# South Southwest MHTTC
# First Episode Psychosis Conference 2022

Re-envisioning FEP Services with Youth & Young Adults

# The Future of Mental Health Care

(is sitting in your pocket)

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University of Washington

## Disclosures

Dr. Ben-Zeev has financial interests in Merlin LLC, FOCUS technology, and CORE technology.

He has an intervention content licensing agreement with Pear Therapeutics and has provided consultation services to Trusst Health, K Health, Boehringer Ingelheim, eQuility, Deep Valley Labs, and Otsuka Pharmaceuticals.

# Origin Story


South Southwest MHTTC
First Episode Psychosis Conference 2022
Re-envisioning FEP Services with Youth & Young Adults

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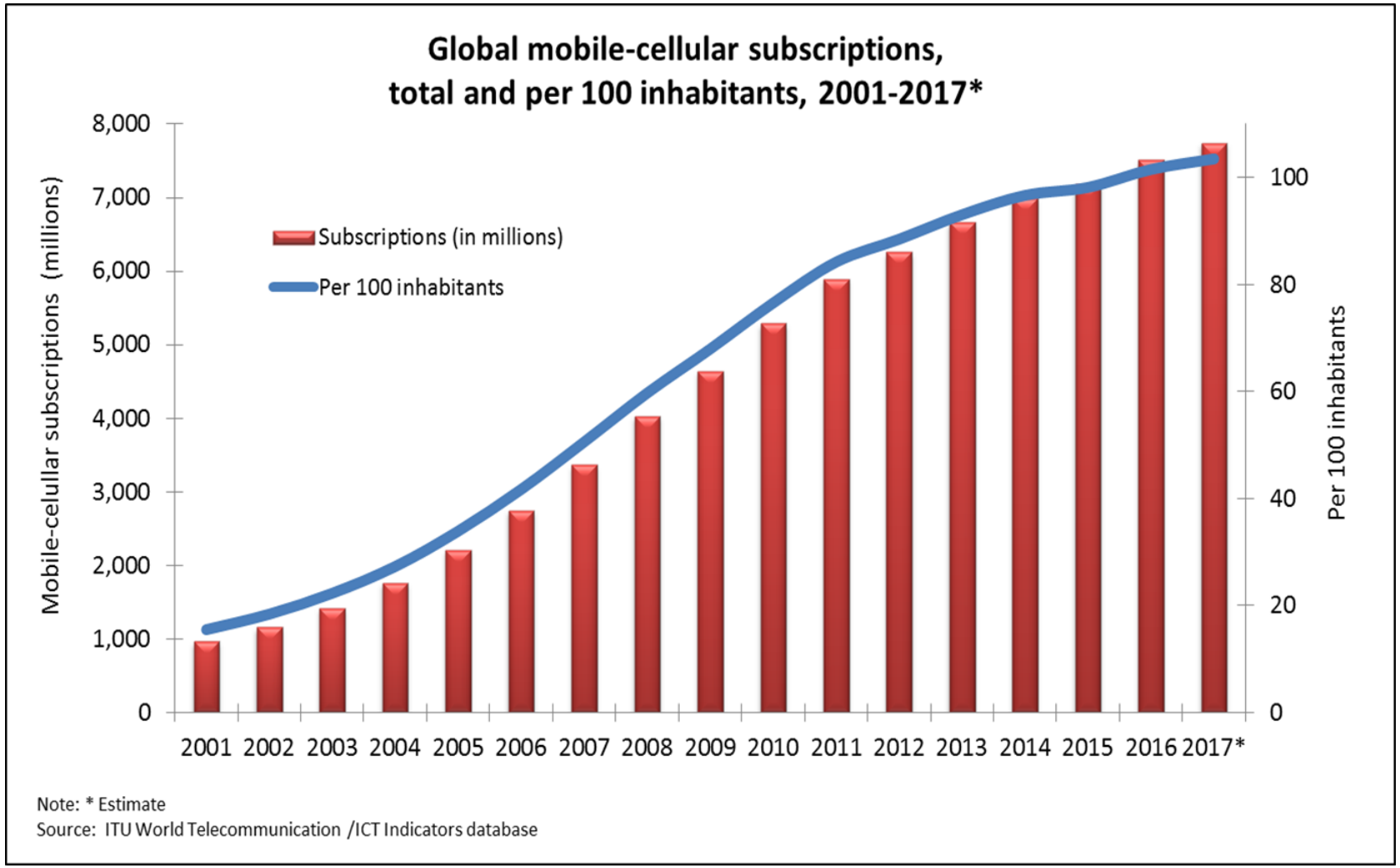
First Episode Psychosis Conference 2022
Re-envisioning FEP Services with Youth & Young Adults

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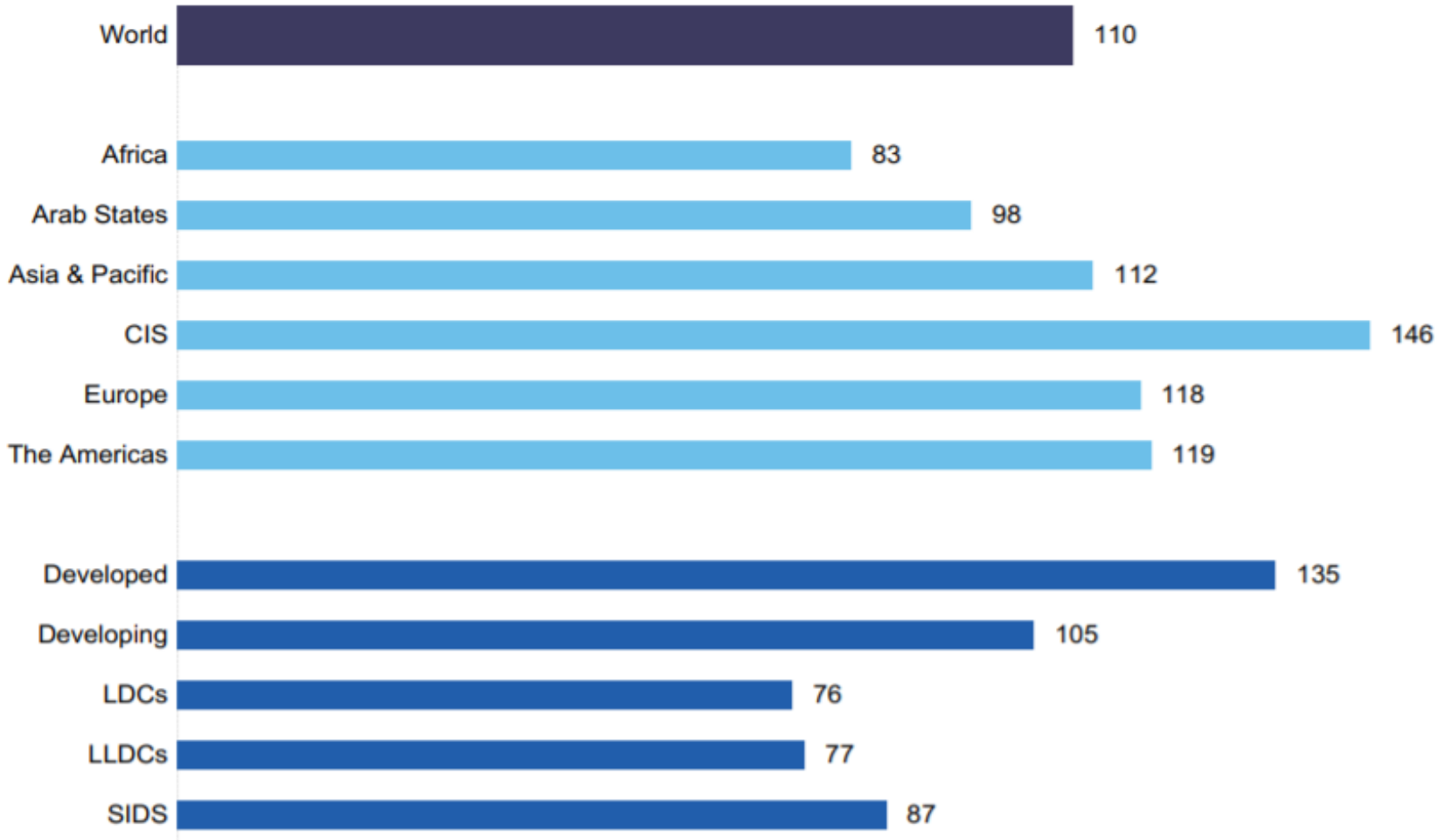
## Mobile-cellular telephone subscriptions per 100 inhabitants, by region, 2021*




Source: ITU

# 2011-12 Survey: Penetration of Mobile Devices among People with Serious Mental Illness

- Respondents:
  - N=1,592
  - Age: 46 y.o.
  - 69% AA, 41% Caucasian
  - 69% HS diploma or less
  - 73% earned $10,0

# Survey Results

- Ownership: 72% had mobile device
- Payment: 35% “government minutes” (Lifeline), 37% month-to-month plan, 14% prepaid cards
- Uses: 92% talk, 39% text, 33% internet

- Maryland, Massachusetts, Rhode Island, California, New Hampshire, Michigan: 82%-97%

(Aschbrenner et al., Brunette et al., 2019; 2018; Carras et al., 2014; Noel et al., 2019; Torous et al., 2014; Young et al., 2020)

- India: 72%-92%

(Jain et al. 2015)

- USA: 92% of people who hear voices recruited via Facebook own smartphones

(Crosier, Brian, Ben-Zeev, 2016)

# Young Adults with Early Psychosis

- n=77
- Average Age: 23.68
- 22% Male, 59% Female, 18% nonbinary, 10% Transgender
- Transgender 8 (10.4%)
- 67% White/Caucasian, 9% Multiracial, 8% Black/African-American
- Latino/Hispanic 5.2%

- 97.4% owned a smartphone

Buck, Chander, Tauscher, Nguyen, Monroe-DeVita & Ben-Zeev (2021). Journal of Technology in Behavioral Science.

