The promise of self-monitoring for precision-psychiatry

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university of groningen

umcg

Groningen

https://ilab-psychiatry.nl

Self-monitoring in clinical practice?

1. Normothetic versus idiographic research
2. Self-monitoring
3. Meet Anna and George (Therap-i study)
4. Meet and greet others from our department?
5. Meet PETRA
6. Some conclusions and discussion

1. Normothetic versus idiographic research

Zuidersma et al. Single-subject research in psychiatry: Facts and fictions. *Front Psychiatry* 2020;11:539777.

Wichers et al. A narrative review of network studies in depression: What different methodological approaches tell us about depression. *Front Psychiatry* 2021;12:719490.

Nomothetic approach

Idiographic approach

Group-averag[es]
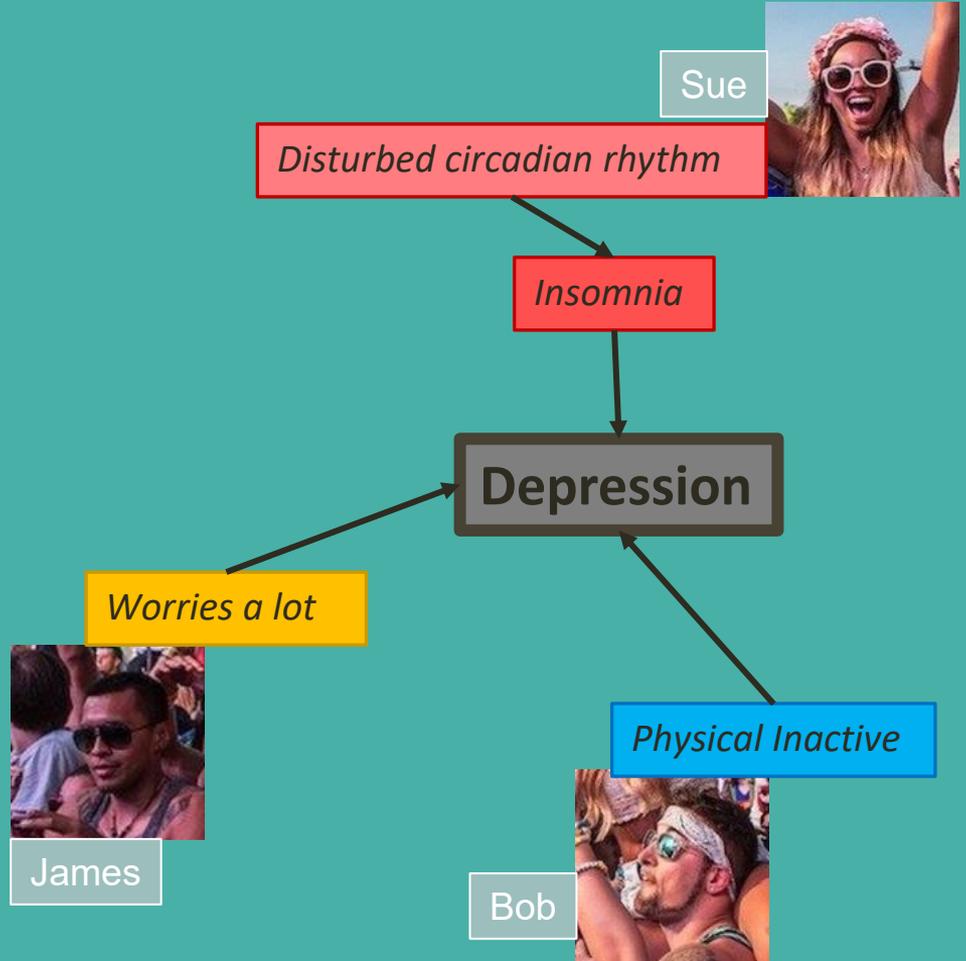
[indi]vidual differences

Sue

Bob

JaBoSu??

Heterogeneity

"Precision medicine requires a different type of clinical trial that focuses on individual, not average, responses to therapy." Quote and figure from Schork (2015) *Nature.*

Herrman H, et al (2022). Time for united action on depression: a Lancet-World Psychiatric Association Commission. *Lancet.*

