that invests financially in the development of the eHealth application and offers / sells the eHealth application to interested parties.
Self-tracking device developer	Organisations that develop self-tracking devices such as Fitbit, Jawbone, Misfit and Garmin.
Usability specialist	A usability specialist ensures that the system is user-friendly in use.
Employer / supervisor	Employer / manager of the organisation within which the eHealth application is distributed among the employees.
Employee	Employee of the organisation in which the eHealth application is implemented.
Health insurer	Organisations in the provision of health insurances.

Question 2a. Stakeholder ranking

For the stakeholder ranking, the attributes "power", legitimacy "and" urgency "have been selected. The scores on these attributes identify the main stakeholders. The attributes are explained below.

- **Power:** a stakeholder has power when he/she has a direct influence on the development of the eHealth application. An example is an employer who gives a caregiver the assignment to replace regular client meetings with video conversations. The employer is the stakeholder with power.
- **Legitimacy:** a stakeholder has legitimacy when he/she HAS to be involved during the development of the eHealth application due to legally, morally, or contractually reasons. An example of a stakeholder with legitimacy is an organisation who provides a quality mark. Without this quality mark, customers may refuse a product.
- **Urgency:** a stakeholder has urgency when he/she imposes requirements that no longer can wait because of time or importance. An example of stakeholders with urgency are citizens in remote areas who impose that video conversations with doctors become available in acute situations to decrease the risk for mortality.

Please indicate per stakeholder in the table below whether you believe one or more of the above attributes should be assigned to that stakeholder.

In addition, please note any stakeholder that you believe is missing from the stakeholder list presented in the table.

	Power	Legitimacy	Urgency	None (4)	I don't know (5)
1. Accountmanager	-	-	-	-	-
2. Labour and organisation specialist	-	-	-	-	-
3. Occupational health and safety services	-	-	-	-	-
4. Dutch Data Protection Authority	-	-	-	-	-
5. Company doctor	-	-	-	-	-
6. Business analyst / innovation expert	-	-	-	-	-
7. Central unions	-	-	-	-	-
8. Coronel Institute for Labour and Health	-	-	-	-	-
9. Data storage specialist	-	-	-	-	-
10. eHealth specialist	-	-	-	-	-
11. Aesthetics specialist	-	-	-	-	-
12. Health behavior specialist	-	-	-	-	-
13. Graphic designer	-	-	-	-	-
14. HR manager	-	-	-	-	-
15. Inspectorate of Social Affairs and Employment	-	-	-	-	-
16. Labour lawyer	-	-	-	-	-
17. Lifestyle coach	-	-	-	-	-
18. Maintenance specialist (maintenance: the long-term use of the application)	-	-	-	-	-
19. Marketing department	-	-	-	-	-
20. Participation council within an organization	-	-	-	-	-
21. Research team	-	-	-	-	-
22. Organisation in eHealth design	-	-	-	-	-
23. Programmer / software developer	-	-	-	-	-
24. Product owner	-	-	-	-	-
25. Self-tracking device developer	-	-	-	-	-
26. Usability specialist	-	-	-	-	-
27. Employer / supervisor	-	-	-	-	-
28. Employee	-	-	-	-	-
29. Health insurer	-	-	-	-	-

Question 2b. Please note here if you believe any stakeholder is missing from the stakeholder list presented in the table. In addition, please report if this stakeholder has power, legitimacy and/or urgency or none of the attributes during the development of an eHealth application for employees?

Question 3a. Differences in phases of creating eHealth

We have divided the process of creating the eHealth application for the employee into two phases, namely: design and implementation. **The design phase** is the actual development of the application. **The implementation phase** is the application will be implemented in the daily work setting of employees.

Do you believe that certain stakeholders score differently for the three attributes per phase?

- Yes
- No

Question 3b. Please indicate here to which stakeholders this applies and how these stakeholders differ in attributes per phase.

Question 4. In the text box below there is room for sharing experiences regarding the completion of the questionnaire.

Appendix 2 – Topic list used during the semi-structured interviews

Table. Topic list of the interviews.

Topic	Question
Start	<p>Discuss (without recording) the informed consent form:</p> <ul style="list-style-type: none"> - Purpose of research & interview - Anonymous processing of data - Monitoring recording & processing - If you do not want to give an answer then you are free to do so (also stop research) - If you have questions, you can ask them at any time - Do you have any questions so far? <p>Start recording</p>
Stress definition	<ol style="list-style-type: none"> 1. Could you describe what stress entails according to you? <ol style="list-style-type: none"> a. Symptoms / characteristics
Customer jobs	<ol style="list-style-type: none"> 1. From the situation of Miriam/Peter: in which way has stress an influence on: <ol style="list-style-type: none"> a. Working life b. Private life
	<ol style="list-style-type: none"> 2. 2. What would Miriam / Peter need when it comes to reducing stress?
	<ol style="list-style-type: none"> 3. Which problems would the reduction of stress solve for Miriam/Peter? <ol style="list-style-type: none"> a. Why is it a problem? b. In what situations?
Gains	<ol style="list-style-type: none"> 1. To what extent do you expect that such an application could help reduce stress?
	<ol style="list-style-type: none"> 2. What could be the benefit of using such an application for Miriam / Peter? <ol style="list-style-type: none"> a. Functional: Could it make a positive contribution to the work? In what way / in which situations? b. Social: Could it make a positive social contribution? In what way / in which situations? c. Emotional: Could it make a positive emotional contribution? In what way / in which situations?
	<ol style="list-style-type: none"> 3. What are essential elements that the application should contain for Miriam / Peter to start using the app?
	<ol style="list-style-type: none"> 4. How do you think the application should be designed so that it is appealing for Miriam / Peter to use the app? <ol style="list-style-type: none"> a. General b. Portable sensor technology <ul style="list-style-type: none"> - Validity of measurements - Manually entering data

	<ul style="list-style-type: none"> - Combine data of, for example, agenda, location, email behaviour, causes of stress c. Coaching messages: <ul style="list-style-type: none"> - Frequency - Time of the day - Appearance of the message - Rewards - Social support. With whom? Colleagues share experiences, etc.? - Goal setting d. Coaching techniques: <ul style="list-style-type: none"> - Relax exercises - Time management - Cognitive therapy
	<p>5. What preconditions must the app meet so that Miriam / Peter would be satisfied with the app?</p> <ul style="list-style-type: none"> - How should employees be guided before and during the use of the application? - How would you like to use the app during the day? - Privacy: Problems with data collection? Who may have access to the data?
Pains	<p>1. What would be barriers for Miriam / Peter to start working on stress management via the app?</p> <ul style="list-style-type: none"> a. Functional: Do you expect Miriam / Peter to start using the app? What infringement / influence does usages of the app have on their daily activities? b. Social: What if colleagues know that Miriam / Peter are using the app to reduce work stress? c. Emotional: Do you believe Miriam / Peter would enjoy working on stress management via the app?
	<p>2. What could frustrate Miriam / Peter or experience as a nuisance when using such an application?</p> <ul style="list-style-type: none"> a. General b. Portable sensor technology <ul style="list-style-type: none"> - Validity of measurements - Manually entering data - Combine data of, for example, agenda, location, email behaviour, causes of stress c. Coaching messages: <ul style="list-style-type: none"> - Frequency - Time of the day - Appearance of the message - Rewards - Social support. With whom? Colleagues share experiences, etc.?

	<ul style="list-style-type: none"> - Goal setting d. Coaching techniques: <ul style="list-style-type: none"> - Relax exercises - Time management - Cognitive therapy
	<p>3. Could Miriam / Peter also experience disadvantages from using the application for the purpose of reducing stress in the workplace setting? What are the disadvantages?</p> <ul style="list-style-type: none"> a. Functional: Are there negative consequences for Miriam / Peter by using the application during the work / job? b. Social: Could it contribute negatively in the social field? In what way / in which situations? c. Emotional: Could it contribute negatively on an emotional level? In what way / in which situations? d. Privacy: What is your view on the collection of personal data via portable sensor technology?
End	<p>1. Would you use such an application for stress management yourself? Yes/No/Doubt</p>

Appendix 3 - Pitch, goals and topic list used during focus groups

Pitch Resilience Navigator app:

How useful would it be if an app helps you to understand your personal stress moments and causes of stress so that you can draw up a personal plan for reducing work stress?

Imagine, you have been sitting for 3 hours at your computer. You have a tight deadline and then all sorts of emails come in with urgent questions for which you actually don't have time... you are frustrated enormously but you ignore the rushed feeling and continue steadily. Then suddenly: "Pling": you receive a notification on your smartphone that the smartwatch has measured an increased heart rate while you are not moving. The app asks whether you are experiencing a positive, negative or neutral emotion at that time. You realize that the increased heart rate is the result of a negative emotion as a result of stress. You remember that the app taught you that short breaks are helpful for concentration levels and stress reduction. Just 5 minutes away from the workplace and a walk will help you to catch your breath and then work on the task again in a concentrated way. At the end of the working day, you will receive a notification again: your heart rate has increased again. Now you realize that a positive emotion as a result of the completed task has caused an increased heart rate. At the end of the day you will see an overview of the experienced emotions and you will be asked to indicate what was the basis of the experienced emotions: what was going on at the time? The app stores the answers in your personal logbook. The next time, the app reminds you that a break helps you to continue working efficiently so you can end the working day with a positive feeling. In your environment, you know people who have dropped out due to high levels of stress. Results on a stress test indicate that you do not yet belong to the risk group for a burn-out, but that your work often entails feelings of stress. In addition, you know that a drop-out due to a burn-out involves a long recovery process. You are happy that there is an app available that can help you anonymously to understand your levels of stress and the causes of the stress. The app helps you gain awareness and coping strategies to do something about it. At this stage, you feel that the step to really go to the manager or company doctor due to your stress levels is too big. That would feel like failure.

The prototype contains two main components: eCoaching and self-tracking. The app is a closed system: no human coaching is involved. [show prototype to give participants an idea of what the intervention might look like]

Work stress definition:

"A condition in which an employee is unable or does not consider himself able to meet the requirements set by the working environment." (Gaillard, 2003)

Main goal of intervention:

Increase the awareness of the personal stress levels and causes of stress via a smartphone application for employees who do not yet belong to the group at risk of burn-out'

Sub-goal intervention:

Improve skills for effective stress management among employees who do not yet belong to the group at risk of burn-out'.

Table. Topic list during focus groups.

Topic	Question	Available time
Pitch + show prototype	Explanation 5 minutes Introductory round + inquiries about eHealth experience Prototype 10 minutes 5 minutes for all participants to look at the goals and images of the prototype	20 min
Coaching during reflection and not more than that	Key words: Reflection important for awareness, focus eCoaching on reflection, prototype example, stress complex, no human coach because of anonymity and scalability. <ol style="list-style-type: none"> a. What do you expect this approach could or could certainly not yield for stress reduction? b. To what extent do you believe that an employee could do something about stress without the guidance of a humane coach? c. Do you expect that this approach offers sufficient guidance for people who do not yet belong to the group "risk of burnout"? 	20 min
Timing and dose of reminders	Disturbing employees in the moment can have negative consequences: disturbing during work can cause stress. However, notifying employees during moments of stress can create awareness and could diminish recall problems when answering to the level of stress and causes of stress. <ul style="list-style-type: none"> - What do you think of the approach of sending reminders during moments of stress? 	20 min

	<ul style="list-style-type: none"> - To what extent do you believe that creating awareness in the moment is important for reducing stress? 	
Suggestion when intervention is not effective for target group	<p>Because stress is complex and we do not expect the system to be effective for everyone, we think it is important that the end user will receive an additional suggestion how to deal with stress when levels of stress do not decrease after a certain period of time.</p> <ul style="list-style-type: none"> - What do you think of the suggestion that the system offers when the intervention proves ineffective? - Who could the end user approach? - Disadvantage: suggestion can cost more work / time / money from professionals. 	20 min
alignment with policy	<p>HR advisers indicated that the intervention should be in line with the health and safety policy within organizations. (Refer to the goals of the intervention)</p> <ul style="list-style-type: none"> - In which way could these intervention goals be connected to the existing policy? - Respondents to the interviews indicate that the intervention should not be an isolated step in stress reduction within organisation: What should be preliminary or follow-up steps? 	20 min
Closing question	<p>Are there any topics that you find important and have not yet been discussed?</p> <p>With a lot of time left: possibly discussing other points via the value proposition.</p> <p>Would you use it in the future / advise the organization to use it?</p>	10 min
End	<p>Explanation of next steps in the design process.</p> <p>Are there any final questions about this focus group?</p>	10 min
		Total: 120 min

[The topics discussed are all topics of which no consensus was reached during interviews (reflection by eCoach, timing, and suggestion at the end) or insufficient information was obtained (alignment with policy)].