# Young Adults with Early Psychosis

- High interest in psychosis-specific digital health.
- 89.6% interested in information about medications and side effects
- 89.3% managing stress and improving mood
- 88% managing symptoms of psychosis
- 89.6% interested in content being delivered as text
- Less interest in: social features
- Those with most negative attitudes toward help-seeking had low interest in mHealth facilitating symptom disclosure

Buck, Chander, Tauscher, Nguyen, Monroe-DeVita & Ben-Zeev (2021). Journal of Technology in Behavioral Science.

# Caregivers of Young Adults with Early Psychosis

- n=43
- Average Age:55
- 77% Female, 70% White, 65% married

- Top 5 five digital health features endorsed:

-95% reports of changes in their family member's symptoms

-90% information about psychological treatments

-90% information about mental health systems

-86% information about medications

Buck, Chander, Monroe-DeVita, Cheng, Stiles, & Ben-Zeev (2021). Psychiatric Services.

# Caregivers of Young Adults with Early Psychosis

- 95% interest in communicating with individual therapists
- 88% with psychiatrists
- 77% researchers or experts
- 75% other caregivers

- Most popular modalities: two-way texts (88%) or phone calls (83%) with providers
- Least popular: video calls (42%) and one-way texts (32%)

Buck, Chander, Monroe-DeVita, Cheng, Stiles, & Ben-Zeev (2021). Psychiatric Services.

# UW Behavioral Research In Technology and Engineering (BRiTE) Center

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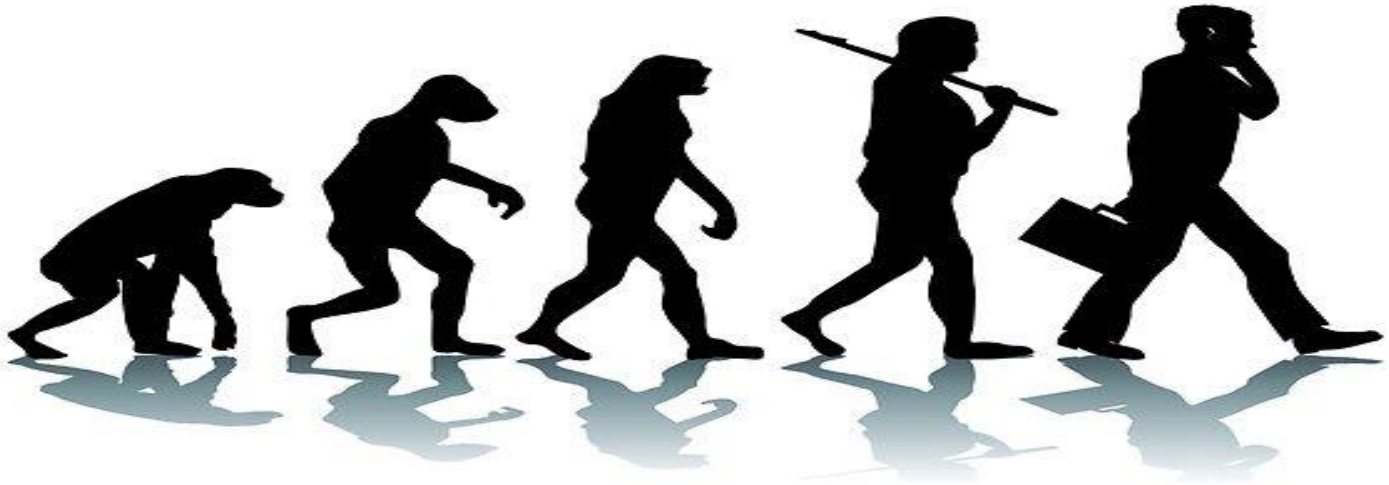
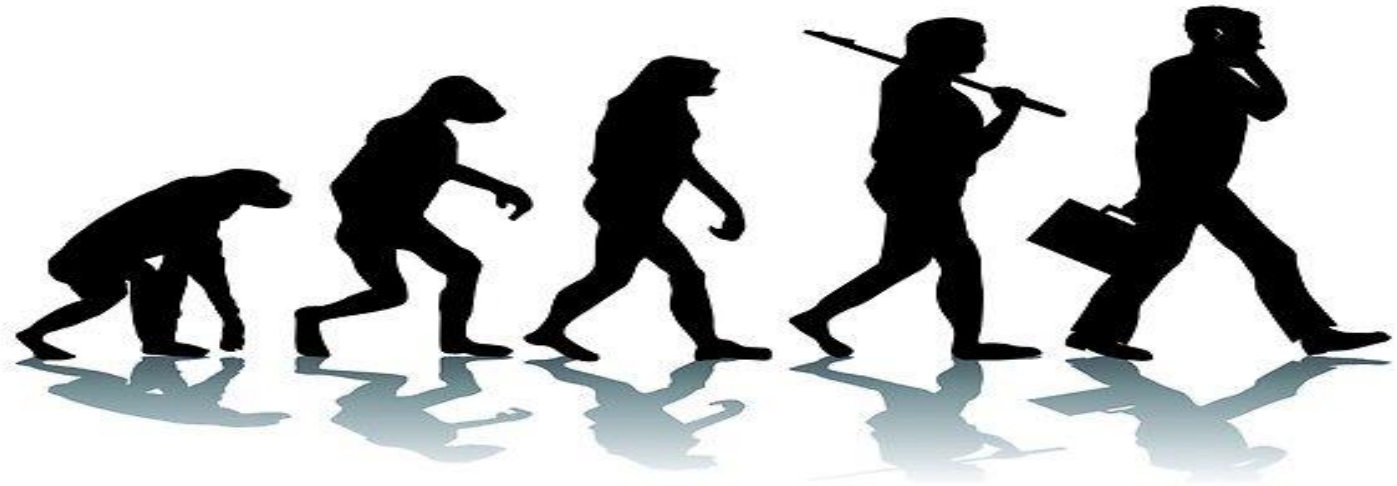
# Using Mobile Technology for Mental Health Care

## Person-to-Person Interactions



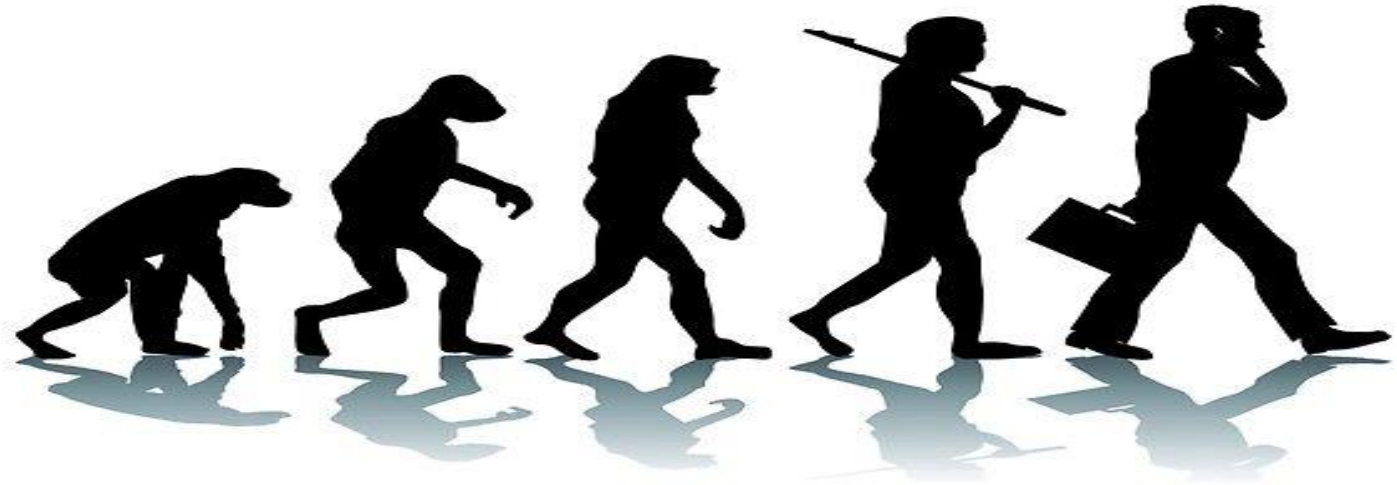
# Using Mobile Technology for Mental Health Care

- Person-to-Person Interactions
- Sensing, Natural Language Processing



# Using Mobile Technology for Mental Health Care

- Automated Interventions
- Sensing, Natural Language Processing
- Person-to-Person Interventions



# Person-to-Person:
# *Mobile Interventionist*

NIH
National Institute of Mental Health

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# Mobile Interventionist Overview

Daily Texts

Client

MI

Weekly Report

Clinical Team

Home Visit

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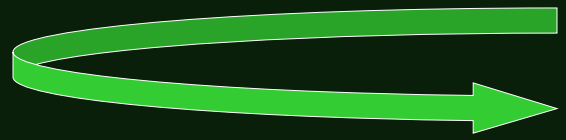
# Mobile Interventionist

Hi its Sara! How are you feeling Ray?



hi sara. voices talking about me

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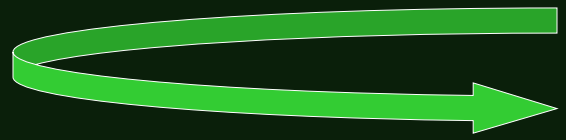
Ben-Zeev, Kaiser, & Krzos. (2014). *Journal of Dual Diagnosis.*

# Mobile Interventionist

That's stressful. You are not alone! lots of people hear voices.