Nomothetic approach

CIDI depressive symptoms

- —— Average group trajectory
- ——⊢ 95% CI

Idiographic approach

CIDI depressive symptoms

Individual trajectories
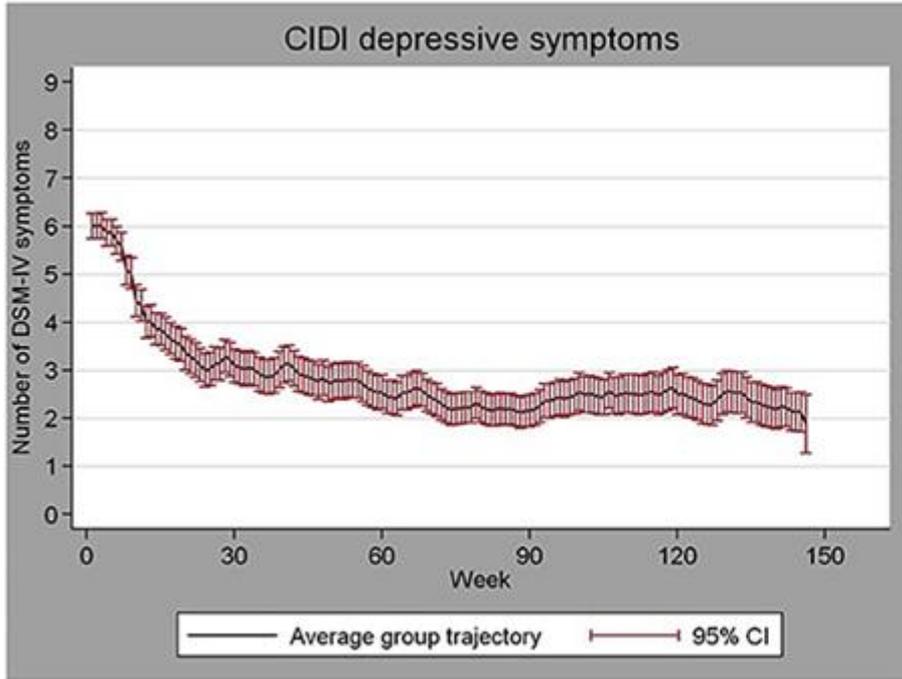
Zuidersma M, Riese H, Snippe E, Booij SH, Wichers M, Bos EH. Single-Subject Research in Psychiatry: Facts and Fictions. *Front Psychiatry,* 2020;11:539777.

2. Self-monitoring for precision psychiatry?
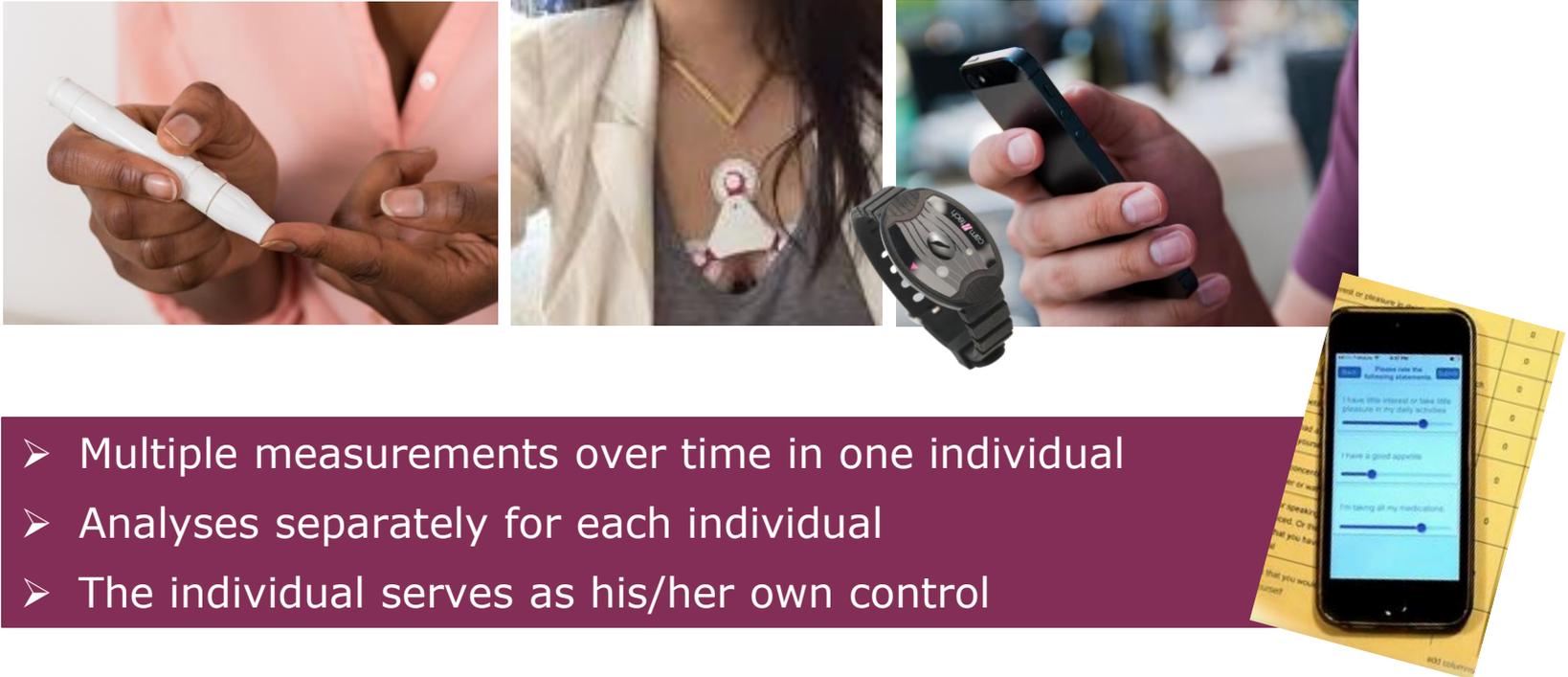
> ➤ Multiple measurements over time in one individual
>
> ➤ Analyses separately for each individual
>
> ➤ The individual serves as his/her own control