Appendix 4 - Results of the online survey for the stakeholder identification

Table. Results of the online survey

Stakeholder	Power	Legitimacy	Urgency	None	I don't know	Nr. of attributes assigned
1. Accountmanager	1 (5.9%)	0	0	10 (58.8%)	6 (35.3%)	0
2. Labour and organisation specialist	3 (17.7%)	4 (23.5%)	1 (5.9%)	7 (41.2%)	3 (17.7%)	0
3. Health and safety services	2 (11.8%)	5 (29.4%)	3 (17.7%)	3 (17.7)	4 (23.5%)	0
4. Dutch Data Protection Authority	4 (23.5%)	9 (52.9%)	2 (11.8%)	3 (17.7%)	4 (23.5%)	1
5. Company doctor	3 (17.7%)	6 (35.3%)	7 (41.2%)	3(17.7%)	3 (17.7%)	2
6. Business analyst/innovation expert	2 (11.8%)	7 (41.2%)	0	4 (23.5%)	4(23.5%)	1
7. Central Unions	5(29.4%)	4 (23.5%)	3 (17.7%)	5 (29.4%)	3 (17.7%)	0
8. Coronel institute for Labour and Health	0	3 (17.7%)	1 (5.9%)	4 (23.5%)	10 (58.8%)	0
9. Data storage specialist	3 (17.7%)	3(17.7%)	3 (17.7%)	7 (41.2%)	1 (5.9%)	0
10. Aesthetics specialist	3 (17.7%)	1 (5.9%)	0	7 (41.2%)	6 (35.3%)	0
11. eHealth specialist	4 (23.5%)	7 (41.2%)	4 (23.5%)	2 (11.8%)	3 (17.7%)	1
12. Health behaviour specialist	3 (17.7%)	5 (29.4%)	2 (11.8%)	3 (17.7%)	5 (29.4%)	0
13. Graphic designer	4 (23.5%)	2 (11.8%)	1 (5.9%)	9 (52.9%)	2(11.8%)	0
14. HR managers	9 (52.9%)	5 (29.4%)	4 (23.5%)	1 (5.9%)	4 (23.5%)	1
15. Inspectorate of Social Affairs and Employment	2 (11.8%)	7 (41.2%)	4 (23.5%)	3 (17.7%)	5 (29.4%)	1
16. Labour lawyer	2 (11.8%)	7 (41.2%)	1 (5.9%)	3 (17.7%)	5 (29.4%)	1
17. Lifestyle coach	4 (23.5%)	2(11.8%)	3 (17.7%)	5 (29.4%)	4 (23.5%)	0
18. Maintenance specialist (a specialist in maintaining the	2 (11.8%)	5 (29.4%)	4 (23.5%)	3 (17.7%)	4 (23.5%)	0

use of an eHealth technology)						
19. Marketing department	2 (11.8%)	3 (17.7%)	1 (5.9%)	7 (41.2%)	4 (23.5%)	0
20. Participation council within organizations	8 (47.1%)	7 (41.2%)	2 (11.8%)	1 (5.9%)	2 (11.8%)	2
21. Research team	4 (23.5%)	6 (35.3%)	7 (41.2%)	1 (5.9%)	4 (23.5%)	2
22. Organisations in eHealth design	5 (29.4%)	3 (17.7%)	2 (11.8%)	4 (23.5%)	4 (23.5%)	0
23. Programmer/software developer	3 (17.7%)	4 (23.5%)	4 (23.5%)	6 (35.3%)	2 (11.8%)	0
24. Product owner	8 (47.1%)	3 (17.7%)	3 (17.7%)	3 (17.7%)	4 (23.5%)	1
25. Self-tracking device developer	5 (29.4%)	3 (17.7%)	3 (17.7%)	4 (23.5%)	5 (29.4%)	0
26. Usability specialist	2 (11.8%)	2 (11.8%)	2 (11.8%)	6 (35.3%)	6 (35.3%)	0
27. Employers	10 (58.8%)	6 (35.3%)	5 (29.4%)	0	3 (17.7%)	2
28. Employees	3 (17.7%)	7 (41.2%)	8 (47.1%)	3 (17.7%)	2 (11.8%)	2
29. Health insurer	5 (29.4%)	6 (35.3%)	3 (17.7%)	3 (17.7%)	2 (11.8%)	1

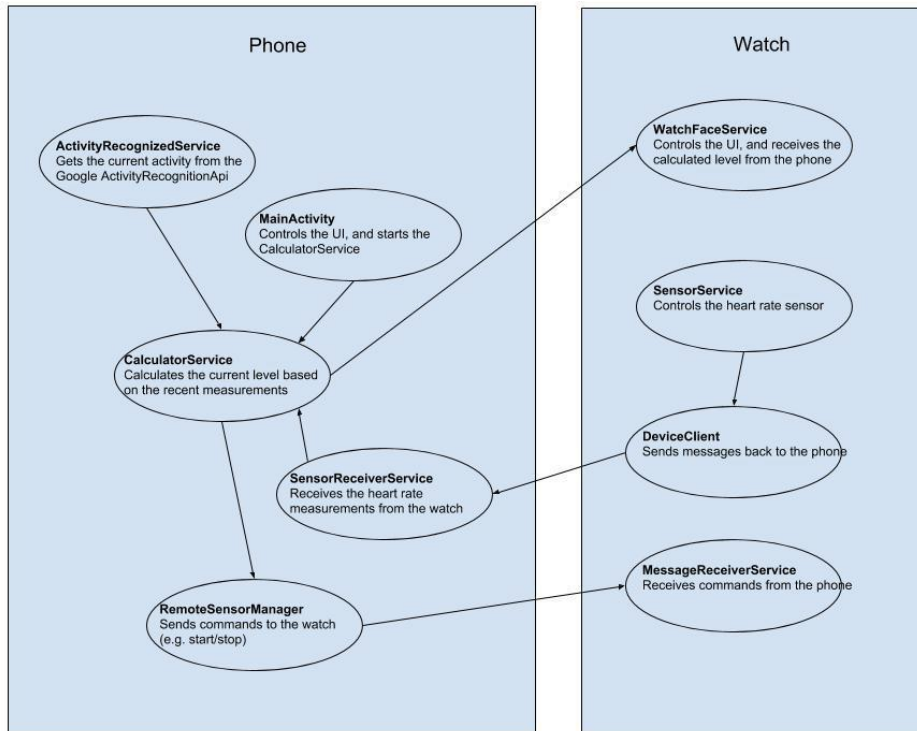
Appendices Chapter 5

Appendix 1 – Sense-IT and Resilience Navigator app description according to CONSORT guidelines

Sense-IT

	<i>Subitem CONSORT reporting eHealth guidelines [28]</i>
i	<i>Mention names, credential, affiliations of the developers, sponsors, and owners (if authors/evaluators are owners or developer of the software, this needs to be declared in a “Conflict of interest” section).</i>
ii	<p><i>Describe the history/development process of the application and previous formative evaluations (e.g., focus groups, usability testing), as these will have an impact on adoption/use rates and help with interpreting results.</i></p> <p>The Sense-IT application is developed by following an iterative, co-creative user centered design method. This included a series of development and testing cycles with prospect users and experts: patients in mental health care, mental health care professionals, and researchers with an expertise in UXD. Main stakeholders were identified via after initial scoping research. Development continued with contextual inquiry, identification of values of main stakeholders and consequent specification of needs and requirements, and mental models of prospect users of the desired app structure and flow. For this purpose, a custom UX-framework was created in which two validated design frameworks were combined: the CeHRes Roadmap [34] and The Five Elements of UX by Garrett [64]. First prototypes were built on the basis of identified needs, requirements and mental models by patients and mental health care professionals. The framework was coined the Elements-Methods-Products (EMP) framework. Main methods employed were semi-structured interviews, use of paper prototypes, card sorting, personas, task scenarios, cognitive walkthroughs, a systems usability scale and real life prototype testing. The initial prototype was programmed and pilot tested with patients. Based on the findings from pilot testing, further iterative development followed in serial cycles with patients, mental health care professionals and UX experts. Two papers on the development process have been published in peer-reviewed journals [27,28].</p>
iii	<p><i>Revisions and updating. Clearly mention the date and/or version number of the application/intervention (and comparator, if applicable) evaluated, or describe whether the intervention underwent major changes during the evaluation process, or whether the development and/or content was “frozen” during the trial. Describe dynamic components such as news feeds or changing content which may have an impact on the replicability of the intervention (for unexpected events see item 3b).</i></p> <p>In this study a stable version of Sense-IT applications (smartphone and smart watch, version April 2018) was used. The application and the content were frozen during the study. Both applications do not make use of dynamic components other than biofeedback related components.</p>
iv	<p><i>Provide information on quality assurance methods to ensure accuracy and quality of information provided, if applicable.</i></p> <p>We assured the quality of the application in the way the application is developed. The application is designed following the Model View Controller (MVC) design pattern. This decouples the major components; model - responsible for managing the data of the application and its intelligence, view - presentation of the model in a format, and control - responds to the user input and performs interactions on the data model objects. MVC makes it easier to adapt parts of the system without changing or affecting other parts of the application to increase stability.</p> <p>The code of the application is reviewed and inspected by a colleague computer scientist from the University of Twente who was not involved in designing and developing the application. Several stress tests (Bluetooth connections, different hardware configurations and different versions of the Android OS) were performed with this version of the Sense-IT application by the different researcher involved in this research.</p>
v	<p><i>Ensure replicability by publishing the source code (preferably as open source), and/or providing screenshots/screen-capture video, and/or providing flowcharts of the algorithms used.</i></p> <p><i>Replicability (i.e., other researchers should in principle be able to replicate the study) is a hallmark of scientific reporting.</i></p>

The source code is not open source yet, but access to the git repository is possible on request. Please find below a flowchart of the Sense-IT application.



vi *Digital preservation: Provide the URL of the application, but as the intervention is likely to change or disappear over the course of the years, also make sure the intervention is archived (Internet Archive, webcitation.org, and/or publishing the source code or screenshots/videos alongside the article). As pages behind login screens cannot be archived, consider creating demo pages which are accessible without login.*

The source code is available on a git repository and access can be given on request. The apk files are distributed by the researcher via email. Instructions for installation on smartphone and smart watch were given face-to-face.

vii *Access: Describe how participants accessed the application, in what setting/context, if they had to pay (or were paid) or not, whether they had to be a member of specific group. If known, describe how participants obtained "access to the platform and Internet". To ensure access for editors/reviewers/readers, consider providing a "backdoor" login account or demo mode for reviewers/readers to explore the application (also important for archiving purposes, see vi).*

Participants received written instructions after selection to participate in the study. The instructions contained URLs to download the application for the smartphone and smart watch. Installation instructions were given on paper. Participants could use their own Android smartphone and Android Wear OS smart watch. If participants did not have any of those devices, we provided the devices when needed.

viii *Describe mode of delivery, features/functionalities/components of the intervention and comparator, and the theoretical framework used to design them (instructional strategy, behavior change techniques, persuasive features, etc., see e.g., for terminology). This includes an in-depth description of the content (including where it is coming from and who developed it), "whether [and how] it is tailored to individual circumstances and allows users to track their progress and receive feedback". This also includes a description of communication delivery channels and – if computer-mediated communication is a component – whether communication was synchronous or asynchronous. It also includes information on presentation strategies, including page design principles, average amount of text on pages, presence of hyperlinks to other resources etc.*

The Sense-IT application collects heart rate measurements via a smartwatch, compatible with all Android Wear 2.0 smartwatches. When a substantial increase in heart rate is detected with respect to a personalised baseline, in the absence of vigorous physical activity of the subject, it is presumed that the increase in heart rate is associated more with emotional than physical arousal [27] (inspired by the idea of Additional Heart Rate, Myrtek [65,66]). 'Substantial' is specified here as a set deviation from a user's personal average heart rate. The 'deviation' is customisable by the researcher/supervisor of the app, standard setting is one standard deviation from the personal average heart rate. The personal

	<p>average heart rate is determined in a baseline measurement done before actual use (standard: 300 measurements over a period of approximately an hour). This substantial heart rate change is the trigger to send a JIT-notification via vibrations via the smartwatch. Substantial heart rate changes are also stored and displayed in the smartphone application. A timeline with changes is available. By clicking on one of the events, users can add written text (e.g. personal notes) to this event.</p> <p>Participants can personalize the sending of JIT-notifications via the smartwatch to some extent. They can change settings in (1) sensitivity (low, normal, high), and (2) the interval in seconds for the comparison between the current heart rate and the personal baseline. This personalization was added by the developers of the Sense-IT app to adjust the triggering of notifications that fits better with the user's perceived emotional arousal than the set values [27]. All communication between the application(s) and the user were digital and without interference of a human experiment leader.</p>
ix	<p><i>Describe use parameters (e.g., intended "doses" and optimal timing for use). Clarify what instructions or recommendations were given to the user, for example, regarding timing, frequency, heaviness of use, if any, or was the intervention used ad libitum</i></p> <p>The Sense-IT application provides real-time biofeedback. Users were instructed to use and wear the application between waking up and going to sleep.</p>
x	<p><i>Clarify the level of human involvement (care providers or health professionals, also technical assistance) in the e-intervention or as co-intervention. Detail number and expertise of professionals involved, if any, as well as "type of assistance offered, the timing and frequency of the support, how it is initiated, and the medium by which the assistance is delivered". It may be necessary to distinguish between the level of human involvement required for the trial, and the level of human involvement required for a routine application outside of an RCT setting (discuss under item 21 – generalizability).</i></p> <p>The experiment leader (AL) was only involved with the intake of the participant. The experiment leader and participant together installed the application on the smartphone and smart watch. Assistance was available on request during the experiment.</p>
xi	<p><i>Report any prompts/reminders used: Clarify if there were prompts (letters, emails, phone calls, SMS) to use the application, what triggered them, frequency, etc. It may be necessary to distinguish between the level of prompts/reminders required for the trial, and the level of prompts/reminders for a routine application outside of an RCT setting (discuss under item 21 – generalizability).</i></p> <p>Prompts, or notifications were generated based on personal parameters (such as average heart rate and standard deviation) and the current heart rate. The algorithm constantly compares the current heart rate and the personal average. Substantial heart rate changes can trigger notification.</p>
xii	<p><i>Describe any co-interventions (including training/support): Clearly state any "interventions that are provided in addition to the targeted eHealth intervention", as eHealth intervention may not be designed as standalone intervention. This includes training sessions and support. It may be necessary to distinguish between the level of training required for the trial, and the level of training for a routine application outside of an RCT setting (discuss under item 21 – generalizability).</i></p> <p>The Sense-IT application was used in combination with the TIIM application to collect qualitative data</p>