They say something bad if i take the bus

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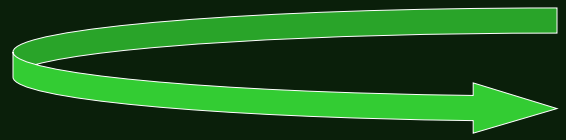
Ben-Zeev, Kaiser, & Krzos. (2014). *Journal of Dual Diagnosis.*

# Mobile Interventionist

I have a trick that can help you feel calm, even when voices are loud on the bus…wanna hear about it?



maybe.

what is it?

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Ben-Zeev, Kaiser, & Krzos. (2014). *Journal of Dual Diagnosis.*

# Mobile Interventionist: Therapeutic Alliance

- Working Alliance Inventory (WAI):

"We agree on what is important for me to work on"

"I am confident in my clinician's ability to help me"

"My clinician and I trust each other"

"I believe my clinician likes me"

WAI ratings:

| In-person | MI (texting) |
|---|---|
| 50.4 (SD=12) | 56.7 (SD=9) |

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Ben-Zeev, Kaiser, & Krzos. (2014). *Journal of Dual Diagnosis.*

# Mobile Interventionist: Randomized Controlled Trial

- 61% people with schizophrenia/schizoaffective disorder, 24% with bipolar disorder, 14% with MDD
- All receiving Assertive Community Treatment (ACT) team care
- Age: 45 years old, 55% male, and 52% White, 26% Black/African-American, 17% multiracial.
- Average lifetime hospitalizations: 3

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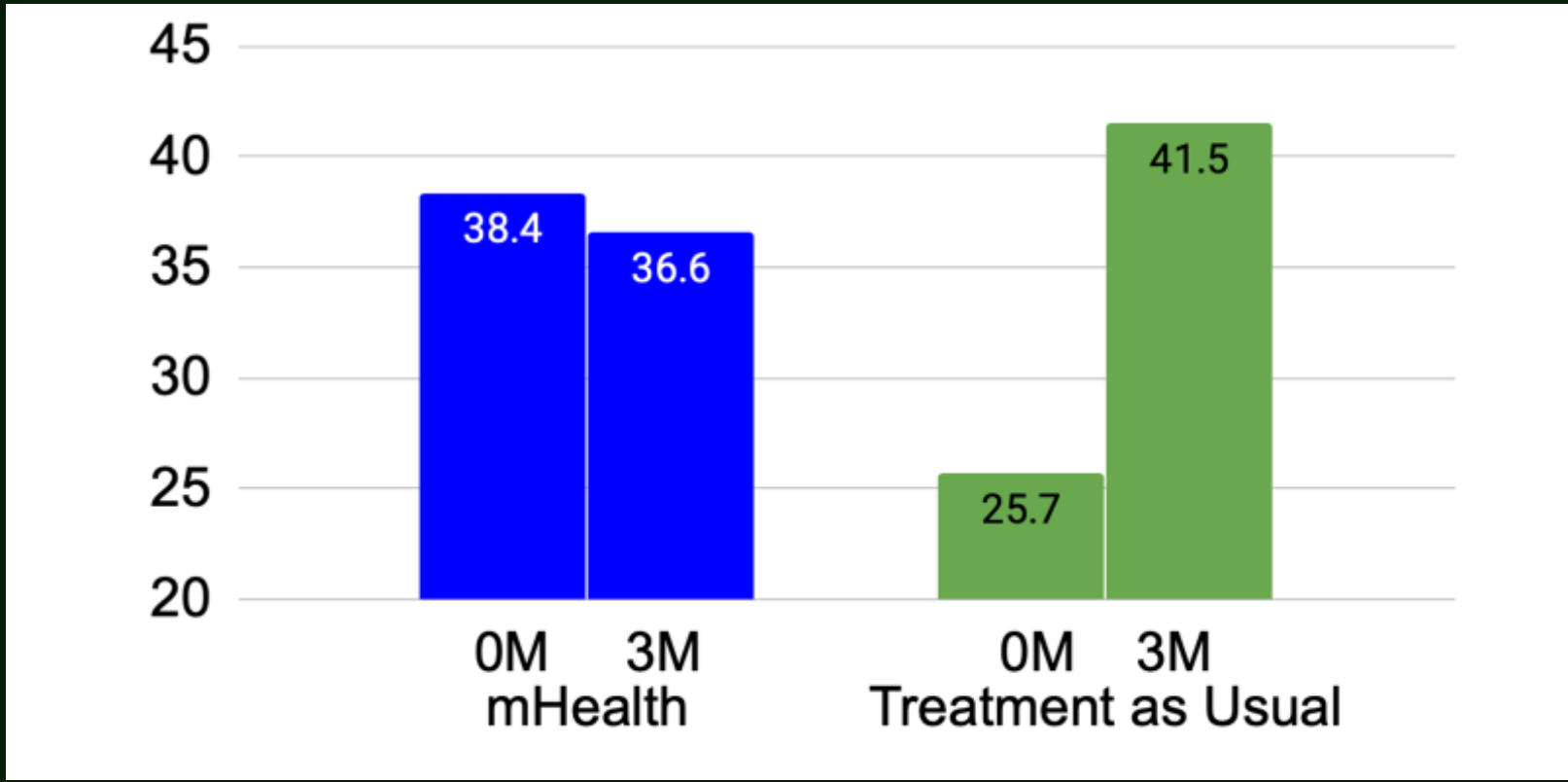
Ben-Zeev, Buck, Meller, Hudenko, & Hallgren (2020). *Psychiatric Services.*

# Mobile Interventionist: Randomized Controlled Trial

## Persecutory Ideation (GPTS)

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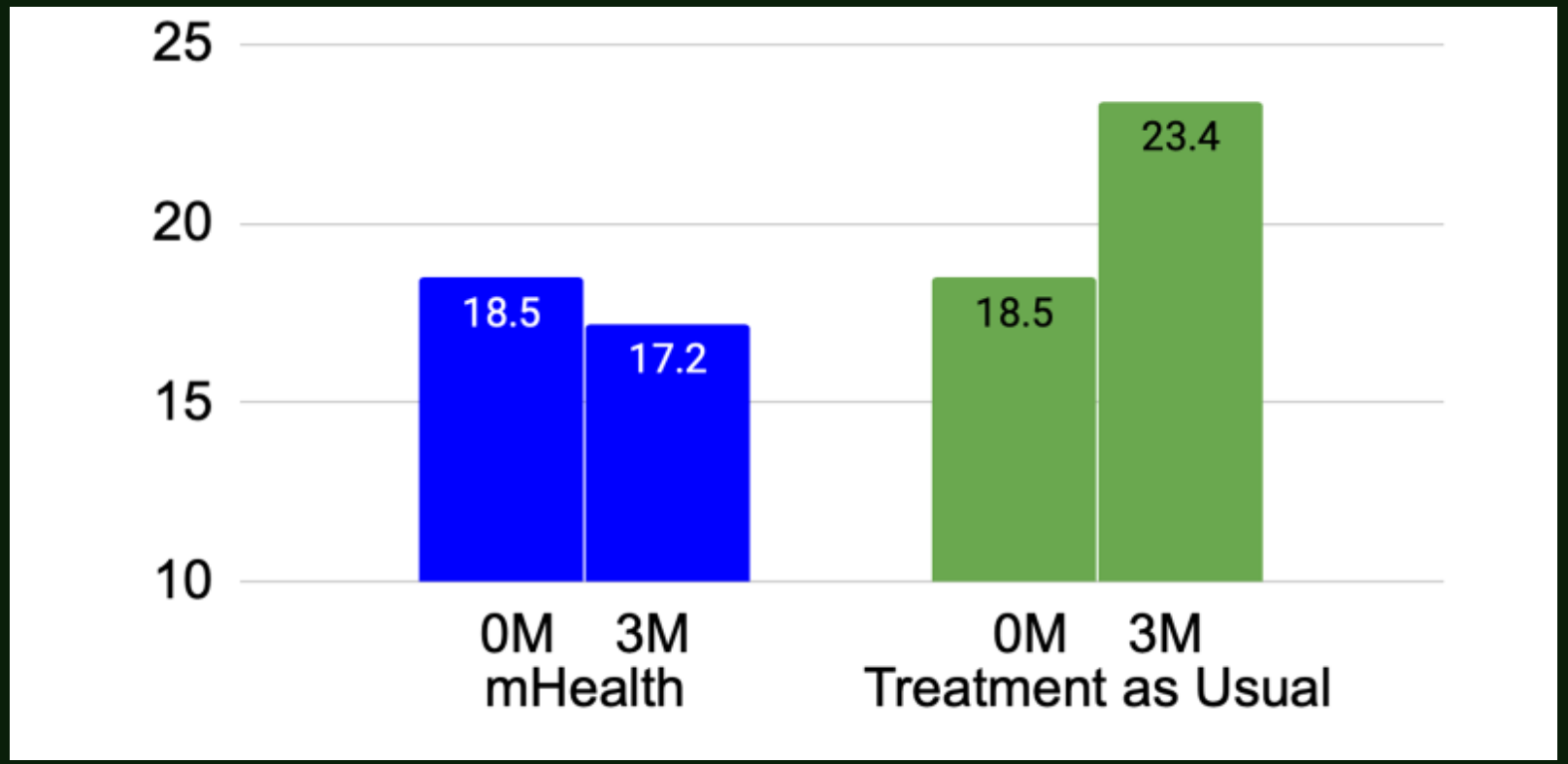
Ben-Zeev, Buck, Meller, Hudenko, & Hallgren (2020). *Psychiatric Services.*