Experience sampling method (ESM)

Static > dynamic

Ecological valid

< Retrospective bias

…to provide new insights into the nature of mood trajectories that can explain the differences in severity and nature of mood disorder beyond the traditional DSM classifications

Myin-Germeys et al. 2016.
Current Opinion in Psychiatry

Gaps - ESM in psychiatry

ESM intervention studies for depression:

- **REMOD-ID**

Kramer et al., 2014, *World Psychiatry*

- **ZELF-i**

Bastiaansen et al 2018, *BMC Psychiatry*. Protocol paper.

Folkersma et al 2021, *Internet Interv*. 2021. Qualitative research

ZELF-i PI
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- **(semi) qualitative studies**

Bos et al. 2019. *Psychiatric Services.*

Janssens, et al. 2018 *BMC Medical Research Methodology* (Suppl 3 for ESM design guideline).

➢ Implementation ESM in psychotherapeutic treatment: Therap-i
➢ An intuitive tool for personalization ESM and feedback: PETRA

3. Meet Anna and George

https://therap-i.com/publicaties/

Selection:
- Kroeze et al, 2017. *J Pers Oriented Res*. A proof-of-principle study.

- Riese et al, 2021. *BMC Psychiatry*. Protocol paper.

- von Klipstein et al, Integrating personalized experience sampling in psychotherapy: A case study. *Preprint available.*

therap i

The missing link between daily life and your consult at the clinic
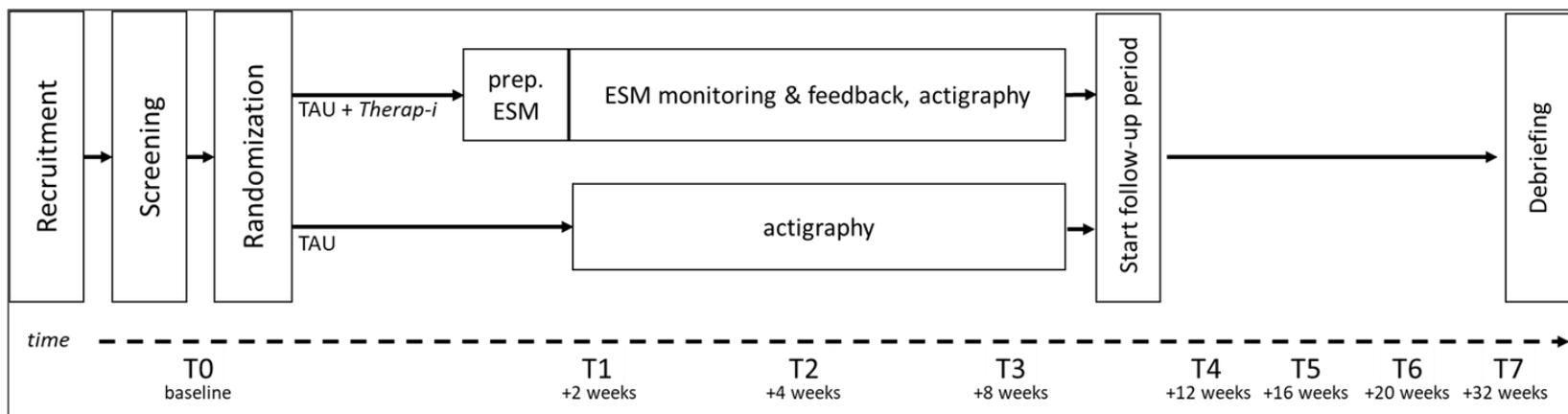
therap i

Riese, H., et al. *BMC Psychiatry* (2021)
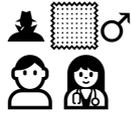
Patient, therapist, and researcher create a personalized diary that captures their ideas and questions about the case.

The patient fills out the diary in his daily life (5x per day for 8 weeks).

In three regular sessions, patient, therapist, and researcher discuss and interpret the data.

Meet Anna

- Women in her 20's,XXXXX
- XXXXX
- Diagnosed with Major Depressive Disorder
- low self-esteem and strong belief 'I did something wrong'
- Psychological treatment for her depressed feelings

REMOVED MOVIE

REMOVED NETWORK GRAPH

Critical reflection on networks:
Von Klipstein L, et al. Networks in
psychotherapy for complex psychopathology:
What's wrong and how we could use them
anyway. *BMC Medicine*, 2020.