Resilience Navigator app

	<i>Subitem CONSORT reporting eHealth guidelines [28]</i>
i	<i>Mention names, credential, affiliations of the developers, sponsors, and owners (if authors/evaluators are owners or developer of the software, this needs to be declared in a "Conflict of interest" section).</i>
ii	<p><i>Describe the history/development process of the application and previous formative evaluations (e.g., focus groups, usability testing), as these will have an impact on adoption/use rates and help with interpreting results.</i></p> <p>The prototype version of the Resilience Navigator app is developed following the CeHRes Roadmap, a roadmap for the development of eHealth with a high focus on involving all important stakeholders and the principles from business modeling [34]. Earlier research included a scoping review to identify critical success factors for self-tracking and persuasive eCoaching [4] and a needs assessment among employees and HR advisors by means of interviews [33] and focus groups among all identified key stakeholders using a business modelling approach [12]. The identified key stakeholders were employees, employers, representative councils within organisations, HR advisors, product owners, company doctors and business analysts [12]. This study is part of the design phase of the CeHRes Roadmap and includes testing a first prototype of the Resilience Navigator app using two existing apps: The Sense-IT app and the TIIM app. Results can lead to the revision of earlier identified values and requirements or the discovery of new values and requirements to improve the current design.</p>

iii	<p><i>Revisions and updating. Clearly mention the date and/or version number of the application/intervention (and comparator, if applicable) evaluated, or describe whether the intervention underwent major changes during the evaluation process, or whether the development and/or content was “frozen” during the trial. Describe dynamic components such as news feeds or changing content which may have an impact on the replicability of the intervention.</i></p> <p>In this study, a first prototype of the Resilience Navigator app was tested (version April 2018). The Resilience Navigator app is in technical readiness level three ‘Proof of concept’ [67]. The applications and the content in the TIIM and Sense-IT app were frozen during the study. The applications did not make use of dynamic components other than biofeedback related components from the Sense-IT app.</p>
iv	<p><i>Provide information on quality assurance methods to ensure accuracy and quality of information provided, if applicable.</i></p> <p>The Resilience Navigator app was pretested by two persons before the app was used in the study. This resulted in including an instruction to users that they only had to fill in a questionnaire when they believed that the signal by the Sense-IT app was the result of an emotion and not because of physical activity, due to the experience of the tester that many reminders were the result of physical activity. In addition, clear instructions were necessary why similar questions were asked during the self-tracking and eCoaching elements of the TIIM app for research purposes. Moreover, some adjustments were made to the questions: (1) the question regarding the receptivity was not clear, and (2) open-ended questions were limited as the typing in of text was experienced as time-consuming in the TIIM app.</p> <p>In addition, the developers of the Sense-IT app and the TIIM app were available for assistance during the experience of difficulties by the users of the apps.</p>
v	<p><i>Ensure replicability by publishing the source code (preferably as open source), and/or providing screenshots/screen-capture video, and/or providing flowcharts of the algorithms used. Replicability (i.e., other researchers should in principle be able to replicate the study) is a hallmark of scientific reporting.</i></p> <p>The source code is not open source. The source code from the Sense-IT app can be accessed via a git repository on request. A demo-version of the app via the TIIM app can be accessed via https://app.tech4people-apps.bms.utwente.nl/preview/Mlb1t/1283.</p>
vi	<p><i>Digital preservation: Provide the URL of the application, but as the intervention is likely to change or disappear over the course of the years, also make sure the intervention is archived (Internet Archive, webcitation.org, and/or publishing the source code or screenshots/videos alongside the article). As pages behind login screens cannot be archived, consider creating demo pages which are accessible without login.</i></p> <p>The source code from Sense-IT is available on a git repository and access can be given on request. The apk files from the Sense-IT are distributed by the researcher via email. The webpage with the demo version of the Resilience Navigator app via the TIIM app is archived via http://archive.today/vPWl6.</p>
vii	<p><i>Access: Describe how participants accessed the application, in what setting/context, if they had to pay (or were paid) or not, whether they had to be a member of specific group. If known, describe how participants obtained “access to the platform and Internet”. To ensure access for editors/reviewers/readers, consider providing a “backdoor” login account or demo mode for reviewers/readers to explore the application (also important for archiving purposes, see vi).</i></p> <p>Participants from the University of Twente and the Hanze University of Applied Sciences could opt-in. They were recruited via flyers. Eligible employees were (1) employees working most of their time behind a digital screen (e.g., more than 4 h during a working day of 8 hours) to be able to have long stretches of time with limited physical exertion, and (2) employees who have affinity with using eHealth technology to involve only potential end-users. Participants received written instructions after selection to participate in the study. The instructions contained URLs to download the application for the smartphone and smart watch. Installation instructions were given on paper. Participants could use their own Android smartphone and Android Wear OS smart watch. If participants did not have any of those devices, we provided the devices when needed.</p>
viii	<p><i>Describe mode of delivery, features/functionalities/components of the intervention and comparator, and the theoretical framework used to design them (instructional strategy, behavior change techniques, persuasive features, etc., see e.g., for terminology). This includes an in-depth description of the content (including where it is coming from and who developed it), “whether [and how] it is tailored to individual circumstances and allows users to track their progress and receive feedback”. This also includes a description of communication delivery channels and – if computer-mediated communication is a component – whether communication was synchronous or asynchronous. It also includes information on presentation strategies, including page design principles, average amount of text on pages, presence of hyperlinks to other resources etc.</i></p> <p>The Resilience Navigator app is a prototype that consists of two apps: (1) the Sense-IT app and (2) the TIIM app. The Sense-IT app is described above and is used in its full form as designed by the developers of the Sense-IT app. As described, the content of the TIIM app can be adjusted by the designers.</p>

A concise description of the Resilience Navigator can be found in the method section of the article. Here we will describe some components of the app in more detail:

Participant could choose the cause of the emotion from a drop-down menu. This drop-down menu was the result of a scan of the literature and a discussion with two occupational psychologists who reviewed the list. The list of causes for positive emotions consisted of: pleasant working atmosphere, social interaction, receiving appreciation, enthusiastic about task, task completed, receiving help during task, personal growth/development, relaxing activity (including physical activity), pleasant moment in general, other (private cause), and other (work-related cause).

The list of causes for negative emotions consisted of: rumination of thoughts, time pressure, emotional burden, high cognitive load (e.g., high level of concentration), little control over work tasks, interaction with someone, not being able to say 'no', high responsibility, exciting activity, having no overview, failure, wrong balance work and private life, other (private cause), and other (work-related cause).

After the reporting of the cause of the emotion, a coaching message was send. In some situations, the coaching message matched with the cause of the emotion. Other coaching messages were randomly selected. This was done to collect data on the level of relevance. The personalised coaching message were expected to be of higher relevance than the non-personalised messages. The relevance was measured on a subjective level. The suggested coping strategies came from existing literature and therapies on stress management and resilience training (the positive psychology approach, time management, ACT, and CBT) [38-41].

Examples of coaching messages

Personalised (high cognitive workload):

"You were experiencing a negative emotion due to high cognitive workload. Did you know that we can best perform when we take a short break, 'a microbreak', after a period of 45 minutes high cognitive workload (Zacher et al., 2014)? Not taking microbreaks can have a negative impact on our energy level during the workday. Standing up to get a cup of coffee or have a quick chat with one of your colleagues helps you to reload for a new period of 45 minutes of high cognitive workload.

Exercise 'Microbreak'

Perhaps this is a moment to take a microbreak. Invest 90 seconds time in yourself multiples times per day and you will end the day with more vitality!"

Not personalised:

"During the self-measurement of emotions, you may have noticed that you often experience a negative emotion. That is not surprising, because we tend to notice negative emotions better than positive emotions. Positive emotions are often more subtle. However, experiencing positive emotions often can serve as a buffer during periods of when things are not going well for a while.

Exercise 'Pay more attention to positive emotions'

Try to be more alert for the experience of positive emotions and spend some more time noticing the positive feeling accompanying the little things in life, such as a ray of sunshine or a good cup of coffee or tea. Enjoy!"

EMA-questionnaires

Information on the EMA-questionnaires are based on the checklist provided in the article by Van Berkel and colleagues [37]:

- Inter-notification time: the standard setting for minimum time in-between two notifications for self-tracking was 20 s. Participants could adjust this to 60 s. In addition, participants were instructed to act upon one signal from the smartwatch per 15 min. This resulted in a minimum time-in-between two notifications for eCoaching of 15 min.
- Notification expiry: Notifications did not expire during the study period.
- Inquiry limit: No maximum number of notifications was established.
- Participants did not receive a reward for their participation.
- EMA question: See below.
- Rich media collection: The input from participants on the EMA questionnaires were text, yes/no answers or scores on scale.

	<p>- Validated questionnaire adaptation: EMA questions were not validated questionnaires. The EMA questions for emotions were based on the circumplex model of affect [36], EMA questions for the causes of the emotions are described above, and the rest of the EMA questions did not have a basis in literature but were pretested with two study-subjects (see described below).</p> <p><i>EMA questions self-tracking:</i></p> <ol style="list-style-type: none"> 1. Did you experience a positive, neutral, or negative emotion during the signal from the smartwatch? 2. How strong was the experienced positive (or negative) emotion during the signal from the smartwatch? (scale 1-10) 3. What was the cause of the positive (or negative) emotion? (dropdown-menu) 4. How appropriate was the timing of the notification from the smartwatch to fill in a questionnaire? (scale 1-10) 5. What was the time of the signal from the smartwatch? (time 00:00) 6. What were you doing just before filling in this questionnaire? (text) <p><i>EMA questions eCoaching:</i></p> <ol style="list-style-type: none"> 1. Did you opened up this coaching message directly after filling in the questionnaire? (yes/no) <i>If yes, then the coaching message was revealed and after the processing of the coaching message, question 7 till 12 were asked.</i> 2. Do you experience a positive, neutral, or negative emotion at this moment? 3. How strong is the experienced positive (or negative) emotion at this moment? (scale 1-10) 4. What were you doing just before opening the coaching message? (text) 5. Coaching message is shown (no input from user) 6. Possible suggestion is shown (no input from user) 7. To what extent did you find the coaching message appealing? (scale 1-10) 8. To what extent did you find the coaching message relevant? 9. How appropriate was the timing to process the coaching message at this moment? (scale 1-10) <p>Questions only asked when the coaching included a suggestions to follow-up:</p> <ol style="list-style-type: none"> 10. Did you followed up the suggestion? (yes/no) 11. How appropriate was the timing of the coaching message to follow-up the coaching message? (scale 1-10) 12. Did the coaching message helped you to improve your emotional state? (yes/no)
ix	<p><i>Describe use parameters (e.g., intended “doses” and optimal timing for use). Clarify describe what instructions or recommendations were given to the user, for example, regarding timing, frequency, heaviness of use, if any, or was the intervention used ad libitum</i></p> <p>Participants were instructed to use the Sense-IT application between waking up and going to sleep. Whenever they received a prompt from the smartwatch, they were instructed to fill in a EMA-questionnaire for self-tracking. In addition, they were instructed to use the app whenever a coaching message became available.</p>
x	<p><i>Clarify the level of human involvement (care providers or health professionals, also technical assistance) in the e-intervention or as co-intervention. Detail number and expertise of professionals involved, if any, as well as “type of assistance offered, the timing and frequency of the support, how it is initiated, and the medium by which the assistance is delivered”. It may be necessary to distinguish between the level of human involvement required for the trial, and the level of human involvement required for a routine application outside of an RCT setting (discuss under item 21 – generalizability).</i></p> <p>The experiment leader (AL) was only involved with the intake of the participant. The experiment leader and participant together installed the application on the smartphone and smart watch. In addition, participants received oral and written instructions from one of the researchers (AL) before using the app. The instructions included a description of the Resilience Navigator app, the installation of the apps (during the face-to-face meeting), to use the app between waking up and going to sleep, to interact with the app as they would normally interact with an app, and instruction were provided on possible difficulties when using the app. These included how to limit battery-use due to the apps, how to resolve the absence of notifications from the smartwatch, to fill in one questionnaire when multiple</p>

	<p>notifications were received during a period of 15 minutes, how to adjust the sensitivity when too many notifications were received, to only fill in a questionnaire when the notifications was the result of an emotion, instructions on similar questions during the coaching element in comparison to the self-tracking element, and what to do when no new questionnaires appeared in the TIIM app. Finally, instructions were given to fill in questionnaires whenever it suited them. If this meant that questionnaires had to be filled in at a later time, the could check the exact time of the moment the notifications from the Sense-IT was received and they were instructed to keep a note in the TIIM app about this specific time.</p> <p>Assistance was available on request during the experiment by mail or phone by the experiment leader. The intervention was executed without human involvement.</p>
xi	<p><i>Report any prompts/reminders used: Clarify if there were prompts (letters, emails, phone calls, SMS) to use the application, what triggered them, frequency, etc. It may be necessary to distinguish between the level of prompts/reminders required for the trial, and the level of prompts/reminders for a routine application outside of an RCT setting (discuss under item 21 – generalizability).</i></p> <p>From the Sense-IT, users received reminders when a substantial increase in heart rate was detected. From the TIIM app, users received reminders whenever a coaching message was available. The coaching message became available after reporting a cause of a negative or positive emotion.</p>
xii	<p><i>Describe any co-interventions (including training/support): Clearly state any “interventions that are provided in addition to the targeted eHealth intervention”, as eHealth intervention may not be designed as standalone intervention. This includes training sessions and support. It may be necessary to distinguish between the level of training required for the trial, and the level of training for a routine application outside of an RCT setting (discuss under item 21 – generalizability).</i></p> <p>The prototype of the Resilience Navigator app consisted of The Sense-IT application in combination with the TIIM application.</p>