# Mobile Interventionist: Randomized Controlled Trial

## Depression (BDI-II)

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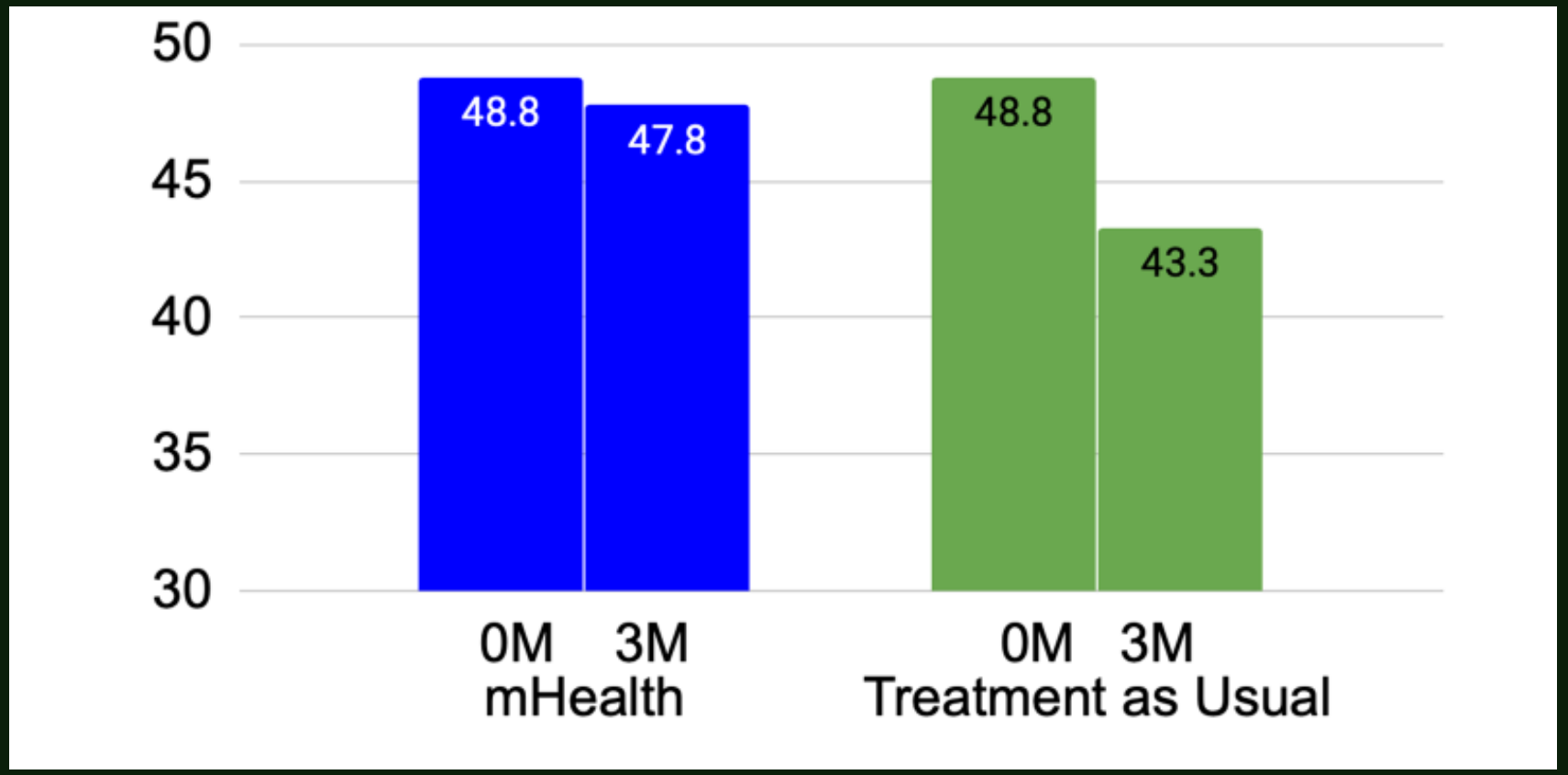
Ben-Zeev, Buck, Meller, Hudenko, & Hallgren (2020). *Psychiatric Services.*

# Mobile Interventionist: Randomized Controlled Trial

## Illness Management and Recovery (IMRS)

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Ben-Zeev, Buck, Meller, Hudenko, & Hallgren (2020). *Psychiatric Services.*

# What about HIPAA?

Director of the US Department of Health and Human Services Office for Civil Rights (OCR), the HIPAA enforcement agency (March 2018):

Health care providers may share Protected Health Information (PHI) with patients through standard text messages. Providers must first warn their patients that texting is not secure, gain the patients' authorization, and document the patients' consent.

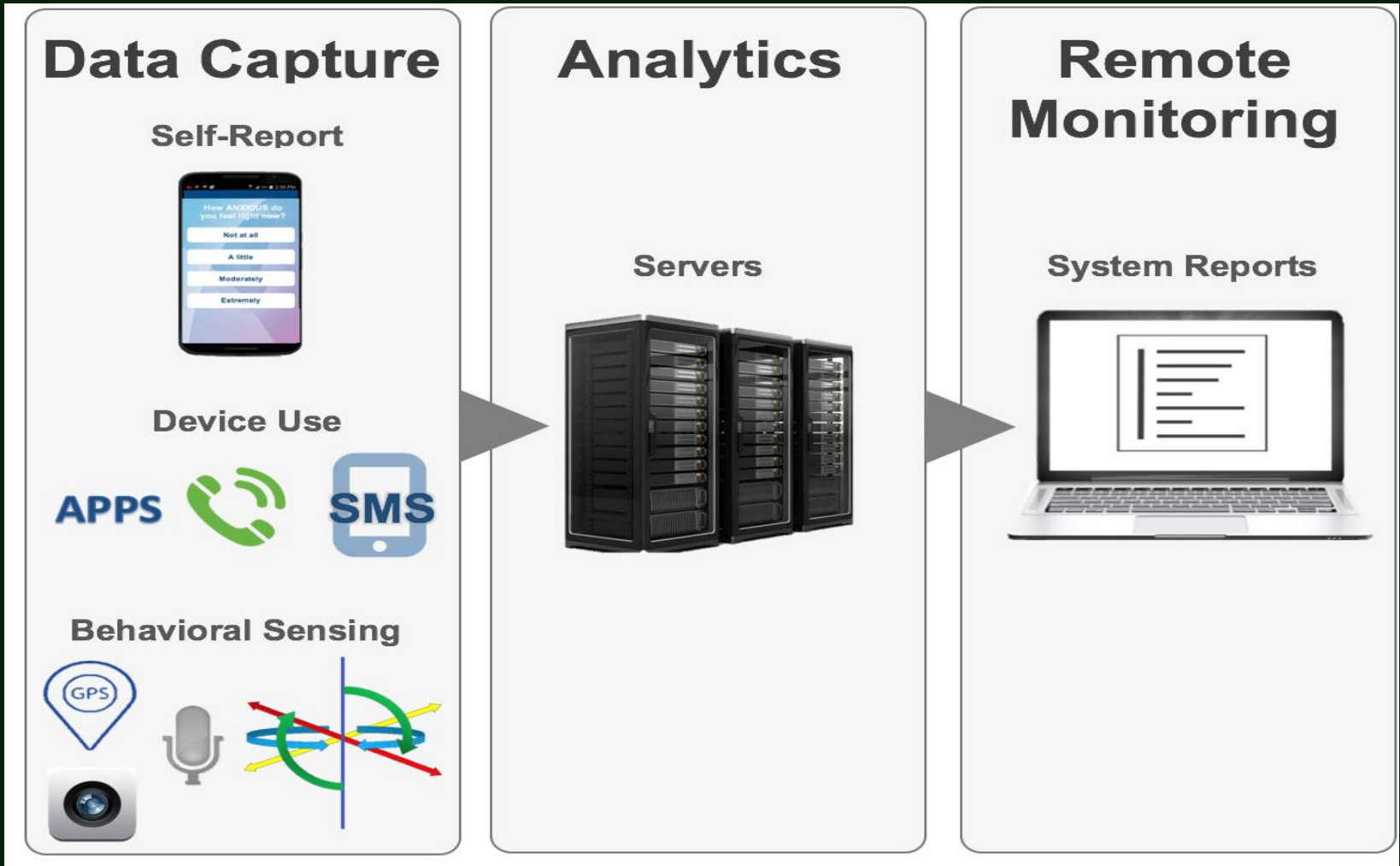
https://www.emrandhipaa.com/mike/2018/03/06/texting-patients-is-ok-under-hipaa-as-long-as-you/

# Helpful Reviews: Clinical Texting

Dwyer, A., de Almeida Neto, A., Estival, D., et al. (2021). Suitability of Text-Based Communications for the Delivery of Psychological Therapeutic Services to Rural and Remote Communities: Scoping Review. *JMIR Mental Health*, *8*(2), e19478.