Feedback

therap i

REMOVED MOVIE

- **Feeling sad**
- **I did something wrong**

Meet George

- 27 year-old man, trained social worker, diagnosed with Major Depressive Disorder

- low self-esteem and low assertiveness

personal history

- bullied in school for years

- family struggled with death of his sister, little room for his struggles

- was in the closet about his homosexuality until 3 years ago

- prior psychotherapy (in total about 15 sessions)

Preprint: https://psyarxiv.com/2srxq/
Note the supplement: https://osf.io/mdkf7/

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Feel **Do** **Think** **Body** **Context**
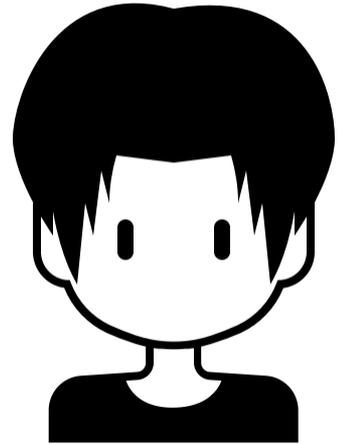
standard item
standard item
...
personalized item

- 5x per day & 1x per day
- personalized items: item bank / newly formulated

George's diary

open vs. withdrawn
- open about my feelings
- speaking my mind
- avoiding

self-worth
- "I am allowed to be here"
- feeling judged by others
- insecure about my abilities

others
- feeling a loss of control
- engaging with my faith
- helping others
- playing video games

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Table 1. Standard (S) and personalized (P) items in George's diary organized by domain.

	English translation	Original Dutch item	Response options
Feelings			
S1	At this moment, I feel content	Op dit moment voel ik me tevreden	VAS: 1-'not at all' to 100-'very much'
S2	At this moment, I am cheerful	Op dit moment voel ik me opgewekt	VAS: 1-'not at all' to 100-'very much'
S3	At this moment, I feel down	Op dit moment voel ik me somber	VAS: 1-'not at all' to 100-'very much'
S4	At this moment, I feel irritated	Op dit moment voel ik me geïrriteerd	VAS: 1-'not at all' to 100-'very much'
S5	At this moment, I feel energetic	Op dit moment voel ik me energiek	VAS: 1-'not at all' to 100-'very much'
S6	At this moment, I feel restless	Op dit moment voel ik me onrustig	VAS: 1-'not at all' to 100-'very much'
P1	Since the previous beep, I have been open about my feelings	Sinds het vorige meetmoment ben ik open geweest over mijn gevoelens	VAS: 1-'not at all' to 100-'very much'
Behavior			
S7	Since the previous beep, what have I done?	Sinds het vorige meetmoment, wat heb ik gedaan?	Checklist (multiple answers possible): - work/study - sports / walking / biking - hobby (e.g., make music) - outing (e.g., into the city, concert) - something calm (e.g., reading, watching TV) - sleep - talk to somebody - something intimate (e.g., cuddle, sex) - messaging - social media - eat - household responsibilities / groceries / administration

Figure 1. Course over time of ESM questions in the first topic area "depression, energy, and sleep".
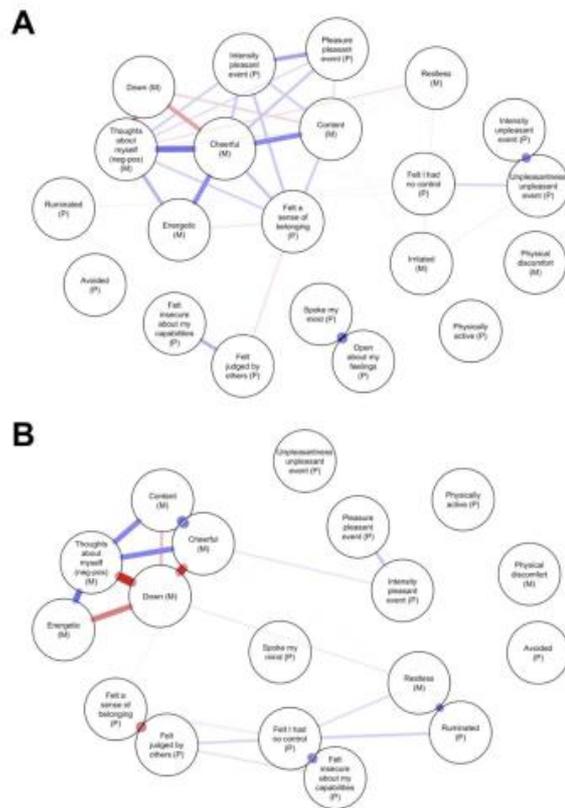
Figure 2. Contemporaneous networks from the second feedback session (panel A) and third feedback session (panel B). Circles represent variables, and lines between circles represent partial associations between the two variables measured at the same time point. The color of lines indicates whether an association is positive (blue) or negative (red), and their thickness and transparency indicate their relative strength. See[28] for a discussion on the use of network graphs in psychotherapy. Questions about the current moment are marked with (M), those about the prior period with (P).