Appendix 2 - Interview scheme Resilience Navigator app

Topic	Questions
General experience	1. How long do you believe you would like to use the Resilience Navigator app?
	2. Were there any specialties during the two-week study period that might have influenced usages?
	3. Did you adjust settings in the Sense-IT?
Value of measurements with the Sense-IT app	1. How did you experience the association between heart rate measurements and the experienced emotions? Did this experience influence the usage of the app?
	2. How did you experience the filling in of the questions after you received a signal that your heart rate was increased? <ol style="list-style-type: none"> a. To which extent did you find it relevant to reflect on the emotions and the causes of the emotions? b. Was that different during certain emotional statuses? c. Was that different during certain causes of emotions?
	3. In case of delaying the filling in of the questionnaire, how difficult/or easy was it for you to recall the emotion that was experienced during the moment of the signal?
Effort self-tracking	1. How many questions were you prepared to answer after a signal that your heart rate was increased? How much time would you spend on filling in the questions?
	2. How many times during a day were you willing to answer the questions?
Receptivity JIT self-tracking	1. What were convenient moments to fill in the questions after a signal from the smartwatch? <ol style="list-style-type: none"> a. During which activities did you find it most convenient to fill in questionnaires? b. During which hour of the day?
	2. Did your emotional status influence your willingness to directly filling in the questionnaire after a signal? If yes, how did it influence your willingness?
	3. What was the most positive aspect that you experienced due to the notifications from the smartwatch during the day?
	4. What was the most negative aspect that you experienced due to the notifications from the smartwatch during the day?
	5. Did the filling in of earlier questionnaires influence your willingness to fill in the next questionnaire after a signal? In what way?
Effort eCoaching	1. When exercises were suggested by the eCoach, how many minutes were you willing to spend on the performance of the exercise during the day?
Receptivity JIT eCoaching	1. During which moments were your willing to process an eCoaching message? <ol style="list-style-type: none"> a. During which activities did you find it most convenient to process an eCoaching message? b. During which hour of the day?
	2. Did your emotional status influence your willingness to directly processing an eCoaching message? If yes, how did it influence your willingness?
	3. What was the most positive aspect that you experienced due to the notifications with the eCoaching messages during the day?
	4. What was the most negative aspect that you experienced due to the notifications with the eCoaching messages during the day?

	5. Did the dose of previously processed eCoaching messages influence your willingness to process a new coaching message? In what way?
	6. Did the level of relevance of the content of the message influence your receptivity to process an eCoaching message? In what way?
	7. Did the level of appeal of the content of the message influence your receptivity to process an eCoaching message? In what way?
	8. During which moments were you prepared to follow-up a suggestion? a. During which activities did you find it most convenient to act upon a suggestion? b. During which hour of the day?
	9. Did your emotional status influence your willingness to directly act upon the suggestion in the eCoaching message? If yes, how did it influence your willingness?
	10. Did the level of relevance of the suggestion influence your receptivity to act upon an eCoaching message? In what way?
	11. Did the level of appeal of the suggestion influence your receptivity to act upon an eCoaching message? In what way?
	12. Did the dose of earlier received suggestion influence your willingness to act upon an eCoaching message? In what way?
	13. What was the most important reason to not act upon a suggestion?
Other	1. Are there any additional things that you noticed during the study period/you would like to discuss?

Appendix 3 – Summary table of results

Factor	Self-tracking (indicated by a=quantitative data, b=qualitative data)	Grounded	eCoaching (indicated by a=quantitative data, b=qualitative data)	Grounded
Emotional valence				
<i>Take-in the message</i>	The receptivity towards the notification seems higher during a positive emotional valence in comparison to a negative emotional valence (a, b)	3	The receptivity towards the eCoaching message seems higher during a positive emotional valence in comparison to a negative emotional valence (b)	7
	During a negative emotional valence, there is no room to pay attention to anything else than the emotional state (b)	9	During a negative emotional valence, eCoaching messages may elicit a negative response (b)	6
	A positive emotional valence can initiate a positive initial response towards a notification as it is perceived as more pleasant to reflect on emotions with positive emotional valence (b)	2		
<i>Act upon the message</i>	Most relevant to overthink situations that involve emotions with negative emotional valence, followed by a positive emotional valence, and least relevant during a neutral emotional valence (b)		eCoaching messages were perceived most relevant during a negative emotional valence in comparison to a positive emotional valence (b)	5
	The time between the emotion and the filling in of the questionnaire is perceived as beneficial for the reflection process as the negative valence needs to diminish before experiencing the time and space to overthink the situation (b)	4	Opinions were divided about the relevance of an eCoaching message during a positive emotional valence (b)	
Emotional arousal				
<i>Take-in the message</i>			The receptivity towards an eCoaching message seems higher among emotions involving a higher positive emotional arousal (a*)	
<i>Act upon the message</i>	The receptivity to act upon the notification seems higher among emotion involving a higher (positive) emotional arousal (a*) due to a higher perceived level of relevance (b)	4	A certain time between the intense emotion is needed to better overthink how the rather general suggestion in the eCoaching message could be relevant for their specific situation (b)	6
Activity				
<i>Take-in the message</i>	In general, users did not perceive it as convenient to interrupt any activity to fill in a questionnaire (b)	8	Choose autonomously to process the message during a moment when there are time and space necessary to appropriately take-in the message (b)	7

	An autonomous perception to decide when to act upon the notification is necessary to avoid a negative initial response (b)	7		
	Users do not perceive it as convenient to interrupt activities that involve some level of concentration and might cause a negative initial response towards the notification (internal locus of control) (b)	4		
<i>Act upon the message</i>	Users believe that during social interaction, others do not find it acceptable that the activity will be interrupted for self-tracking (external locus of control) (b)	12		
	Users do not experience the ability to fill in a questionnaire during days characterised by a busy schedule (external locus of control) (b)	7		
Number of earlier messages				
<i>Take-in the message</i>			A higher number of earlier processed eCoaching messages decreases the effort spend in processing the message (b)	2
<i>Act upon the message</i>	Results were divided with the qualitative data reflecting a decrease in receptivity caused by a higher number of earlier filled in questionnaires (b) and the quantitative data reflecting an increase in receptivity caused by a higher number of earlier filled in questionnaires (a*).	7	Not perceived as relevant to receive eCoaching after every single emotional state (b)	3
	A higher number of earlier filled in questionnaires affected the effort the user spend in filling in the questionnaire (b)	2		
	A shorter period between the filling in of two questionnaires can negatively affect the receptivity towards self-tracking due to higher chances that it relates to the same situation (b)	4		
Time of the day				
<i>Take-in the message</i>			The processing of eCoaching messages requires time and space which was often not experienced in the daytime (b)	7
			Results on the best time of the day to process an eCoaching message were not decisive. The evening and afternoon scored significantly better on receptivity in comparison to the morning (a*), with the evening being mentioned as the	9

			most opportune moment during interviews (b). However, the evening was not the most frequent moment to process an eCoaching message.	
			Fixed moments during the day were experienced as opportune moments to process eCoaching messages as respondents reserve time on forehand (b)	6
<i>Act upon the message</i>	Results are conflicting about the evening as the most receptive moment during the day to act upon a notification. During the evening the receptivity was higher in comparison to the morning or afternoon (a, b) due to having the time and space to overthink the situation and/or respondents liked to look back on how their day evolved (b). However, the evening was not the most frequent moment to act upon a notification (a).	5		
	Fixed moments during the day were perceived as opportune moments to act upon a notification because respondents can account for such moments on forehand (b).	5		
	A certain time between the notification and the filling in of the questionnaire was mentioned as beneficial for the reflective process due to having more time to overthink the situation (b).	2		
Effort				
<i>Take-in the message</i>	-		When participants processed the eCoaching message right away, involving a lack of time and space, they processed the message less intensively (b).	7
<i>Act upon the message</i>	Problems with the usability of the system made it more effortful to act upon the notification and affected the receptivity (b).	4	The less effort is required, the higher the chance to deal with the eCoaching message right away (b)	6
	It requires some time to overthink the situation (b).	4		
Appeal				
<i>Take-in the message</i>	-		The receptivity to eCoaching messages was better when users appraised the message as more appealing (a*,b)	3
			eCoaching messages that appealed to the user were remembered longer (b)	3
			eCoaching messages with a positive framing affected the receptivity positively (b)	4
<i>Act upon the message</i>	-			

Relevance				
<i>Take-in the message</i>	Many false-positive notifications can lead to ignorance of the notifications (b)	8	A mismatch between the coping strategy and the cause of the emotion evoked a negative initial response (b)	3
<i>Act upon the message</i>	Coherence experienced between heart rate and the emotional state increases the willingness to fill in a questionnaire because of the higher perceived relevance of filling in a questionnaire (b)	8	The higher the perceived relevance of the eCoaching message, the higher the receptivity (a*)	
	When no coherence was experienced, the notification could be annoying (b)	7	When the eCoaching message is already known to the user, the participant experienced a lack of challenge which did not motivate them to act upon the eCoaching message (b)	5
	When no coherence was experienced, it was sometimes still perceived as relevant to overthink what is going on in the situation (b)	6	When the eCoaching message was already known, the participant experienced the eCoaching message as a refresher of their known coping strategies (b)	3
	When no coherence was experienced, it felt artificial to search for emotions as the additional heart rate was in essence caused by an increase in physical activity (b)	4		
	Repetition of filling in the same information for notifications related to similar situations affected their tolerance towards filling in the questionnaire (b)	5		
Effectiveness				
<i>Take-in the message</i>			Messages that were experienced as effective scored higher on receptivity than messages that were not experienced as effective (a*)	
			Some participants experienced the eCoaching messages as too general to be effective which affected their receptivity in a negative way (b).	4
<i>Act upon the message</i>			A few other participants did believe that the eCoaching messages could be effective although this did not always lead to following-up the suggestion (b).	2
<u>Interactions between variables</u>				
Activity vs. relevance	More relevant on days involving a lot of social interaction and a busy schedule although less receptive during such days. Activity is mentioned to be more important (b)	3	Opinions were divided about what factor was more decisive for the receptivity: the relevance of the eCoaching messages or the activity the user is involved in during the moment of the notification. Somewhat more participants gave priority to the activity	3 relevance vs. 5

			instead of the relevance. Thus, activity seems to be more important (b) .	activity
Activity vs. effort	The activity the user was involved in was perceived as more important than the acceptable effort requested to fill in a questionnaire for self-tracking Activity seems to be more important (b)	3		
Relevance vs. emotional valence	Although relevance is perceived higher during a negative emotional valence in comparison to a positive emotional valence (b), the receptivity seems lower (a,b). Level of receptivity during emotional valence seems to be more important than the relevance (b)	8 em otio nal vale nce vs. 5 rele van ce	Although relevance is perceived higher during a negative emotional valence in comparison to a positive emotional valence (b), the receptivity seems lower (b). The fact that the emotional state does not make them able to act upon the coaching properly, the level of receptivity due to the emotional valence seems to be more important (b) .	7 em otio nal vale nce vs. 5 rele van ce

Note: a* = significant association between the receptivity and the factor of interest.