Berrouiguet, S., Baca-García, E., Brandt, S., et al. (2016). Fundamentals for future mobile-health (mHealth): a systematic review of mobile phone and web-based text messaging in mental health. *Journal of Medical Internet Research*, 18(6), e5066.

# Sensing, Natural Language Processing, Signal Detection




R01MH103148 (Ben-Zeev), R01MH112641 (Ben-Zeev) R42MH123215 (Kopelovich), R37MH066031 (Barch)

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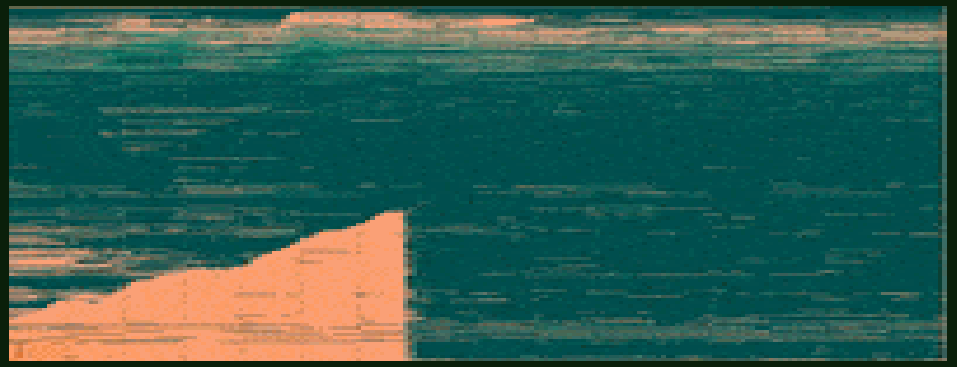
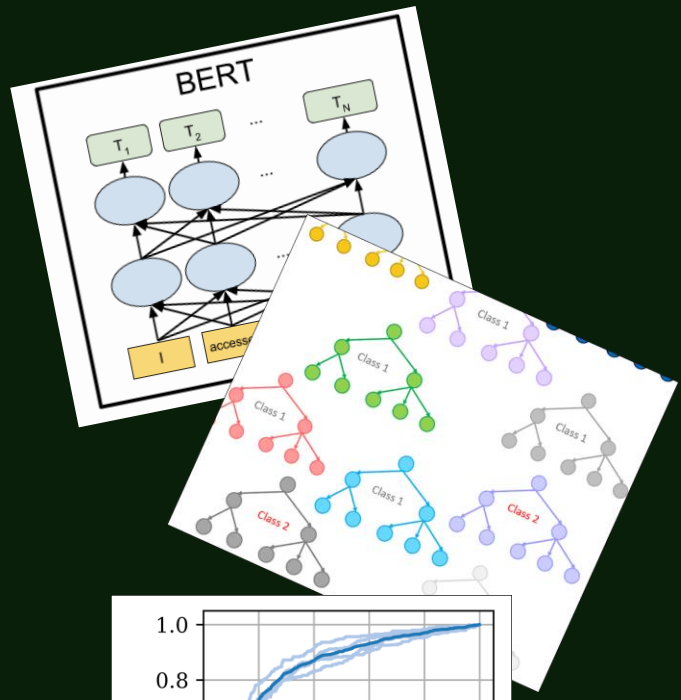
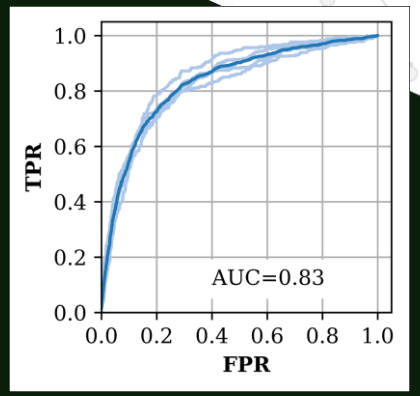
# Natural Language Processing (NLP): Thought Coherence

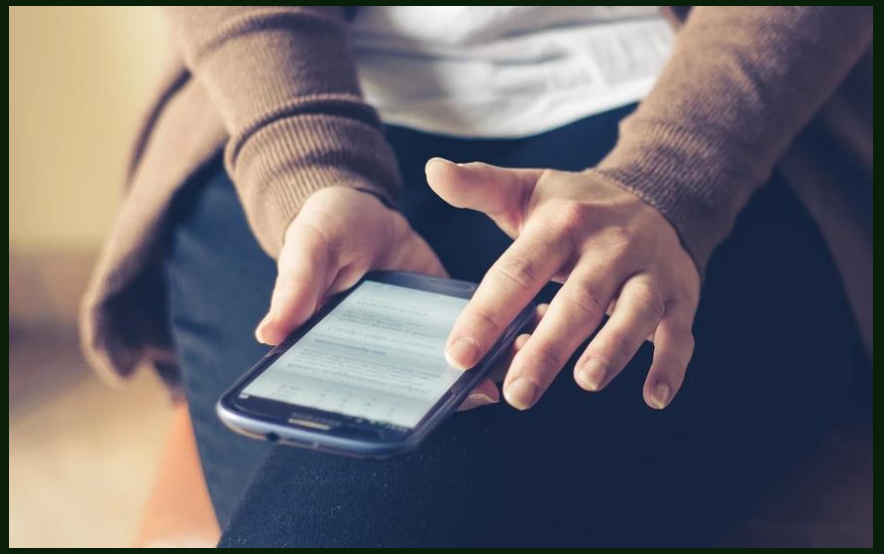





Xu, Portanova, Chander, Ben-Zeev, Cohen (2020). AMIA Annual Symposium Proceedings.

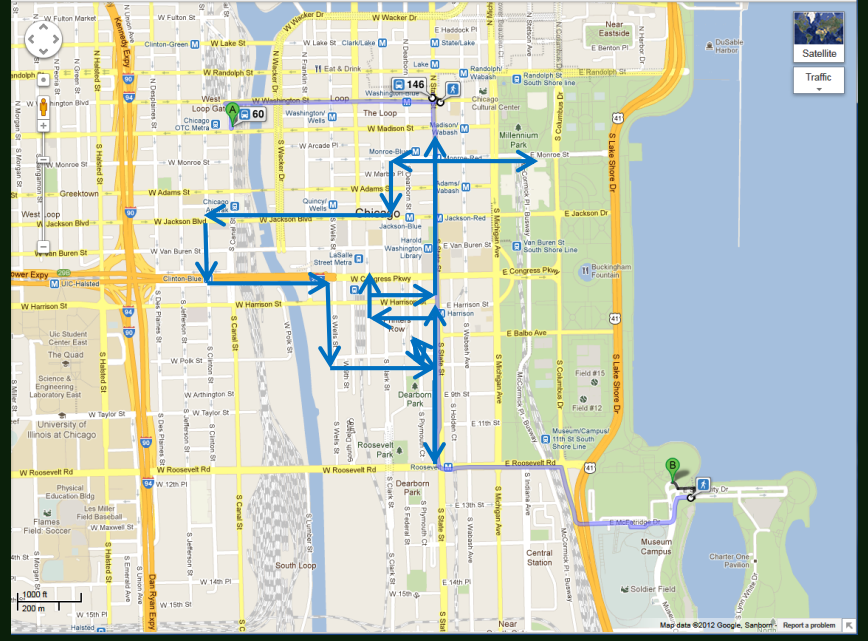
# Natural Language Processing (NLP): Thought Distortions




| Distortion | SHAP Explainer |
|---|---|
| mental filter | ys distracted within myself thoughts daydreaming wishing things didn't turn out the way they did in my life and with myself always asked God what is it and why |
| jumping to conclusions | Maybe they really don't like me. |
| catastrophizing | Feeling unsure of myself right now. Desperate. Idk if I can handle my money or tackle my goals of saving for a rainy day. |
| shoulding & musting | Yes, but I've got to be able to make better decisions for myself, and not let people use my issues for their personal shit |
| Over-generalizing | I've never been able to rest in my life the way I wanted to. |

Tauscher, Lybarger, Ding, Chander, Hudenko, Cohen, Ben-Zeev (Under Review).