Outcome

most important insight:
I really benefit from meaningful contact with others
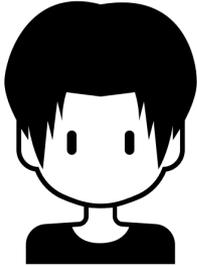
treatment plan:
- running therapy group (physical activity and social aspect)
- melatonin to improve sleep

"It's kind of like a mirror "

4. Meet and greet others from our department?

Trapped: Rigidity in psychiatric disorders

- **Rigidity**: an inability to flexibly adapt cognitions, emotions and behavior in response to changes in the environment

- **Transdiagnostic** and **mechanistic** character of this concept makes it an ideal vehicle to investigate markers of **course of illness** across **psychiatric disorders** and **research levels**

- Investigating rigidity using **experience sampling methodology (ESM)** and **dynamic functional connectivity**

- **Rigidity markers** may help to:
  - detect **vulnerability for and onset** of psychiatric disorders
  - monitor **treatment progress** and subsequent potential **relapse**
  - improve the **efficacy of transdiagnostic interventions** targeted at this core aspect

Stuck!

Michelle Servaas, PI Rigidit-i project. M.N.Servaas@umcg.nl
*Servaas MN, Schoevers RA, Bringmann LF, van Tol MJ, Riese H. Trapped: rigidity in psychiatric disorders. Lancet Psychiatry 2021; **8**: 1022-4.*

Early warning signals for critical transitions based on complex system theory (Scheffer et al 2012, *Science*)
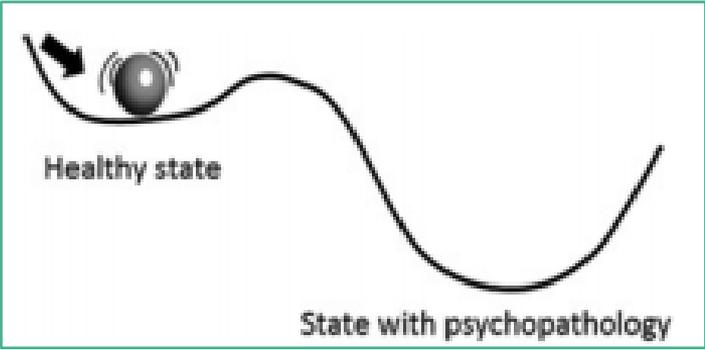
Wichers et al, *Psychol Med* 2018

www.transid.nl = Repeated single-subject study

➤ Monitoring: patterns depressive symptoms & ESM affect, behavior, physiology
➤ Capture changes as they happen
➤ Test of individual change/trajectories

Transitions in Depression Team

Evelien Snippe
Scientific coordinator TRANSID
e.snippe01@umcg.nl
PI 'Depression Barometer'
https://www.rug.nl/staff/e.snippe/projects

Marieke Wichers
PI TRANS-ID

i-CASE

Idiographic study of Cognition, Affect and Sleep in the Elderly

m.zuidersma@umcg.nl

Procedure

Monitoring for 63 days:

- 2 times a day ESM

- actigraphy

Analyse

- Time series analyses for calculation of daily predictors of sleep.

- Repeated single subject design.

Variabels

Sleep:

- Duration

- Effectivity

- Quality

Predictors:

- Mood

- Physical activity

- Social contacts

- Alcohol, cafeïne

- Pain

Studie	**BEAT-IT studie: Boosting antidepressant treatment by personalized ESM-based feedback – A feasibility study in older people.**
Website	nvt
Onderzoekers	Richard Oude Voshaar (hoofdonderzoeker), Alieke Tieks (coördinerend onderzoeker), Fionneke Bos, Harriette Riese, Marij Zuidersma
Datum	Januari 2022 – Januari 2023
Doel	Onderzoeken van de haalbaarheid van 16 weken ESM dagboekmetingen middels PETRA gecombineerd met actigrafie.
Deelnemers	Oudere patienten (60+) met een affectieve stoornis die behandeld worden bij het UCP of GGZ Friesland en die aan een (nieuw) antidepressivum beginnen.

Alieke Tieks
a.tieks@umcg.nl

5. Meet PETRA

www.petrapsy.nl

Bos FM, von Klipstein L, Emerencia AC, Veermans E, Verhage T, Snippe E, Hadders-Prins G, Doornbos B, Wichers M, Riese H. A web-based application for personalized ecological momentary assessment in psychiatric care: User-centered development of PETRA. *JMIR Mental Health,* in press.

Fionneke Bos
Scientific coordinator
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https://www.fionnekebos.com/thesis/

HOW TO DEVELOP AN ESM/EMA TOOL

- For whom is ESM/EMA relevant?

- What are possible applications and
  negative effects?

- What are necessary requirements for a
  practical tool?