Appendices Chapter 6

Appendix 1 – Description of the BringBalance app according to the CONSORT guideline on reporting eHealth

	<i>Subitem CONSORT reporting eHealth guidelines [24]</i>
i	<p><i>Mention names, credential, affiliations of the developers, sponsors, and owners (if authors/evaluators are owners or developer of the software, this needs to be declared in a "Conflict of interest" section).</i></p> <p>Developers BringBalance: Ewold de Maar, MSc, De Maar Training & Advies, Glimmen, The Netherlands Aniek Lentferink, MSc, Psychology, Health, & Technology, University of Twente, Enschede, The Netherlands & Marian van Os Centre for Entrepreneurship, Hanze University of Applied Sciences, Groningen, The Netherlands Prof. dr. Lisette van Gemert-Pijnen, Psychology, Health, & Technology, University of Twente, Enschede, The Netherlands Dr. Hugo Velthuisen, Marian van Os Centre for Entrepreneurship, Hanze University of Applied Sciences, Groningen, The Netherlands Dr. Hilbrand Oldenhuis, Marian van Os Centre for Entrepreneurship, Hanze University of Applied Sciences, Groningen, The Netherlands</p> <p>Developers The Incredible Intervention Machine: Behavioural, Management and Social Sciences Lab (BMS Lab), University of Twente, Enschede, The Netherlands</p> <p>Sponsors: De Maar Training & Advies Menzis Hanze University of Applied Sciences University of Twente</p> <p>Owner content BringBalance programme: Ewold de Maar, MSc, De Maar Training & Advies, Glimmen, The Netherlands</p> <p>Owner the Incredible Intervention Machine: Behavioural, Management and Social Sciences Lab (BMS Lab), University of Twente, Enschede, The Netherlands</p>
ii	<p><i>Describe the history/development process of the application and previous formative evaluations (e.g., focus groups, usability testing), as these will have an impact on adoption/use rates and help with interpreting results.</i></p> <p>The content of the BringBalance app is based on the face-to-face coaching programme <i>Working on Resilience</i> by De Maar Training & Advies. Results from a pilot study on this face-to-face coaching programme indicated positive effects on stress reduction [27].</p> <p>In addition, the prototype version of the BringBalance app is developed following the CeHRes Roadmap, a roadmap for the development of eHealth with a high focus on involving all important stakeholders and the principles from business modeling [54]. Earlier research included a scoping review to identify critical success factors for self-tracking and persuasive eCoaching [25] and a needs assessment among employees and HR advisors by means of interviews [28] and focus groups among all identified key stakeholders using a business modelling approach [24]. The identified key stakeholders were employees, employers, representative councils within organisations, HR advisors, product owners, company doctors and business analysts [24].</p> <p>This study is part of the design phase, the third phase, of the CeHRes Roadmap and includes testing a first prototype of the BringBalance programme using an existing app: The Incredible Intervention Machine (TIIM) app. Results can lead to the revision of earlier identified values and requirements in the</p>

	<p>first two phases of the CeHRes roadmap, namely the contextual inquiry and value specification phase, or the discovery of new values and requirements to improve the current design.</p>
iii	<p><i>Revisions and updating. Clearly mention the date and/or version number of the application/intervention (and comparator, if applicable) evaluated, or describe whether the intervention underwent major changes during the evaluation process, or whether the development and/or content was “frozen” during the trial. Describe dynamic components such as news feeds or changing content which may have an impact on the replicability of the intervention.</i></p> <p>In this study, a first prototype of the BringBalance app was tested (version October 2018). The BringBalance app is in technical readiness level three “Proof of concept” [58, 74]. The applications and the content of the BringBalance programme in the TIIM app were frozen during the study. The applications did not make use of dynamic components other than the personal self-tracking data and the biofeedback related components from the Bringbalance app.</p>
iv	<p><i>Provide information on quality assurance methods to ensure accuracy and quality of information provided, if applicable.</i></p> <p>The BringBalance app was pretested by two persons before the app was used in the study. This resulted in improving the navigation in the app as some elements were unintentionally missed (such as short clips with the BringBalance techniques), clarification of unclear spoken or written text, and usability adjustments such as decreasing the number of notifications by the app, enabling to check certain design elements more than once, and to set reminders for self-reporting of stress and resilience on natural moments during the day (end of the morning, afternoon, and evening) instead of 10:00 h, 14:00 h ect.</p> <p>In addition, the developers of the Sense-IT app and the TIIM app were available for assistance during the experience of difficulties by the users of the apps.</p>
v	<p><i>Ensure replicability by publishing the source code (preferably as open source), and/or providing screenshots/screen-capture video, and/or providing flowcharts of the algorithms used. Replicability (i.e., other researchers should in principle be able to replicate the study) is a hallmark of scientific reporting.</i></p> <p>The source code is not open source. Screenshots of the BringBalance programme via the TIIM app are included in the article (see Figure 1).</p>
vi	<p><i>Digital preservation: Provide the URL of the application, but as the intervention is likely to change or disappear over the course of the years, also make sure the intervention is archived (Internet Archive, webcitation.org, and/or publishing the source code or screenshots/videos alongside the article). As pages behind login screens cannot be archived, consider creating demo pages which are accessible without login.</i></p> <p>Screenshots of the BringBalance programme via the TIIM app are included in the article (see Figure 1).</p>
vii	<p><i>Access: Describe how participants accessed the application, in what setting/context, if they had to pay (or were paid) or not, whether they had to be a member of specific group. If known, describe how participants gained “access to the platform and Internet”. To ensure access for editors/reviewers/readers, consider providing a “backdoor” login account or demo mode for reviewers/readers to explore the application (also important for archiving purposes, see vi).</i></p> <p>Participants from the University of Twente and the Hanze University of Applied Sciences could opt-in. They were recruited via flyers. Eligible employees were (1) employees working most of their time behind a digital screen (e.g., more than 4 hours during a working day of 8 hours) to be able to have long stretches of time with limited physical exertion, and (2) employees who have affinity with using eHealth technology to involve only potential end-users. Participants received written instructions after selection to participate in the study. The instructions contained URLs to download the application for the smartphone and smart watch. Installation instructions were given on paper. Participants could use their own Android smartphone and Android Wear OS smart watch. If participants did not have any of those devices, we provided the devices when needed.</p>
viii	<p><i>Describe mode of delivery, features/functionalities/components of the intervention and comparator, and the theoretical framework used to design them (instructional strategy, behaviour change techniques, persuasive features, etc., see e.g., for terminology). This includes an in-depth description of the content (including where it is coming from and who developed it), “whether [and how] it is tailored to individual circumstances and allows users to track their progress and receive feedback”. This also includes a description of communication delivery channels and – if computer-mediated communication is a component – whether communication was synchronous or asynchronous. It also includes information on presentation strategies, including page design principles, average amount of text on pages, presence of hyperlinks to other resources etc.</i></p> <p>A concise description of the BringBalance app can be found at the end of the introduction of the article. A schematic overview of the programme can be found in the table below. The BringBalance app is a prototype that consists of two apps: (1) TIIM app including the full content of the programmem and (2) the Inner Balance app (HeartMath Institute) for the receiving biofeedback via the Inner Balance sensor during the practicing of the BringBalance Techniques (see Table). Below, we will describe some elements</p>

of the app in more detail. The theoretical framework used to build the content of the BringBalance app included literature on persuasive features, coaching techniques, reflection, and the earlier performed studies during the needs assessment [24, 25, 28]. The literature on persuasive features included the Persuasive System Design Model [20], the Fogg behavioural model [38], guidelines for persuasive interfaces [39], and earlier theory on effective persuasive elements for reflection [15]. Persuasive elements used in the app were for example *self-monitoring* using the EnergyBalance questionnaires (see described below), *reduction* by cutting down the reflection process in smaller steps, *personalisation* by helping them choose their own strategies to apply in daily life, and *rehearsal* by guiding the user through the practicing of the BringBalance techniques using short clips with instructions, guiding questions and biofeedback via the Inner Balance sensor.

The literature on coaching techniques and reflection included the reflective coaching model [13], levels of reflection [29], reflection via technology [9, 10, 22, 30, 31], 4G scheme [32], circumplex model of affect [36], implementation intentions [34], the four levels of evaluation [35], cognitive coaching [33], and the growth model [37].

Table. Content of the BringBalance programme

Phase	Duration	What?
Phase 1 – Identification	Week 1 - 2	<p>Three times per day:</p> <ul style="list-style-type: none"> Filling in the EnergyBalance questionnaire (during the weekend once daily) <p>Once daily:</p> <ul style="list-style-type: none"> Reflecting on the measurements of the day before <p>End of phase 1:</p> <ul style="list-style-type: none"> Choosing the three most important energy sources and leaks <p>Result: Self-tracking data on the EnergyBalance for comparison with phase 3, list of energy sources and leaks and top three most important sources and leaks.</p>
Phase 2 – Strategy generation	Week 3 – 4	<p>Every Monday, Wednesday and Friday:</p> <ul style="list-style-type: none"> Learning a new BringBalance technique <p>The day after the introduction of the technique:</p> <ul style="list-style-type: none"> Practicing the BringBalance technique with the Inner Balance Trainer <p>End of phase 2:</p> <ul style="list-style-type: none"> Choosing strategies for their three most important energy sources and –leaks Setting implementation intentions and reminders for phase 3 <p>Result: Strategies were chosen for the top three energy sources and leaks, implementation intentions were set including the strategies for the energy sources and leaks, reminders were set with the implementation intentions</p>

Phase 3 - Experimenting	Week 5 - 6	<p>Daily:</p> <ul style="list-style-type: none"> • Receiving reminders at chosen moments with their implementation intentions • Experimenting with the chosen strategies (optional: using the Inner Balance sensor) according to implementation intentions • Evaluating the strategy with a strategy evaluation form after experimenting with a strategy • Filling in the EnergyBalance questionnaire once daily <p>Result: Data on the evaluation of the strategies, self-tracking data on the EnergyBalance for comparison with phase 1</p>
Phase 4 – Evaluation	End of week 6	<p>At the end of the programme:</p> <ul style="list-style-type: none"> • Receiving the data collected in phase 3 via visualisations in tables and graphs • Evaluating if the strategies helped to prevent or resolve energy leaks and helped to make more use of energy sources. • Evaluating if the energy balance improved. • Advice on how to continue working on their energy balance after completion of the programme <p>Result: Final reflection on the strategies and energy balance and advice on how to continue working on their energybalance</p>

Examples of EMA questionnaires in the BringBalance app

The advice given by Burke, Shiffman [76] was applied during the development of EMA questionnaires. Information given here on the EMA-questionnaires are based on the checklist provided in the article by Van Berkel and colleagues [30]:

- Inter-notification time: due to the many different steps in the BringBalance programme, the inter-notification time was different each phase and sometimes even per day. For example, the EnergyBalance questionnaires (see below) were send at 12:00 h, 17:00 h, and 22:00 h on workdays and at 15:00 h on weekend days. Participants were instructed to allow the sending of notifications via the TIIM app. Participants received a notification whenever a new module was available in the app. At the end of phase 2, participants were able to set their own timing of reminders with the implementation intentions during phase 3.
- Notification expiry: Notifications of the EnergyBalance questionnaire expired when a new EnergyBalance questionnaire became available. Most notifications did not expire during the study period. Some non-mandatory modules disappeared after 1 day to secure chaos in available modules in the app.
- Inquiry limit: the number of notifications could vary between 1-8 notifications per day. The maximum notifications were received at the end of phase 2 when participants had to choose their strategies, and set implementation intentions and reminders with those implementation intentions.
- Participants did not receive a reward for their participation.
- EMA question: See below.

- Rich media collection: The input from participants on the EMA questionnaires were dropdown menu, text, yes/no answers or scores on a scale from 1-10.
- Validated questionnaire adaptation: EMA questions were not validated questionnaires. The theoretical framework described above was input for developing the questions. The questions were pre-tested with two persons.

EMA questions EnergyBalance (phase 1):

1. What was your most important energy source of this morning/afternoon/evening? (text entry)
2. How energetic did you feel on a scale from 1-10?
3. Did you feel positive, neutral or negative?
4. What was your most important energy leak of this morning/afternoon/evening? (text entry)
5. How energetic did you feel on a scale from 1-10?
6. Did you feel positive, neutral or negative?

EMA questions practicing BringBalance techniques (phase 2):

1. What has the Neutral practicing day brought you?
 - a. Less balance, I feel less energetic
 - b. Just as much balance as usual, I feel the same as usual
 - c. More balance, I feel more energetic
2. What is the most important lesson you have learned from the Neutral technique? (text entry)
3. How could you integrate the Neutral in your daily life? (text entry)
Think of situations in which the Neutral might be useful, during what moments of the day and how long you should use the Neutral to achieve the best results.

EMA questions strategy evaluation form (phase 3):

1. Which strategy did you try out? (dropdown menu)
2. On a scale from 1-10: To what extent has the strategy helped you with this energy leak?
3. Do you feel more energetic? (Yes/No)
4. Do you feel more pleasant? (Yes/No)
5. If you have used the Inner Balance sensor, please note your coherence score over here:
6. On a scale from 1-10: How easy did you find it to complete the strategy on a scale from 1-10?
7. On a scale from 1-10: How relevant was it to perform the strategy in this specific situation?
8. On a scale from 1-10: How much did you enjoyed performing the strategy?
9. Make a short note about your experience with performing the strategy: (text entry)
For example, make notes about:
 - What has the strategy brought you?
 - What factors have worked against you (barriers)?
 - What factors have stimulated you?
 - How did people around you react?