# GPS (Geospatial Activity): Distance Covered





Ben-Zeev, Wang, Abdullah, Brian, Scherer, Mistler, Hauser, Kane, Campbell, Choudhury (2016)
*Psychiatric Services.*

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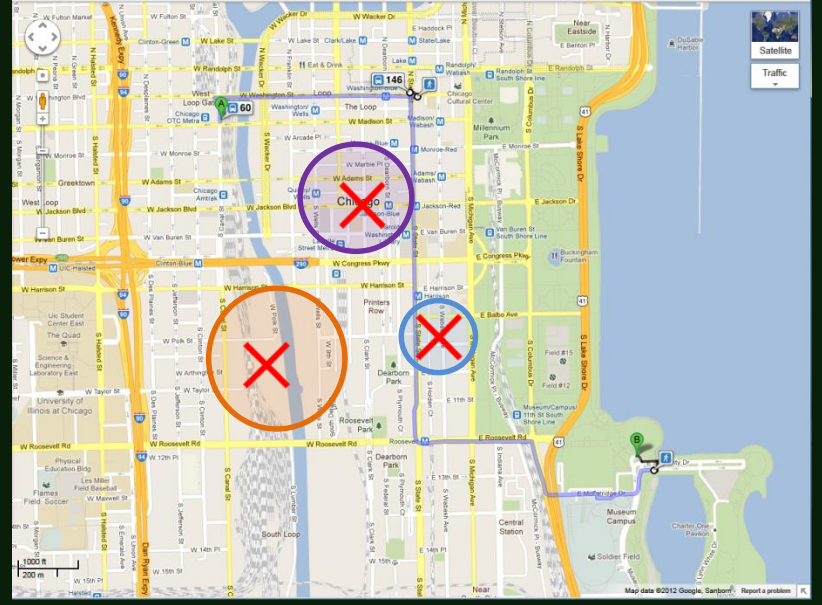
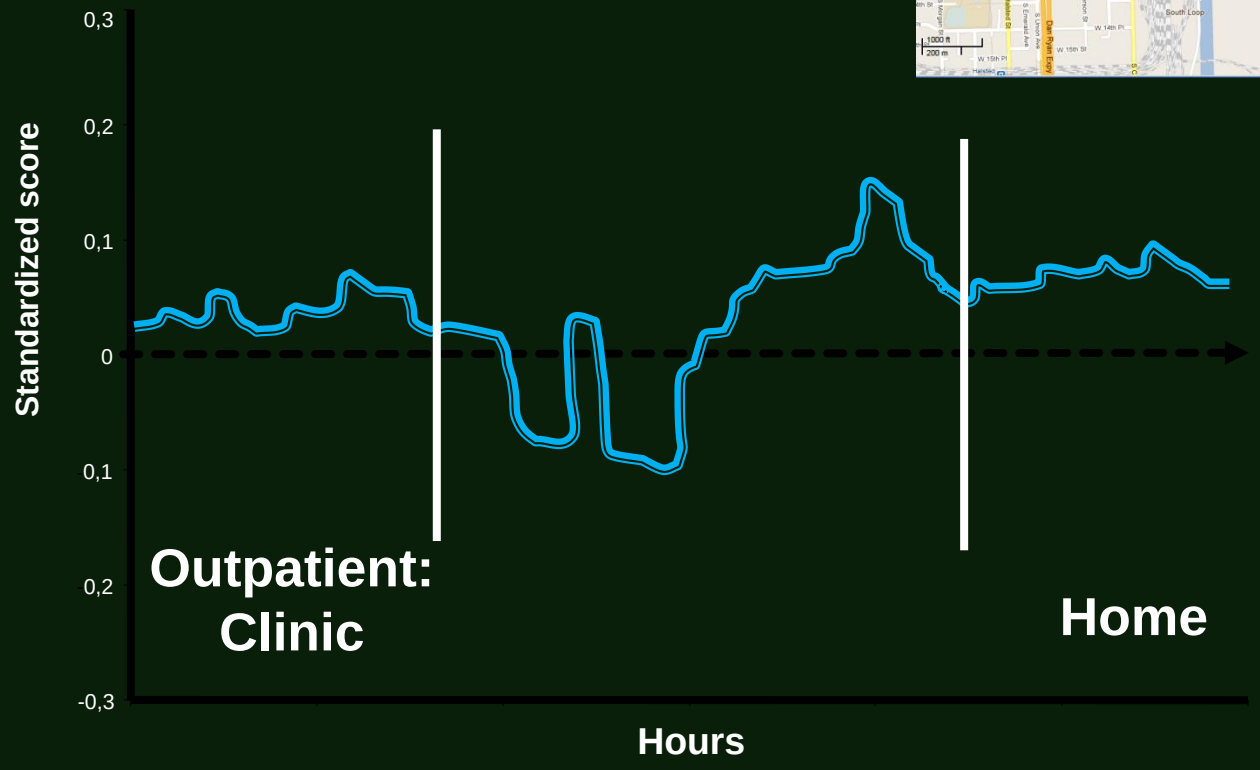
# GPS (Outdoor Geospatial Activity): Time Spent at Location




Ben-Zeev, Wang, Abdullah, Brian, Scherer, Mistler, Hauser, Kane, Campbell, Choudhury (2016) *Psychiatric Services.*

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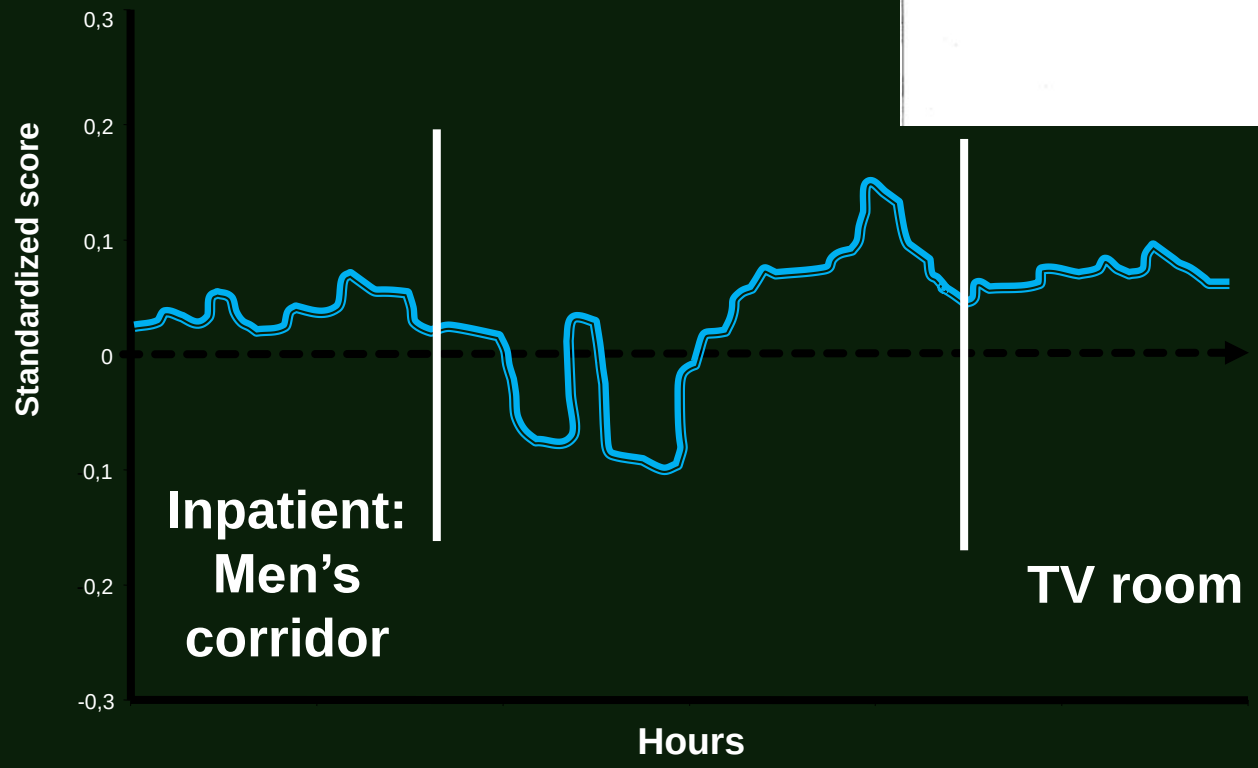
# Bluetooth Beacons (Indoor Geospatial Activity): Time Spent at Location


Ben-Zeev, Wang, Abdullah, Brian, Scherer, Mistler, Hauser, Kane, Campbell, Choudhury (2016) *Psychiatric Services.*