1. Bos et al. (2020) Int J of Bipolar Disorders
2. Bos et al. (2019) Psych Services
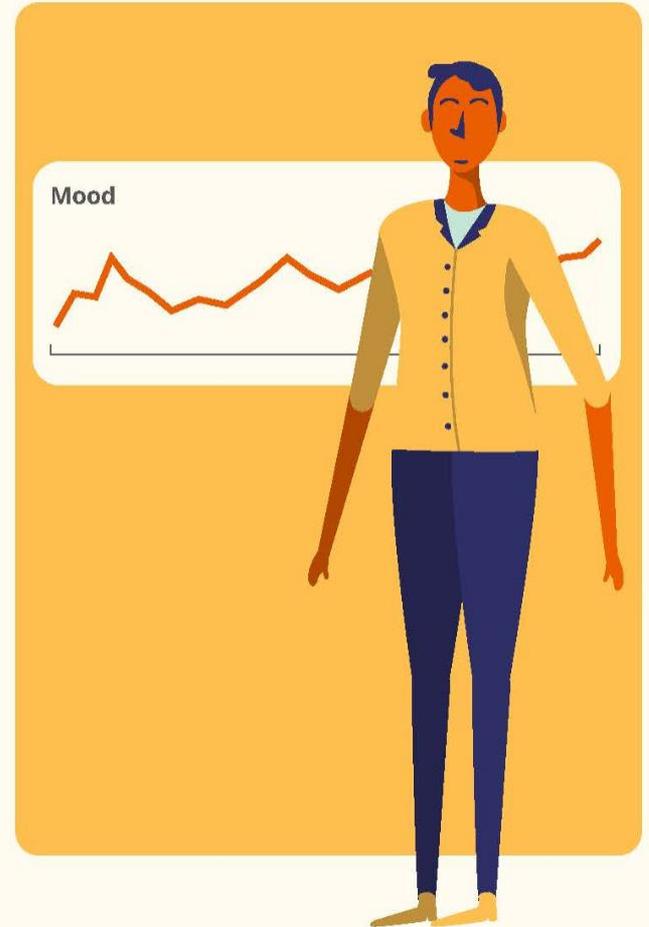
CEHRES ROADMAP

1. van Gemert-Pijnen (2011). JMIR

1 Contextual inquiry

2 Value specification

3 Design

4 Operationalization

5 Evaluation

1 Contextual inquiry

2 Value specification

Focus groups, interviews, and implementation experiments

49 patients
- mood
- anxiety
- psychosis

56 clinicians
- psychologists
- psychiatrists
- psychiatric nurses

1. Bos et al. (2020) Int J of Bipolar Disorders
2. Bos et al. (2019) Psych Services

REQUIREMENTS

- Personalized

- User friendly/automated

- Encourages collaboration

- Facilitates scientific innovations

- Scientifically valid

- Privacy protected

1. Bos et al. (2020) Int J of Bipolar Disorders
2. Bos et al. (in prep)

3

Design

12 prototypes were made
and tested

PETRA
Gepersonaliseerde behandeling
door dagboekmetingen

1: Goal and target group

Doel

Discover when I experience complaints

Discover what influences my complaints ✓

Monitor changes in complaints

2: Themes and diary items

Themes and diary items

Mood (3/4)

☐ I feel down
☑ I feel content
☑ I feel agitated
☐ I feel irritated

3: Diary schedule

Moments
Semi-random

08:00   12:00

Duration
✓ 2 weeks: 14/2 - 28/2

4: Completing the dairy

PETRA

Diary

I feel happy

I feel anxious

I feel down

I feel
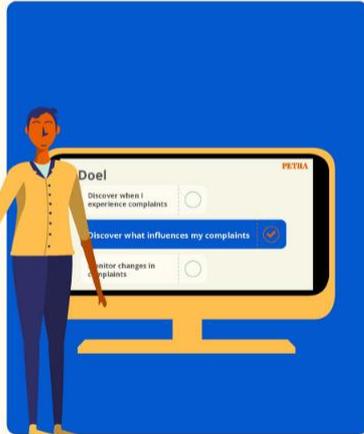
5: Discussing the summary

Mood

Tuesday 14 July 2020
Average mood: 56
Range: 45 - 66

Welkom bij PETRA, dagboeken op maat voor de psychiatrie

Start nieuw dagboek

Recente dagboeken

april 2022 - Depressie en angst AFGEROND

Periode: van 06-04-2022 tot 20-04-2022

Aangemaakt op: 05-04-2022

Protocol: Petra: Semi-random beep design

samenvatting | rapporten | herhalen

Hoe werkt PETRA?

0:00
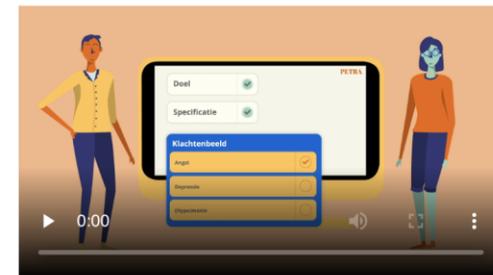
▸ Bekijk onze korte instructievideo (2 minuten)

▸ Bekijk onze handleiding (pdf)

Suggesties voor PETRA?

▸ We zijn altijd op zoek naar tips en trucs om PETRA te verbeteren. Je kunt je suggesties sturen naar petra@umcg.nl

▸ Meer weten over PETRA? Dat kan natuurlijk. Op onze website (petrapsy.nl) vind je meer

Left sidebar navigation

- Overzicht
- Auto-Protocollen
- Uitkomsten
- Vragenlijsten
- Uitnodigingsbrieven
- Rapporten
- PETRA

Goals

Overzicht

Auto-Protocollen

Uitkomsten

Vragenlijsten

Uitnodigingsbrieven

Rapporten

PETRA

Welkom bij PETRA

Stel hier snel en simpel je eigen dagboekstudie samen

▸ Bepaal met welk doel en welke focus je een dagboek wilt invullen.