EMA questions evaluating the strategies (phase 4):

1. Presentation of collected data in a graph and table of the strategy evaluation forms in phase 3 on that specific strategy.
2. Why couldn't you give a 10 to the question "To what extent has the strategy helped you with this energy leak?" (text entry)
3. What does it take to make it a 10? (text entry)
4. What is the most positive aspect that you experienced during performing this strategy in situations related to this energy leaks? (text entry)
5. What is the most negative aspect that you experienced during performing this strategy in situations related to this energy leaks? (text entry)
6. What is the most important lesson that you have learned by applying the strategy in situations related to this energy leaks? (text entry)
7. What factors have stimulated you to perform the strategy? Can you make more use of such factors in the future? (text entry)

	<p>8. What factors have worked against you to perform the strategy? Can you eliminate those factors in the future? (text entry)</p> <p>9. On the basis of the answers given until now, do you feel the need to adjust the strategy of this energy leaks? (Yes/No)</p>
ix	<p><i>Describe use parameters (e.g., intended “doses” and optimal timing for use). Clarify describe what instructions or recommendations were given to the user, for example, regarding timing, frequency, heaviness of use, if any, or was the intervention used ad libitum</i></p> <p>Participants were instructed to use the BringBalance application daily during a study period of six weeks. About 15 minutes of time was asked from the participants on a daily basis with the exception of the weekend days, during which the app was used less intensively. Whenever they received a notification from the app, they were instructed to act upon the notification by checking out the available module in the TIIM app.</p>
x	<p><i>Clarify the level of human involvement (care providers or health professionals, also technical assistance) in the e-intervention or as co-intervention. Detail number and expertise of professionals involved, if any, as well as “type of assistance offered, the timing and frequency of the support, how it is initiated, and the medium by which the assistance is delivered”. It may be necessary to distinguish between the level of human involvement required for the trial, and the level of human involvement required for a routine application outside of an RCT setting (discuss under item 21 – generalizability).</i></p> <p>The experiment leader (AL) was only involved during the intake of the participant and for problem solving during the study period. A week before the study period, the experiment leader was available on location for two days to help install the apps and to answer questions. In addition, before the start of the study, the participant received an instruction video and written instructions including a description of the BringBalance app, the installation of the apps, how to interact with the app in practice and instruction were provided on possible difficulties when using the app. Instructions on how to interact with the app included, among others, the advice to not skip modules as that could affect other steps in the BringBalance programme, not to mute notifications of the app, and to be aware about not skipping clips in the app (as they could be easily missed). Instructions on possible difficulties included what to do when they do not receive a notification by the app and what to do when the clips do not include sound.</p> <p>Assistance was available on request during the experiment by mail or phone by the experiment leader. The intervention was executed without human involvement.</p>
xi	<p><i>Report any prompts/reminders used: Clarify if there were prompts (letters, emails, phone calls, SMS) to use the application, what triggered them, frequency, etc. It may be necessary to distinguish between the level of prompts/reminders required for the trial, and the level of prompts/reminders for a routine application outside of an RCT setting (discuss under item 21 – generalizability).</i></p> <p>Users received reminders whenever a module became available in the app. Most of the reminders were set by the experiment leader. The reminders in phase 3 with the user’s personal set implementation intentions were set personally. See additional information about notifications described above in the section about the EMA questionnaires.</p>
xii	<p><i>Describe any co-interventions (including training/support): Clearly state any “interventions that are provided in addition to the targeted eHealth intervention”, as eHealth intervention may not be designed as standalone intervention. This includes training sessions and support. It may be necessary to distinguish between the level of training required for the trial, and the level of training for a routine application outside of an RCT setting (discuss under item 21 – generalizability).</i></p> <p>The prototype of the BringBalance app consisted of the TIIM application in combination with the Inner Balance application.</p>

BringBalance – English translation

BringBalance questionnaire

This questionnaire consists of the following parts:

- Your experiences with BringBalance
- Your experiences with the elements in the BringBalance programme
- The Perceived Stress Scale
- The Brief Resilience Scale

It will take about 30 minutes to complete the questionnaire.

Q1 Please, fill in your name:

Part 1 – Your experiences with BringBalance

Firstly, we would like to ask you some questions about your experiences with the BringBalance program in general.

Q2. The following statements are about your perceived effect of the automated eCoach in the BringBalance app.

Please indicate to what extent you agree with the statements.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. The eCoach has given me a clear overview of my most important energy leaks and energy sources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Thanks to the eCoach, I know what I could do in future to prevent or resolve energy leaks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Thanks to the eCoach, I know what I could do in the future to take more advantage of my energy sources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3. The following statements are about the degree to which the BringBalance programme motivated you. Please indicate to what extent you agree with the statements.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. The BringBalance programme motivated me to reflect on my energy leaks and sources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The BringBalance programme motivated me to reflect on the chosen strategies for my energy leaks and sources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4. On a scale of 1-10: What score would you give the BringBalance programme in general?

- 1 2 3 4 5 6 7 8 9 10
-

Q5. Briefly describe why you gave this rating:

Q6. Please indicate on a scale from 1-10: How much did you learn from the BringBalance program?

1 2 3 4 5 6 7 8 9 10

Q7. Describe here the three main things you have learned from BringBalance:

Q8. Indicate on a scale of 1-10: To what extent did the BringBalance program appeal to you?

1 2 3 4 5 6 7 8 9 10

Q9. On a scale of 1-10: How useful did you find it to complete the BringBalance program?

1 2 3 4 5 6 7 8 9 10

Q10. On a scale from 1-10: How would you rate the usability of the BringBalance program?

1 2 3 4 5 6 7 8 9 10

Q11. On a scale of 1-10: How easy was it to integrate the BringBalance program into your daily life?

1 2 3 4 5 6 7 8 9 10

Q12. Would you recommend the BringBalance program to a colleague?

Yes

No

Q13. Before the start you described your expectations of the BringBalance program. We have emailed you this expectation, together with the link to this questionnaire. On a scale of 1-10: To what extent did BringBalance meet this expectation?

1 2 3 4 5 6 7 8 9 10

Q14. Briefly describe why you gave this rating:

Part 3 – Elements from the BringBalance programme

You will see a number of elements from the BringBalance program. We are curious to what extent these elements have helped you in reflecting on situations related to your energy balance and determining and evaluating strategies for your energy leaks and sources. If you have not fully finished the BringBalance program, fill in the questions for the elements that you have gone through.

If you want to fully view a module from the BringBalance program again, please use the links below:

Phase 1: <https://app.tech4people-apps.bms.utwente.nl/preview/nuJvh/517>

Phase 2: <https://app.tech4people-apps.bms.utwente.nl/preview/YnIDY/475>

Phase 3: <https://app.tech4people-apps.bms.utwente.nl/preview/NMwON/462>

Phase 4: <https://app.tech4people-apps.bms.utwente.nl/preview/A02dL/528>

The questions are asked per phase. The last question contains space for comments about elements from that phase.

Q15 Phase 1. The EnergyBalance

You received the Energy Balance three times a day with the following questions:

- *What was your most important energy leak or source of the past half day?*
- *How energetic did you feel on a scale of 1-10?*
- *Did you feel pleasant, neutral or unpleasant at that time?*

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you gain insight into your energy leaks and energy sources?

- 1 2 3 4 5
-

Q16 Completing the Energy Balance three times a day was:

- Not enough to get a clear overview of my energy leaks and sources during the day.
 - Just right to get a clear overview of my energy leaks and resources during the day.
 - Too often to get a clear overview of my energy leaks and resources during the day.
-

Q17 Phase 1. Look back on the previous day - Graph.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has the graph helped you gain insight into your energy leaks and energy sources?

- 1 2 3 4 5
-

Q18 Phase 1. Look back on the previous day - Table.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has the table helped you gain insight into your energy leaks and energy sources?

- 1 2 3 4 5
-

Q19 Phase 1. Look back on the previous day – 4G questions

During the look back, you chose the most important energy leak and source of the previous day. There are a number of questions:

- What happened exactly? / Where did it happen? / When did it happen? / Who was present?
- What emotions did you experience during this situation?
- What were your physical reactions in this situation?
- What thoughts were you having at the time?
- How would you describe your behaviour in this situation?
- Describe your energy leak (source) in keywords.

You may never have been asked these questions. Then choose 'not applicable' (n / a).

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you gain insight into your energy leaks and energy sources?

- 1 2 3 4 5 n / a
-

Q20 Phase 1. Look back on the previous day – personalisation of the questions

Based on the following three categories, you were referred to all 4G questions as mentioned above (option 1 or 2) or you could immediately describe the energy leak or energy source in keywords (option 3):

1. *I look at the data but I can't give it any meaning.*
2. *On the basis of the graph and table I can indicate what and when something gave me energy and or cost me energy, but I find it difficult to clearly identify what exactly happened then.*
3. *When I see the graph and the table I can give a good interpretation of what was going on at the time, how I felt physically and emotionally and what my reaction was at the time.*

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has the choice between these options helped you gain insight into your energy leaks and energy sources?

- 1 2 3 4 5
-

Q21 Phase 1. Top 3 energy leaks and sources

During the last module of phase 1, you saw an overview of your energy leaks and sources. From this overview you chose the three most important energy leaks and energy sources.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you gain insight into your most important energy leaks and energy sources?

- 1 2 3 4 5
-

Q22 Phase 1. Reminders to fill in the EnergyBalance questionnaire

During phase 1 you received reminders when a new EnergyBalance was ready for you and when you had not yet filled in the EnergyBalance questionnaire after a certain period.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you gain insight into your energy leaks and energy sources?

- 1 2 3 4 5
-

Q23 Phase 1. Reminders to fill in the module 'Look back on the previous day'

During phase 1 you received reminders when you could look back on the day before and when you hadn't looked back on the day before after a while.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you gain insight into your energy leaks and energy sources?

- 1
 - 2
 - 3
 - 4
 - 5
-

Q24 Space for comments about the elements from phase 1.

Q25 Phase 2. BringBalance techniques

In phase 2, you were introduced every other day to a new BringBalance technique, including videos:

- Neutral
- Shift
- Preframe
- Reframe
- Flexframe
- Zzleep

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you determine appropriate strategies for your energy leaks and resources?

1 2 3 4 5

Q26 Indicate on a scale of 1-5 (1 = not at all, 5 = very much): How clear did you find the animation videos?

1 2 3 4 5

Q27 Indicate on a scale of 1-5 (1 = not at all, 5 = very much): How clear did you find the text in the modules with the BringBalance techniques?

1 2 3 4 5

Q28 Indicate on a scale of 1-5 (1 = not at all, 5 = very much): To what extent did the animation films appeal to you?

1 2 3 4 5

Q29 Please indicate on a scale of 1-5 (1 = not at all, 5 = very much): How easy was it for you to learn the BringBalance techniques?

- 1 2 3 4 5
-

Q30 What did you think of the variation in BringBalance techniques you learned?

- Too little variation
- Just enough variation
- Too much variation
-

Q31 Use the space below if you want to report something about the BringBalance techniques:

Q32 Phase 2. Train BringBalance techniques

Every next day, after you were introduced to a new technique, you trained the technique.

You received reminders to practise. If you have not been able to practise, enter 'not applicable' (n / a).

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you determine appropriate strategies for your energy leaks and resources?

- 1 2 3 4 5 n / a

Q33 Phase 2. Evaluate BringBalance training days

At the end of the training day you were asked to evaluate the training with the technique.

You received the following questions:

- What did the training day yield to you?
- What is the most important thing you learned from the technique?
- How could you integrate the technique into your daily life?

If you have not been able to evaluate the training day, enter 'not applicable' (n / a).

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you determine appropriate strategies for your energy leaks and resources?

- 1 2 3 4 5 n / a
-

Q34 Phase 2. Techniques in your daily life

This module provided you with an overview of your answers to the evaluations of the BringBalance techniques.

If you have not been able to evaluate the training day, enter 'not applicable' (n / a).

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this advice helped you determine appropriate strategies for your energy leaks and resources?

- 1 2 3 4 5 n / a
-

Q35 Phase 2. Inner Balance Trainer while learning the techniques

While practicing the above techniques, you automatically received information via the sensor about the effects of the technique on your physical state. During the exercise you received feedback in the form of colors: Red: moderate coherence, blue: good coherence, green: excellent coherence. In addition, you received a summary of the measurements during the exercise at the end.

If you have not been able to train the techniques with the Inner Balance Trainer, enter 'not applicable' (n / a).

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you determine appropriate strategies for your energy leaks and resources?

- 1 2 3 4 5 n/a
-

Q36 Did you find it useful to use the Inner Balance app while learning the BringBalance techniques?

- Yes
 No
-

Q37 Describe here why you believed the Inner Balance trainer was (not) useful during the learning of the BringBalance techniques:

Q38 Phase 2. HRV measurements

In phase 1, you were asked to use the Inner Balance Trainer several times to perform a measurement.

In phase 2 you were asked to perform a measurement with the Inner Balance Trainer during the Neutral technique.

You received the differences between the measurements in the module 'Your HRV measurements'.

If you have not started this module, enter 'not applicable' (n / a).

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you determine appropriate strategies for your energy leaks and resources?

- 1 2 3 4 5 n / a
-

Q39 Phase 2. Determining the energy leak strategies - Options

You could determine a strategy that matched your wishes and needs for closing your energy leaks.

The strategy could consist of one of the six BringBalance techniques, one of your energy sources or a self-devised strategy. You could choose from the following options to determine a strategy:

1. I already have an idea: With this module you can immediately write down a strategy for the energy leak in question.
2. I would like to take a look at the strategy database: In this module you will find an overview of the learned BringBalance techniques and you will receive advice on how to use the BringBalance techniques for your energy leaks.
3. I would like help from the eCoach: In this module you will be asked a number of questions. From this, suggestions for strategies follows.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has the choice in these options helped you determine appropriate strategies for your energy leaks and resources?

- 1 2 3 4 5

Q40 Phase 2. Determining the energy leak strategies - I already have an idea myself

When you chose the option 'I already have an idea myself', you independently determined a strategy for your energy leak.

If you have not started this module, enter 'not applicable' (n / a).

Indicate on a scale of 1-5 (1 = not at all, 5 = very bad):

To what extent has the 'I already have an idea' option helped you to determine appropriate strategies for your energy leaks?

- 1 2 3 4 5 n / a
-

Q41 Phase 2. Determining the strategies for energy leaks - Strategy database

In the strategy database, you have found an overview of the taught BringBalance techniques and you received advice on how to use the BringBalance techniques for your energy leaks.

An example:

In the Neutral video you received the following advice: "For example, if you feel restless or rushed, the Neutral can calm you down and regain balance. However, if you feel lifeless or tired, the Neutral can activate you".

You were also advised to take a look at your list of energy sources for possible strategies.

If you have not started this module, enter 'not applicable' (n / a).

Indicate on a scale of 1-5 (1 = not at all, 5 = very bad):

To what extent has the 'Strategy database' option helped you to determine appropriate strategies for your energy leaks?

- 1 2 3 4 5 n / a
-

Q42 Phase 2. Determining the energy leak strategies - Help from the eCoach

You were asked a number of questions in this module. Based on your answers, suggestions for strategies followed.