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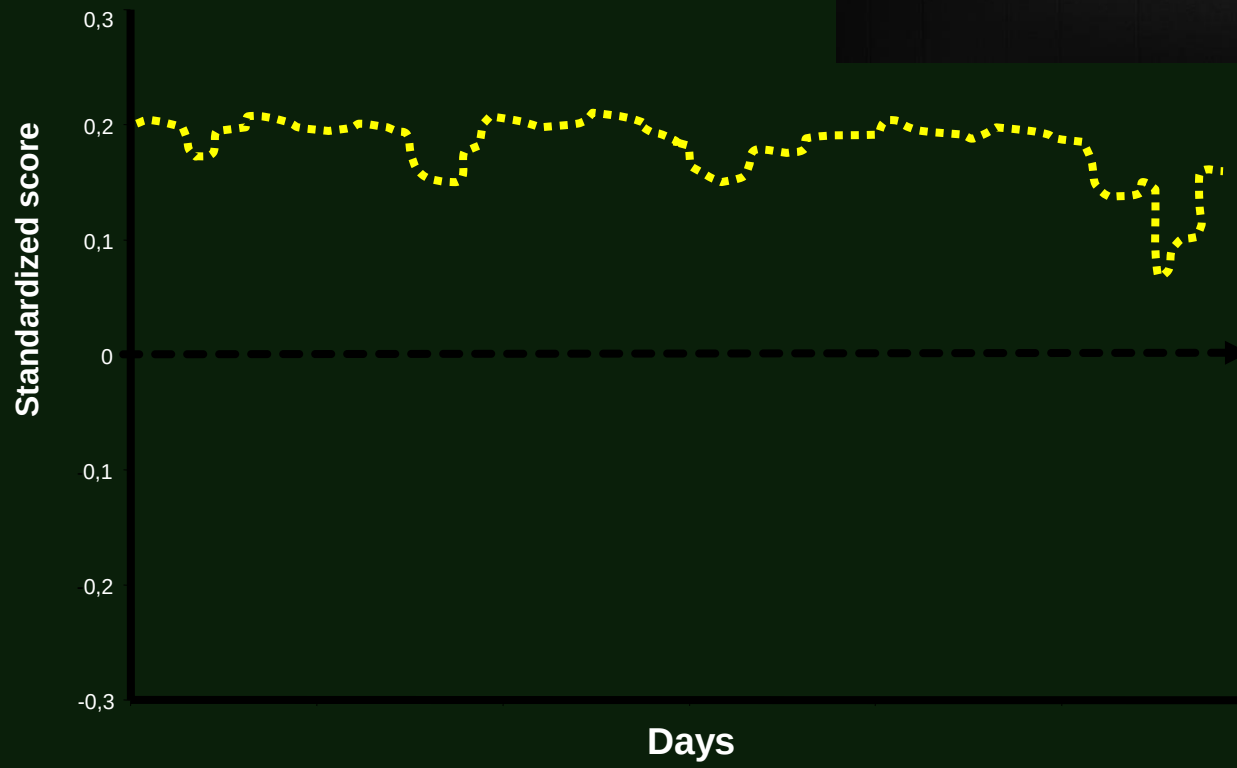
# Accelerometer (Physical Activity): Walking/ Running/Cycling

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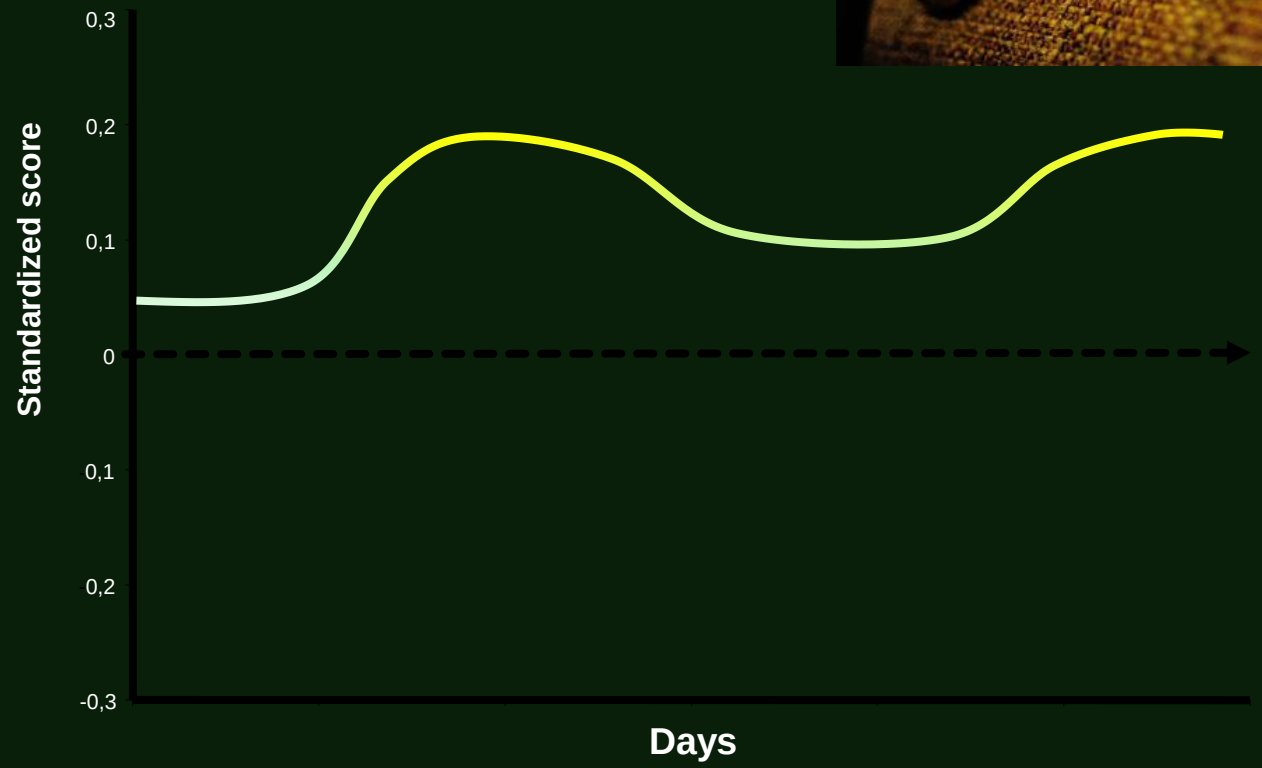
# Accelerometer (Physical Activity): Sedentary Time




Ben-Zeev, Wang, Abdullah, Brian, Scherer, Mistler, Hauser, Kane, Campbell, Choudhury (2016)
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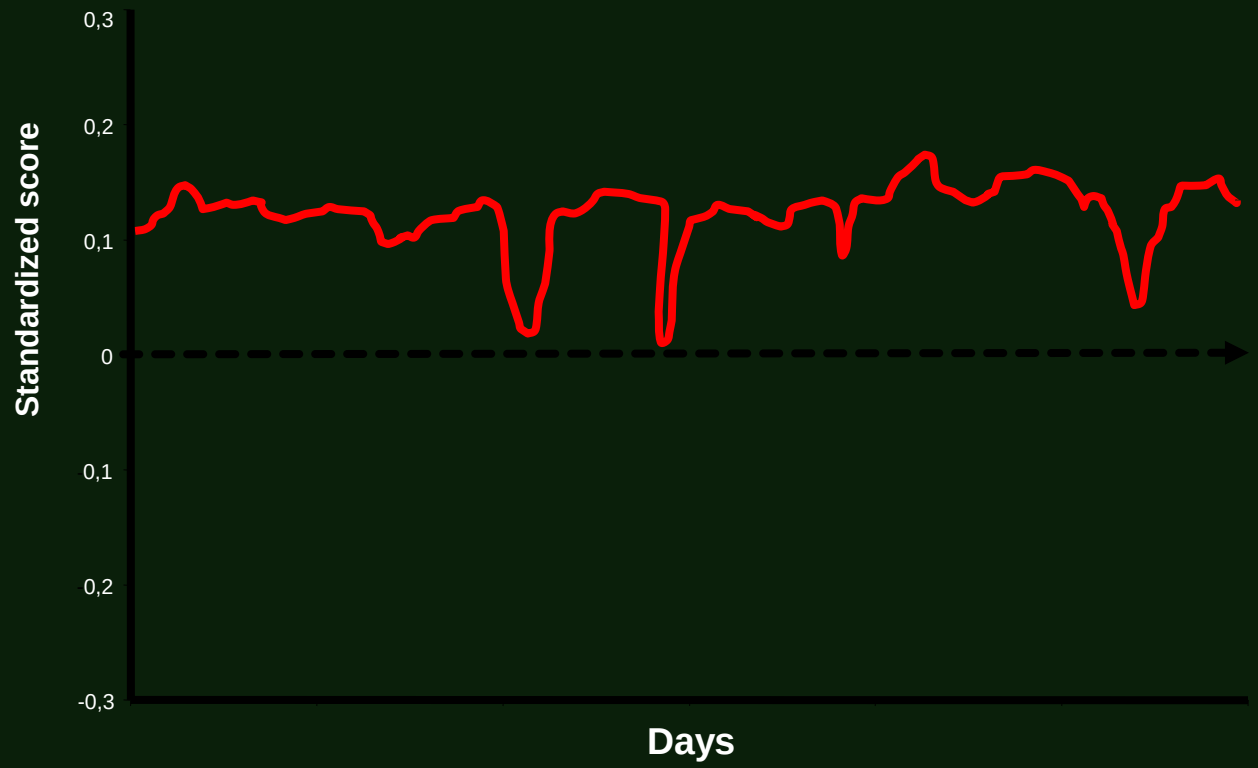
# Microphone (Speech): Conversation Frequency




Ben-Zeev, Wang, Abdullah, Brian, Scherer, Mistler, Hauser, Kane, Campbell, Choudhury (2016)
*Psychiatric Services.*