▸ PETRA doet een suggestie voor de vragen. Pas ze aan naar eigen inzicht.

▸ Rechts in beeld zie je hoe ver je bent met het samenstellen van het dagboek.

Wat is het doel van de dagboekstudie?   vraag 1 / 4

Ontdekken wanneer ik klachten ervaar   ✓

Maak het doel specifieker   vraag 2 / 4

Tijdens welke activiteiten heb ik klachten?
Dit doel kan alleen op willekeurige momenten gemeten worden   ✓

Op welk klachtenbeeld wil je je focussen?   vraag 3 / 4

Angst
Denk aan: spanning, vermijding, paniek   ✓

Wil je de vragen willekeurig of op vaste momenten ontvangen?   vraag 4 / 4

Je ontvangt via sms een uitnodiging om het dagboek in te vullen. Deze smsjes kunnen op vaste momenten verstuurd worden, of tussen bepaalde tijden (dus op willekeurige

Stel dagboek samen in 3 stappen

1. Kies een doel

Ontdekken wanneer ik klachten ervaar
Tijdens welke activiteiten heb ik klachten?
Angst

2. Kies onderwerpen en vragen

3. Instellingen en afronden

Instellingen en afronden

Hoe vaak wo

9 keer per dag

Tussen welk

Bij 9 metingen p

07:30 en

Tussen welk

- ✓ Op willekeu
- ○ Op vaste m

Dat leidt tot

00:00

Van wanneer tot wanneer moet het onderzoek lopen?

Kies eerst hoe vaak je per dag wilt meten.

21 juni 2020 📅 en kies datum 📅

Naar welk mobiel nummer moeten de smsjes verstuurd worden?

+31 6

Hoe heet dit dagboek?

Let op: gebruik geen patiëntgegevens voor de naam van het dagboek in verband met privacy

Wil je dat collega's de opzet van dit dagboek ook kunnen gebruiken?

○ Ja   ○ Nee

- Overzicht
- Auto-Protocollen
- Uitkomsten
- Vragenlijsten
- Uitnodigingsbrieven
- Rapporten

PETRA

Stemming en klachten

Tijdlijn

Beloop van stemming en klachten

- Op dit moment voel ik me angstig
- Op dit moment ben ik aan het piekeren

Meer informatie over deze grafiek

Items in dagboek

Getoond
- ☑ Angstig
- ☑ Piekeren

Stemming (0/6)

Angst (2/3)
- ☑ Angstig
- ☑ Piekeren
- ☐ Vermijding

Zelfbeeld (0/2)

Positiviteit (0/1)

Verminderde interesse & initiatief (0/1)

Piekeren (1/1)

Omgeving, gedrag en middelen (0/4)

Agitatie en stress (0/2)

C. 1 ID petracasus001 Geslacht Onbekend Geb.dat. Onbekend

AFDELING: Geen

Overzicht

Auto-Protocollen

Uitkomsten

Vragenlijsten

Uitnodigingsbrieven

Rapporten

PETRA

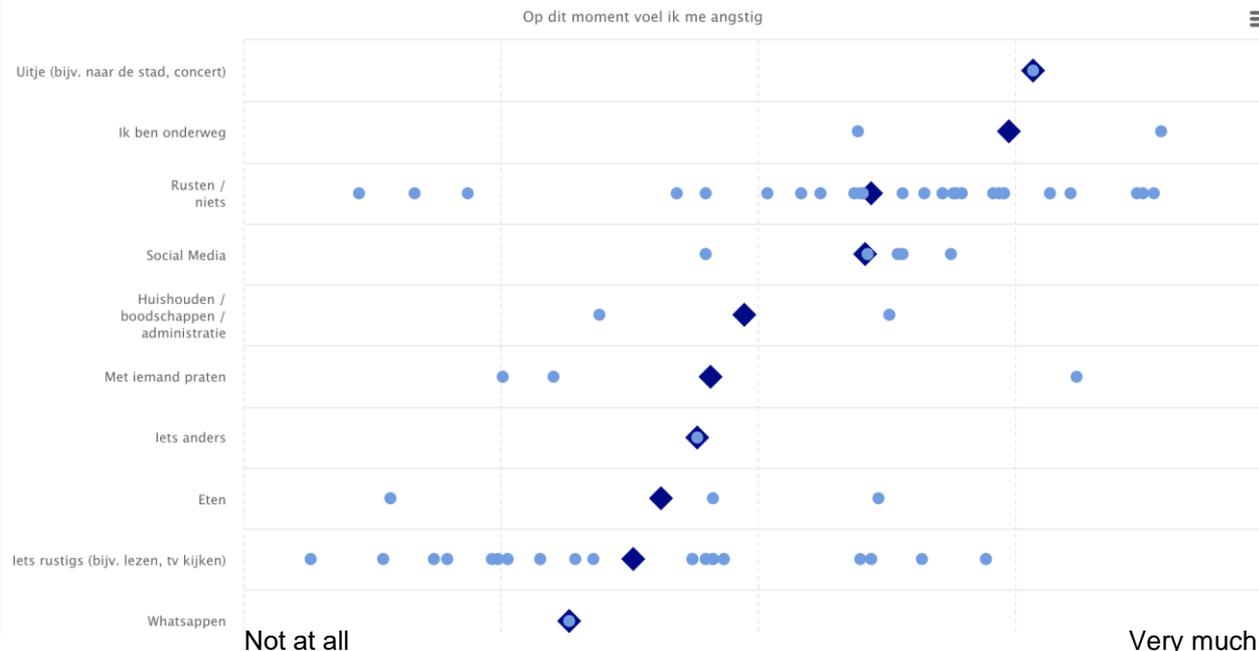| Activiteit | Gezelschap | Locatie | Eten | Middelen | Lichamelijke klachten |