An example:

If you answered 'Yes' to the question *'Is it an energy leak by which you experience a lot of tension beforehand?'* then you received the following suggestion: *"Then we advise you to apply the Preframe exercise prior to this energy leak."*

If you have not started this module, enter 'not applicable' (n / a).

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has the 'Help from the eCoach' option helped you to determine appropriate strategies for your energy leaks?

- 1 2 3 4 5 n / a
-

Q43 Phase 2. Determining the energy leak strategies - Advice for a strategy.

If you were unable to determine a strategy using the modules 'strategy database' and 'help from the eCoach', you received the following advice:

"In order to ensure that your body is not constantly under tension during the day due to this energy leak, it would be good to occasionally relax by using the Neutral technique. We advise you therefore to apply the Neutral technique for 3 minutes 3 times a day for this energy leak, for example before you go to work in the morning, during the lunch break and in the evening after work. "

Enter 'not applicable' (n / a) if you have not used this option.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this advice helped you determine appropriate strategies for your energy leaks and resources?

- 1 2 3 4 5 n / a
-

Q44 Phase 2. Determining the strategies for your energy sources

In this module, you were first asked whether you could already use the energy source as a strategy or if some adjustment was needed. If that was the case, you were asked what it took to be able to use the source more often.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you determine appropriate strategies for your energy leaks and resources?

- 1 2 3 4 5
-

Q45 Phase 2. Module 'More Zzleep'

In this module, you received your average score on the question 'How well did you sleep last night?' from the Energy Balances filled in in phase 1.

The following was included in the module:

In the Energy Balances you gave your sleep quality an average score of 6.2 on a scale from 1-10. Would you like to improve your sleep quality based on this?

Enter 'not applicable' (n / a) if you have not completed the module 'More Zzleep?'

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you determine appropriate strategies for your energy leaks and resources?

- 1 2 3 4 5 n / a
-

Q46 Phase 2. Set goals for the strategies for your leaks and sources.

In this module you received guidance in setting up your personal goals.

You received the following information: Set a goal for energy leak 1 and the associated strategy.

- a. Situation: During which moment should you apply the strategy (this could be your energy leak)?
- b. When: Do you have to apply the strategy BEFORE, AFTER or DURING the moment to achieve the desired effect or at a fixed time of the day or week?
- c. Strategy: What strategy will you apply?
- d. Duration: How long do you have to apply the strategy?

Example: "Before (b) giving a presentation (a), I apply the PreFrame technique (c) for 5 minutes (d)".

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent did this element help you experiment and evaluate whether the chosen strategy was the right one for your energy leak or source?

- 1 2 3 4 5
-

Q47 Space for comments on the elements in phase 2:

Q48 Phase 3. Reminders with your personal goals

During phase 3, you received reminders with your personal goals at the times set by you. Enter 'not applicable' (n / a) if you have not set any reminders for phase 3.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent did this element help you experiment and evaluate whether the chosen strategy was the right one for your energy leak or source?

- 1 2 3 4 5 n / a
-

Q49 Phase 3. Experiment with the strategies

During the experimentation phase, you tested your own chosen strategies in daily life per energy leak or source.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent did testing the strategies in daily life help you evaluate whether the chosen strategy was the right one for your energy leak or source?

- 1 2 3 4 5
-

Q50 Phase 3. Experiment with the BringBalance techniques

During the experimentation phase, you could test the BringBalance techniques as a strategy for an energy leak or energy source in everyday life.

Enter 'not applicable' (n / a) if you have not used the BringBalance techniques as a strategy.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has testing the BringBalance strategies in daily life helped you to evaluate whether the chosen strategy was the right one for your energy leak or source?

- 1 2 3 4 5 n / a
-

Q51 Phase 3. Using the Inner Balance training during experimentation with the BringBalance techniques

If you have linked the BringBalance techniques to your energy leak (s) or energy source (s), you could use the Inner Balance Trainer to receive feedback. The sensor automatically gave you information about how the strategy influenced your physical state. During the exercise you received feedback in the form of colors: Red: poor coherence, blue: moderate coherence, green: good coherence. In addition, you received a summary of the measurements during the exercise at the end.

Enter 'not applicable' (N / A) if you have not used the Inner Balance Trainer while experimenting with strategies.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent did this element help you experiment and evaluate whether the chosen strategy was the right one for your energy leak or source?

- 1 2 3 4 5 n / a
-

Q52 Phase 3. Experiment with your energy sources to prevent or resolve energy leaks.

During the experimentation phase, you could test your energy sources as strategies for your energy leaks in everyday life.

Enter 'not applicable' (n / a) if you have not used your energy sources as a strategy.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has testing the energy source strategies in daily life helped you evaluate whether the chosen strategy was the right one for your energy leak?

- 1 2 3 4 5 n / a
-

Q53 Phase 3. Experiment with self-devised strategies.

During the experimentation phase, you could test a self-devised strategy as a strategy for an energy leak in everyday life.

Enter 'not applicable' (N / A) if you have not used a self-devised strategy

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has testing the self-devised strategies in daily life helped you evaluate whether the chosen strategy was the right one for your energy leak?

- 1 2 3 4 5 n / a
-

Q54 Phase 3. Experiment to make better use of your energy sources.

During the experimentation phase, you experimented in daily life with the strategies to make better use of your energy sources.

Enter 'not applicable' (N / A) if you were not in the ability to experiment with the strategies for your sources.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has testing the strategies for your energy sources in daily life helped you to evaluate whether the chosen strategy was the right one to make better use of your energy sources?

- 1 2 3 4 5 n / a
-

Q55 Phase 3. Strategy evaluation forms

After testing a strategy for an energy leak or source, you were asked to fill in the strategy evaluation form.

The form contained the following questions:

- Which strategy did you try out? (dropdown menu)
- On a scale from 1-10: To what extent has the strategy helped you with this energy leak?
- Do you feel more energetic? (Yes/No)
- Do you feel more pleasant? (Yes/No)
- If you have used the Inner Balance sensor, please note your coherence score over here:
- On a scale from 1-10: How easy did you find it to complete the strategy on a scale from 1-10?
- On a scale from 1-10: How relevant was it to perform the strategy in this specific situation?
- On a scale from 1-10: How much did you enjoy performing the strategy?
- Make a short note about your experience with performing the strategy: (text entry)

Choose 'not applicable' (n / a) if you have not been able to complete the strategy evaluation forms.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent did this element help you experiment and evaluate whether the chosen strategy was the right one for your energy leak or source?

1 2 3 4 5 n / a

Q56 Phase 3. EnergyBalance

In phase 3 you filled in the energy balance again. This time only at the end of the day.

Select 'not applicable' (n / a) if you have not been able to complete the EnergyBalance questionnaires in phase 3.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent did this element help you experiment and evaluate whether the chosen strategy was the right one for your energy leak or source?

1 2 3 4 5 n / a

Q57 Phase 3. Additional questions in the EnergyBalance

The EnergyBalance contained a number of additional questions compared to phase 1:

- Did you succeed in following-up all the personal goals of today?
- What goal(s) did you fail to achieve?
- Make a short note below what prevented you from following up on the personal goal(s)

Enter 'not applicable' if you have not been able to complete the EnergyBalance questionnaires.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent did this element help you experiment and evaluate whether the chosen strategy was the right one for your energy leak or source?

- 1 2 3 4 5 n / a

Q58 Space for comments on the elements in phase 3:

Q59 Phase 4. Evaluate strategies - Graph

During the evaluation of the strategies in phase 4, you received the results of the strategy evaluation forms from phase 3 in a graph.

Enter 'not applicable' (N / A) if no results were shown for you.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you to evaluate whether the chosen strategy was the right one for your energy leak or source?

- 1 2 3 4 5 n / a
-

Q60 Phase 4. Evaluate strategies - Table

During the evaluation of the strategies in phase 4, you received the results of the strategy evaluation forms from phase 3 in a table.

Enter 'not applicable' (N / A) if no results were shown for you.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you to evaluate whether the chosen strategy was the right one for your energy leak or source?

- 1 2 3 4 5 n / a
-

Q61 Phase 4. Evaluate strategies - Questions

During the evaluation of the strategies in phase 4, you received the results of the strategy evaluation forms were visualized for you in a graph and table.

Then you were asked the following questions:

- Why couldn't you give a 10 to the question "To what extent has the strategy helped you with this energy leak?" (text entry)
- What does it take to make it a 10? (text entry)
- What is the most positive aspect that you experienced during performing this strategy in situations related to this energy leaks? (text entry)
- What is the most negative aspect that you experienced during performing this strategy in situations related to this energy leaks? (text entry)
- What is the most important lesson that you have learned by applying the strategy in situations related to this energy leaks? (text entry)
- What factors have stimulated you to perform the strategy? Can you make more use of such factors in the future? (text entry)
- What factors have worked against you to perform the strategy? Can you eliminate those factors in the future? (text entry)
- On the basis of the answers given until now, do you feel the need to adjust the strategy of this energy leaks? (Yes/No)

Enter 'not applicable' (N / A) if no results were shown for you.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you to evaluate whether the chosen strategy was the right one for your energy leak or source?

- 1 2 3 4 5 n/a
-

Q62 Phase 4. Evaluate whether your energy balance has improved - graph

While evaluating whether your energy balance has improved, the results of the EnergyBalances in phases 1 and 3 were visualized in a graph.

Then you were asked the following question: Has your energy balance improved in recent weeks?

Enter 'not applicable' (N / A) if no results were shown for you.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you to evaluate whether the chosen strategy was the right one for your energy leak or source?

- 1 2 3 4 5 n / a
-

Q63 Phase 4. Evaluate whether your energy balance has improved - Table

While evaluating whether your energy balance has improved, the results of the EnergyBalances in phases 1 and 3 were visualized in a table.

Then you were asked the following question: Has your energy balance improved in recent weeks?

Enter 'not applicable' (N / A) if no results were shown for you.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you to evaluate whether the chosen strategy was the right one for your energy leak or source?

- 1 2 3 4 5 n / a
-

Q64 Phase 4. Final advice

Based on your answers to the questions below, you received a final suggestion:

- Has your energy balance improved in recent weeks?
- If not, do you feel that the insights and strategies have brought you something?

The last suggestion could be one of these three options:

1. We are very sorry to hear that the BringBalance did not provide you with insights and / or useful strategies. Your situation may require a different approach. Is working on stress and resilience via an app really what you need? Talk to someone and look for other solutions.
2. You have gained more insight into your energy balance and / or strategies that can help! How nice! Improving the energy balance is not done overnight. The first important step is to gain insight. Without insight into your energy leaks and sources, you don't know where to start. The targeted use of strategies in order to improve your energy balance is the next step. Good that you have also gained some more knowledge about that. Keep looking for your personal energy leaks and resources and don't forget your learned strategies!
3. An improved energy balance! How nice that you have felt more energetic and pleasant in recent weeks. Keep looking for your personal energy leaks and resources and don't forget your learned strategies!

Enter 'not applicable' (N / A) if you did not received a final advice.

Indicate on a scale of 1-5 (1 = not at all, 5 = very much):

To what extent has this element helped you to understand what you could do in the future to improve your energy balance?

- 1 2 3 4 5 n/a

Q65 Space for comments about the elements in phase 4:

Part 4 – Brief Resilience Scale

Q66 The Brief Resilience Scale

Again, we ask you to fill in the Brief Resilience Scale and Perceived Stress Scale so that we can compare the post-test scores with the scores of the scales prior to the start of BringBalance.

Six statements are presented. For each statement, indicate to what extent you agree with the statement.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. I tend to bounce back quickly after hard times.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I have a hard time making it through stressful events.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. It does not take me long to recover from a stressful event.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. It is hard for me to snap back when something bad happens.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I usually come through difficult times with little trouble.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I tend to take a long time to get over set-backs in my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part 5 – Perceived Stress Scale

Q67 The Perceived Stress Scale

The 10 questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate, by checking the box, how often you felt or thought a certain way.

	Never	Almost never	Sometimes	Fairly often	Very often
1. In the last month, how often have you been upset because of something that happened unexpectedly?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. In the last month, how often have you felt that you were unable to control the important things in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. In the last month, how often have you felt nervous and “stressed”?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. In the last month, how often have you felt that things were going your way?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. In the last month, how often have you been able to control irritations in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. In the last month, how often have you felt that you were on top of things?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. In the last month, how often have you been	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

angered because of things
that were outside of your
control?

10. In the last month, how
often have you felt
difficulties were piling up so
high that you could not
overcome them?

Thank you for filling in this questionnaire!

Appendix 3 – Scores on the utility of the elements of BringBalance for the reflection process

Table. The utility of the elements of BringBalance for the reflection process per phase.