Toon gemiddeldes ✓

Toon losse momenten ✓

Toon periode tussen

[ ] en [ ]

Angstig tijdens activiteiten

Op dit moment voel ik me angstig

- Uitje (bijv. naar de stad, concert)
- Ik ben onderweg
- Rusten / niets
- Social Media
- Huishouden / boodschappen / administratie
- Met iemand praten
- Iets anders
- Eten
- Iets rustigs (bijv. lezen, tv kijken)
- Whatsappen

Not at all · Very much

Items in dagboek

Getoond
- ✓ Angstig

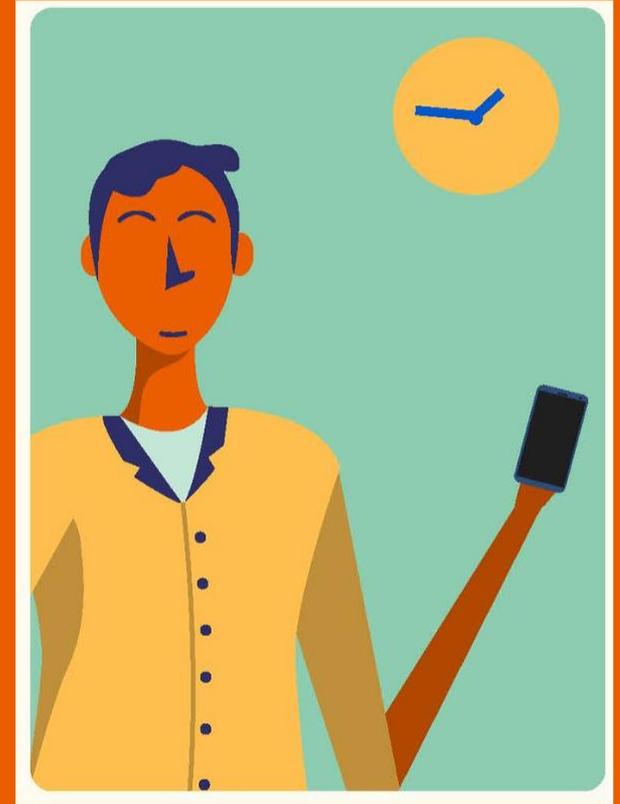**Stemming**

Angst
- ✓ Angstig
- ○ Piekeren
- ○ Vermijding

Zelfbeeld

Positiviteit

Verminderde interesse & initiatief

Piekeren

Omgeving, gedrag en middelen

Agitatie en stress

Take-aways

- **PETRA is live since June 20th 2021!**

- **Importance of involving patients/clinicians in development**

- **Training is important**

6. Some conclusions and discussion

Self-monitoring in precision psychiatry? Promising but work in progress!

TRANS-ID: tapering, Recovery. TRAILS adolescent cohort study.

iCase: idiographic study of cognitive function, affect, and sleep in early Alzheimer

PETRA: personalized treatment real-time assessment

ZELF-i: self-monitoring and personalized feedback as a tool to boost depression treatment

Therap-i: personalized self-monitoring and feedback tool to boost depression treatment

Clinical case-studies (anxiety/OCD, depression, bipolar disorder)

HAMLETT: handling antipsychotic medication, long- term evaluation of targeted treatment

MINDCOG: mechanisms of change of short therapeutic interventions to reduce perseverative cognition in depression

And more ongoing clinical research: see **ilab-psychiatry.nl**

iLab
PSYCHIATRY

Discussion

- Balance between the **positive and negative effects** of ESM
- Does ESM add **new/additional information** that would otherwise not be uncovered?
- What kind of **diary feedback** is relevant for clinical practice?
- Challenges in the **technological development** of ESM tools
- **Training** mental health care professionals
- **Compensation** by insurance companies/investment of the therapists

Thank you for your attention also on behalve of the:

 Team

 Team

Harriëtte Riese

Date van der Veen

Michelle Servaas

Lino von Klipstein

Robert Schoevers

FIONNEKE BOS

HARRIËTTE RIESE

LINO VON KLIPSTEIN

TOM VERHAGE

ANDO EMERENCIA

ERWIN VEERMANS

And all collaborating patients and health care professionals and many, many, many more!!

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