Element of the BringBalance app	Study non-completerStudy non-completers (n=14) M (SD) n=number of responses to the question	Completers (n=14) M (SD) n=number of responses to the question	Number of participants filling in the questions in this phase N=27
Elements phase 1 (scale 1-5): did the element helped you to gain insights into energy leaks and sources?			
EnergyBalance	3.5 (0.7) n=13	3.6 (0.8) n=14	3.6 (0.8) n=27
EnergyBalance: Filling in the EnergyBalance three times per day was: too infrequent, just enough, too often	Too infrequent =0% Just enough = 23% Too often = 77% n=13	Too infrequent = 14% Just enough = 50% Too often = 36% n=14	Too infrequent = 7% Just enough = 37% Too often = 56% n=27
Look back on yesterday – graph	2.6 (0.9) n=13	3.3(1.1) n=14	2.9 (1.1) n=27
Look back on yesterday – table	3.2 (0.7) n=13	4.1(0.6) n=14	3.6 (0.8) n=27
Look back on yesterday – 4G scheme	2.9 (1.0) n=11	3.5 (0.9) n=13	3.3 (1.0) n=24
Look back on yesterday – personalisation of the questions on the basis of Durall et al. (2017)	2.5 (0.8) n=13	2.8(0.9) n=14	2.6 (0.8) n=27
Top 3 energy sources and leaks	3.3 (0.9) n=9	4.0(0.7) n=14	3.7 (0.8) n=27
Reminders EnergyBalance	2.5 (1.1) n=13	3.4(0.9) n=14	2.9 (1.1) n=27
Reminders Look back on yesterday	2.6 (1.2) n=13	3.4 (0.7) n=14	3.0 (1.0) n=27
Elements phase 2 (scale 1-5): did the element helped you to determine appropriate strategies for the energy sources and leaks?			Number of participants filling in the questions in this phase n=23
BringBalance techniques	2.6 (1.0) n=9	4.1 (0.6) n=14	3.5 (1.1) n=23
How clear were the animation clips to you?	3.8 (1.3) n=4	4.4 (0.6) n=14	4.3 (0.8) n=18
How clear did you find the text in the modules with the BringBalance techniques?	3.8 (0.5) n=4	3.8 (0.6) n=14	3.8 (0.5) n=18
To which extent did the animation clips appeal to you?	3.8 (0.5) n=4	4.1 (0.7) n=14	4.0 (0.7) n=18
How easy did you find it to learn the BringBalance techniques?	2.5 (1.0) n=4	3.1 (0.9) n=14	2.9 (0.9) n=18

What did you think of the variation in the BringBalance techniques? Too little variance, just enough variance, too much variance.	Too little = % Just enough = 100% Too much = % n=3	Too little = 21% Just enough = 79% Too much = % n=14	Too little = 18% Just enough = 82% Too much = % n=17
BringBalance techniques training days	2.5 (0.7) n=2	3.5 (0.8) n=12	3.4 (0.8) n=14
BringBalance evaluation of training days	2.5 (0.7) n=2	3.4 (0.7) n=11	3.2 (0.7) n=13
Techniques in your daily life	-	3.6 (1.1) n=9	3.6 (1.1) n=9
Biofeedback via the Inner Balance trainer during learning the techniques	2.6 (1.3) n=5	3.0 (1.0) n=14	2.9 (1.0) n=19
Did you find it useful to use the Inner Balance app while learning the BringBalance techniques?	Yes = 67% No = 33% n=3	Yes = 64% No = 36% n=14	Yes = 65% No = 35% n=17
HRV-measurements	2.7 (0.6) n=3	2.8 (1.1) n=11	2.8 (1.0) n=14
Determine strategies for leaks - options	2.7 (1.5) n=3	3.2(0.8) n=14	3.1 (0.9) n=17
Determine strategies for leaks – already have an idea	3.0 (1.7) n=3	3.0 (1.1) n=8	3.0 (1.2) n=11
Determine strategies for leaks – strategy-database	3.0 (1.0) n=3	3.8 (0.7) n=8	3.6 (0.8) n=11
Determine strategies for leaks – help from eCoach	-	4.7 (0.6) n=3	4.7 (0.6) n=3
Determine strategies for leaks – advice for a strategy	-	-	-
Determine strategies for sources	3.0 (1.0) n=3	2.9(0.7) n=14	2.9 (0.7) n=17
More Zzleep?	2.0 n=1	3.7 (1.0) n=9	3.5 (1.1) n=10
Set implementation intentions (did this element helped you to experiment and evaluate whether the chosen strategy was the right one for the leak or source?)	3.3 (1.5) n=3	3.0(0.8) n=14	3.1 (0.9) n=17
Phase 3 (scale 1-5): Did the element helped you in evaluating whether the chosen strategy was appropriate for the leak or source?			Number of participants filling in the questions in this phase n=17
Reminders with implementation intentions (did this element helped you to experiment and evaluate whether the chosen strategy was the right one for the leak or source?)	1.0 n=1	2.6 (0.7) n=11	2.4 (0.8) n=12
Experiment with the strategies	2.0 (1.4) n=2	2.9(1.0) n=14	2.8 (1.0) n=16
Experiment with the BringBalance techniques	-	2.5 (0.8) n=11	2.5 (0.8) n=11
Experiment with the BringBalance techniques using the Inner Balance trainer	1.0 N=1	2.8 (1.2) n=11	2.7 (1.2) n=12
Experiment with sources to fill up the energy leaks	4.0 N=1	2.9 (0.6) n=13	3.0 (0.7) n=14
Experiment with an own thought off strategy	-	3.2 (0.4) n=5	3.2 (0.4) n=5

Experiment with strategies for energy sources	-	3.1 (0.7) n=12	3.1 (0.7) n=12
Strategy evaluation forms	-	2.7 (0.8) n=11	2.7 (0.8) n=11
Phase 3 EnergyBalance	-	3.1 (0.8) n=9	3.1 (0.8) n=9
Additional questions in EnergyBalance	-	2.6 (0.7) n=8	2.6 (0.7) n=8
Phase 4 (scale 1-5): Did the element helped you in evaluating whether the chosen strategy was appropriate for the leak or source?			Number of participants filling in the questions in this phase n=13
Evaluating the strategy – graph	-	3.1 (1.2) n=9	3.1 (1.2) n=9
Evaluating the strategy – table	-	3.0 (0.9) n=9	3.0 (0.9) n=9
Evaluating the strategy – questions	-	2.8 (1.0) n=12	2.8 (1.0) n=12
Evaluating if energy balance improved? – graph	-	2.7 (0.9) n=10	2.7 (0.9) n=10
Evaluating if energy balance improved? – table	-	3.1 (1.2) n=9	3.1 (1.2) n=9
Final advice	-	3.3 (0.8) n=12	3.3 (0.8) n=12

Appendix 4 – Summary table of the stimulators and stagnating factors for reflection per phase of reflection

Table.

Element	Stimulators	N*	Stagnating factors	N*
Phase 1 - Identification				
<i>EnergyBalance</i>	Perceived as an important element during reflection	-	Problems with recognizing energy sources and leaks	5
	Energy sources and leaks could be filled in via the instructions in the EnergyBalance questionnaire	10	Difficulties with recognizing energy sources and leaks due to the term "Energy"	2
	Writing down helps to gain insights	4	Blockade when writing down leaks and sources	1
	Per part of the day leads to identification of 'smaller' leaks and sources	3	Boring due to the repetition of filling in the same questions	3
	The focus on energy sources was experienced as positive	4	Writing down in own words includes a margin of error as you only report what you can recall	1
	Most participants linked low energy levels to events related to a negative feeling and high energy levels to events related to a positive feeling	-		
	Repetition in filling in the same leaks and sources helps in observing a trend	3		
<i>Look back on yesterday – 4G scheme</i>	Helps to understand personal indicators of leaks and sources which leads to better recognition later on	2	Problems recognizing physical and emotional indicators of leaks and sources	4
	Questions stimulated to perform a more in depth reflection	5	Not recognizing physical and emotional indicators as he/she is more mentally present	2
	Reflection via the 4G scheme a day later leads to being able to zoom out and notify more relevant aspects	4	Difficulties answering the questions due to difficulties recognizing indicators	4
			Superfluous in relation to what has been filled in via the EnergyBalance	5
<i>Look back on yesterday – Table with overview of the data</i>	Important element that helped in gaining understanding	-		
	Contextual information from table led to a better reconstruction of	4		

	the situation from the previous day			
	Look back on the day before is useful	4		
<i>Look back on yesterday – graph with overview of the data</i>			One of the least important elements in the gain of understanding	-
			Too little variance in the data visualized did not lead to a recall of the situation	4
<i>Top 3 energy sources and leaks</i>	The most important elements that helped in gaining understanding	-		
	The list regularly led to the observation of a trend: the most common leaks and sources were often the most important ones	5		
<i>In general</i>	Elements in the app stimulates to think about the leaks and sources	7	Discussing the self-tracking data in a dialogue could have led to a higher level of reflection	9
	Elements in phase 1 could be performed independently	7	The identified sources and leaks were sometimes too specific (due to EnergyBalance per part of the day but also due to 4G scheme)	4
			Doubts about their thinking process	3
<i>Phase 2 – Strategy generation</i>				
<i>The BringBalance Techniques</i>	Important element in the gain of understanding of strategies	-	Need for confirmation from experts that techniques work	3
	Principles of the techniques could be learned via the short clips	12		
	Examples in the clips were helpful to relate what and when to use in their situation	3		
	The deciding upon strategies initiated for some during watching the clips with the techniques	2		
<i>BringBalance techniques training days</i>	Practicing was perceived as a crucial part to understand when and what strategy to use	9	Multitasking by focussing on breathing and mentally imaging was experienced as difficult to master by some	3
	The ones that did use the reminders to train and evaluated the days of training in the app experienced it as helpful in the understanding when and what strategy to use	-	Reminders to train and the evaluation of the training days was not used very often due to (1) the aspect of time and (2) difficulties practicing without the presence of a relevant situation	(1)=5 (2)=2
			Period too short to master the techniques	6
			Doubts if they performed the techniques in the right way	4
<i>Biofeedback via the Inner Balance trainer during learning the techniques</i>	The biofeedback was of added value during practicing. It guided them while practicing the techniques.	-	Difficulties in interpreting the results	4

	The relationship between breathing-exercises and the effect on heart rate was made clear due to the biofeedback	6	Uncertainty about when to perform the measurement	2
	Visualization of the biofeedback convinced them about the effectiveness of the technique	8	No improvement possible as measurements were good from the start	3
<i>Determine strategies</i>	Connecting strategies to the most important leaks and sources stimulates the mental process of how to integrate the techniques in daily life	5	More difficult to decide upon strategies for sources as techniques are perceived as having a better fit with the leaks	4
	Strategies for energy sources were seen as just planning in more moments to perform the activity related to the source	5	Not experienced as having the freedom to also use the technique as maintenance of their EnergyBalance as it should be linked to a leaks or source	4
<i>Determine strategies for leaks – help from eCoach</i>	Was experienced as very helpful during the deciding of strategies	3	Not used very often by participants	-
	It helps to structure your thoughts towards the right direction for a strategy	3		
	Most needed to use this tool twice during the deciding of the strategies	-		
<i>Determine strategies for leaks – strategy-database</i>	Most participants chose the strategy-database as a tool to help them decide	-		
	Was perceived as helpful in deciding upon a strategy	2		
	Most needed this tool only ones during the deciding of strategies	-		
	The database was used as a refresher of what the techniques were about	3		
<i>Implementation intentions</i>	Stimulates the mental process when to actually use the strategies in daily life	2	Steered to much towards setting up very specific implementation intentions	4
	Stimulates the actual intention to use the strategies in daily life	5		
<i>Setting up reminders with implementation intentions</i>			Hard to decide upon moments when it is useful to receive the reminders	4
<i>In general</i>	Understanding why the leaks or source effects the energybalance is important in order to be able to know what to do about your situation	4	Low-quality input from previous elements complicates the step of deciding upon strategies due to the fact that identified sources and leaks from phase 1 appeared to be irrelevant in phase 2	3
	Most were able to choose the strategies using the tools in BringBalance	9	Low-quality input from previous elements complicates the step of deciding upon strategies due to not mastering the techniques	3

	The deciding upon strategies was already initiated for some during the identification of leaks and sources	5	Doubts existed if they had chosen the right strategies for their leaks and sources	2
	Being attentive to indicators of sources and leaks, identified with the 4G scheme, was mentioned by a few as a prerequisite to understand when to apply the technique in daily life.	2	Discussing the results with someone as a check or receive advise what other options they should consider	6
<i>Phase 3 – Experimentation</i>				
<i>Experimenting with strategies</i>	More easy to experiment with strategies for sources than leaks due to more structure in when to perform the strategies	2	Little experimentation took place due to: (1) leaks and sources did not occur anymore (2) time period was too short, and (3) too many techniques to experiment with.	(1)=6 (2)=4 (3)=4
<i>Reminders with implementation intentions</i>	Reminders were triggers to start experimenting	2	Reminders for leaks and sources that occur randomly over time did not arrive at the right moment to trigger an action	4
<i>EnergyBalance phase 3</i>			Not often filled in by participants	-
<i>Strategy-evaluation form</i>	Perceived as a trigger to start the evaluation process of reflection	3	Too repetitive and generic questioning	4
			Not necessary to fill in the forms each time depending on the specific strategy and/or the situation	5
			Some participants asked themselves automatically the questions for evaluation after performing a strategy. Not necessary to report.	2
<i>In general</i>	The set-up in phase 3 made sense	3	The elements in this phase scored lowest in the process of reflection	-
			Most started phase 3 later than planned	-
			Wish to discuss their experiences during the experimentation with someone	2
<i>Phase 4 – Evaluation</i>				
<i>Evaluation of the EnergyBalance and strategies</i>			Too little data presented in the overview to perform a meaningful evaluation	6
			When they had known that they received such overviews, they would have collected more data in phase 3	2
			Wish to evaluate the strategies and energybalance at the end with someone	3
<i>Final advice</i>	This element received the highest score for the evaluation process	-		

<i>In general</i>	Set-up of the elements for evaluation is useful to winded-up the programme	7	Doubts if the wind-up of the BringBalance program would lead to continuation of using the strategies in the future	3
	Action was made for the continuation of integrating the strategies in daily life	4		