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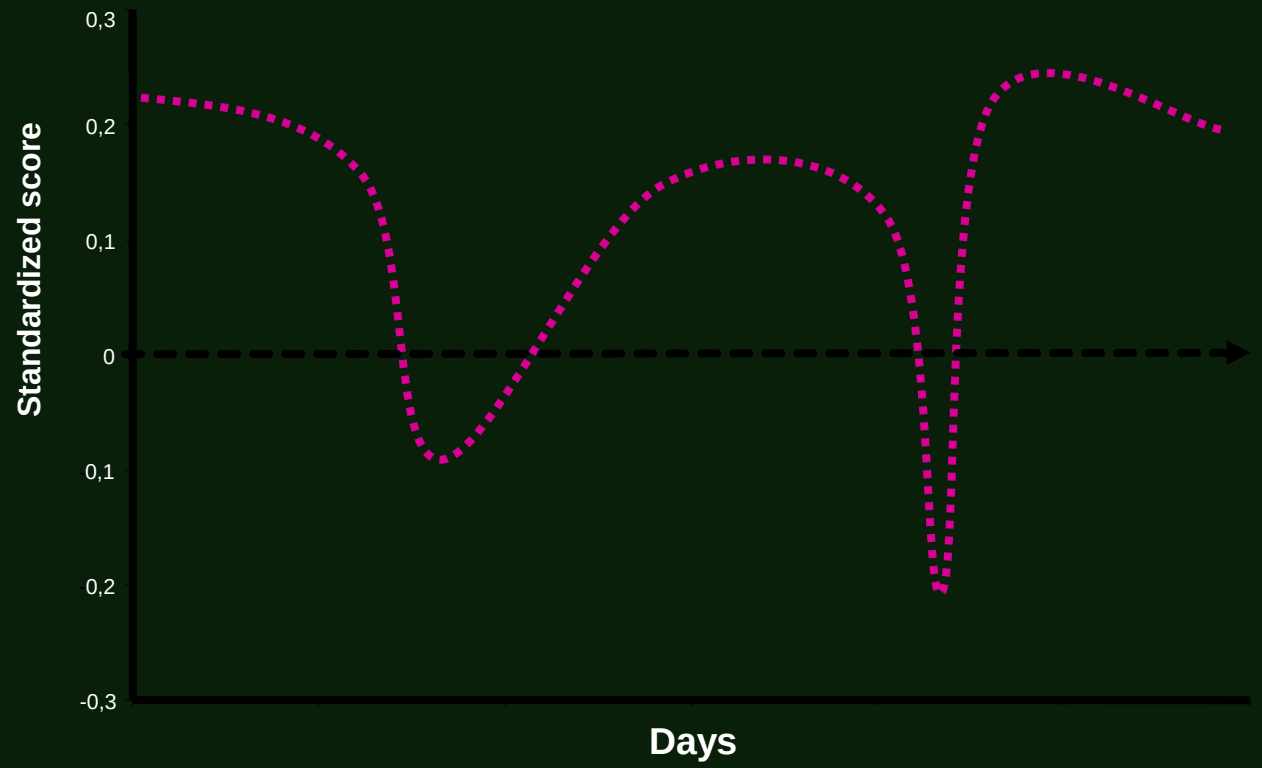
# Microphone (Speech): Conversation Duration


Ben-Zeev, Wang, Abdullah, Brian, Scherer, Mistler, Hauser, Kane, Campbell, Choudhury (2016)
*Psychiatric Services.*

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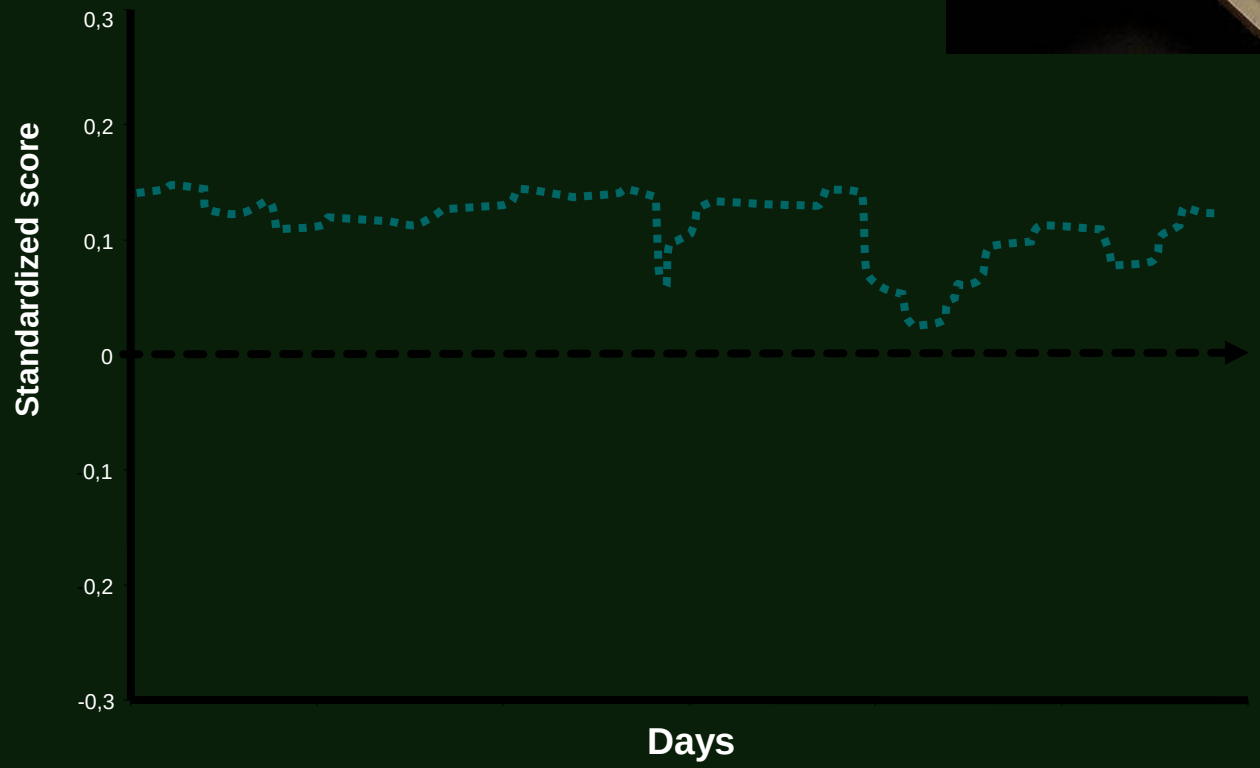
# Device use + Light + Sound+ Movement: Sleep Model

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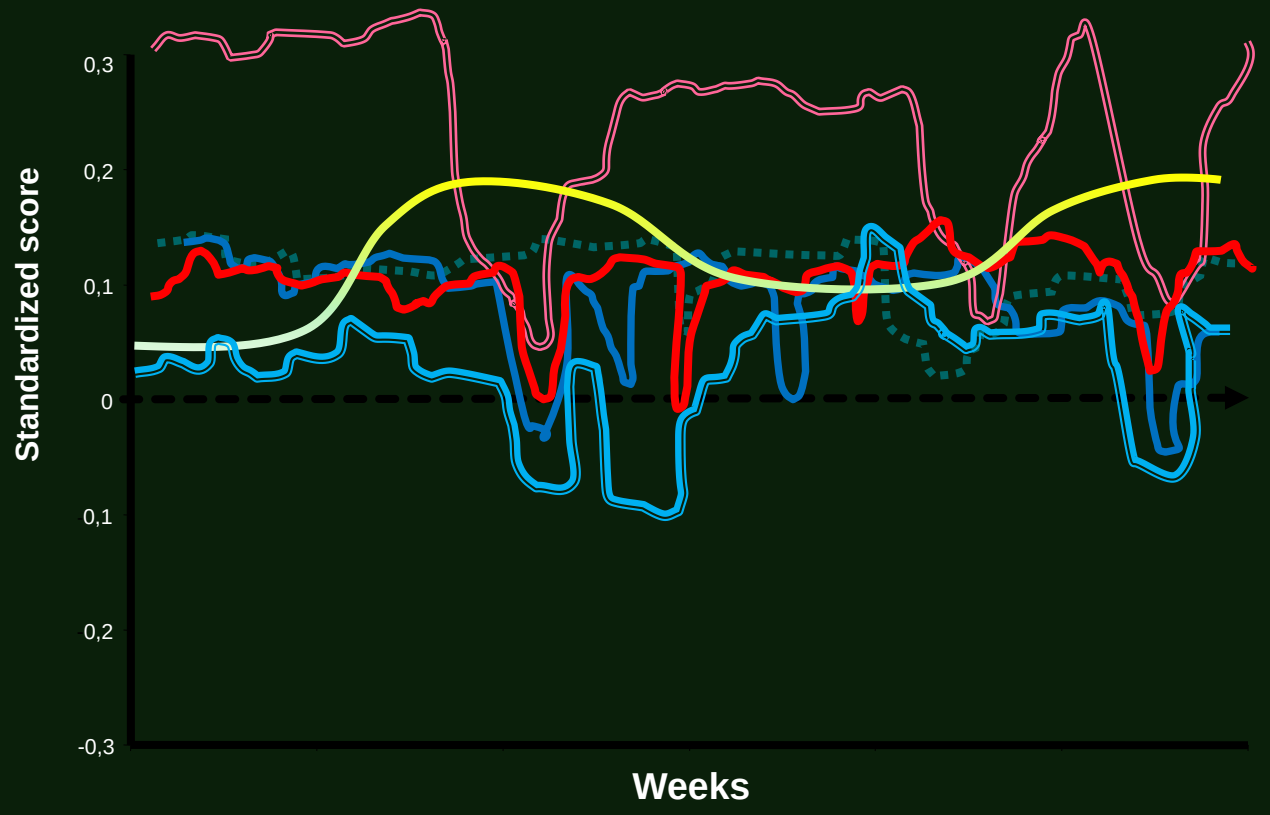
# Remote Monitoring and Notification




Ben-Zeev et al. (2017). *Psychiatric Rehabilitation Journal*

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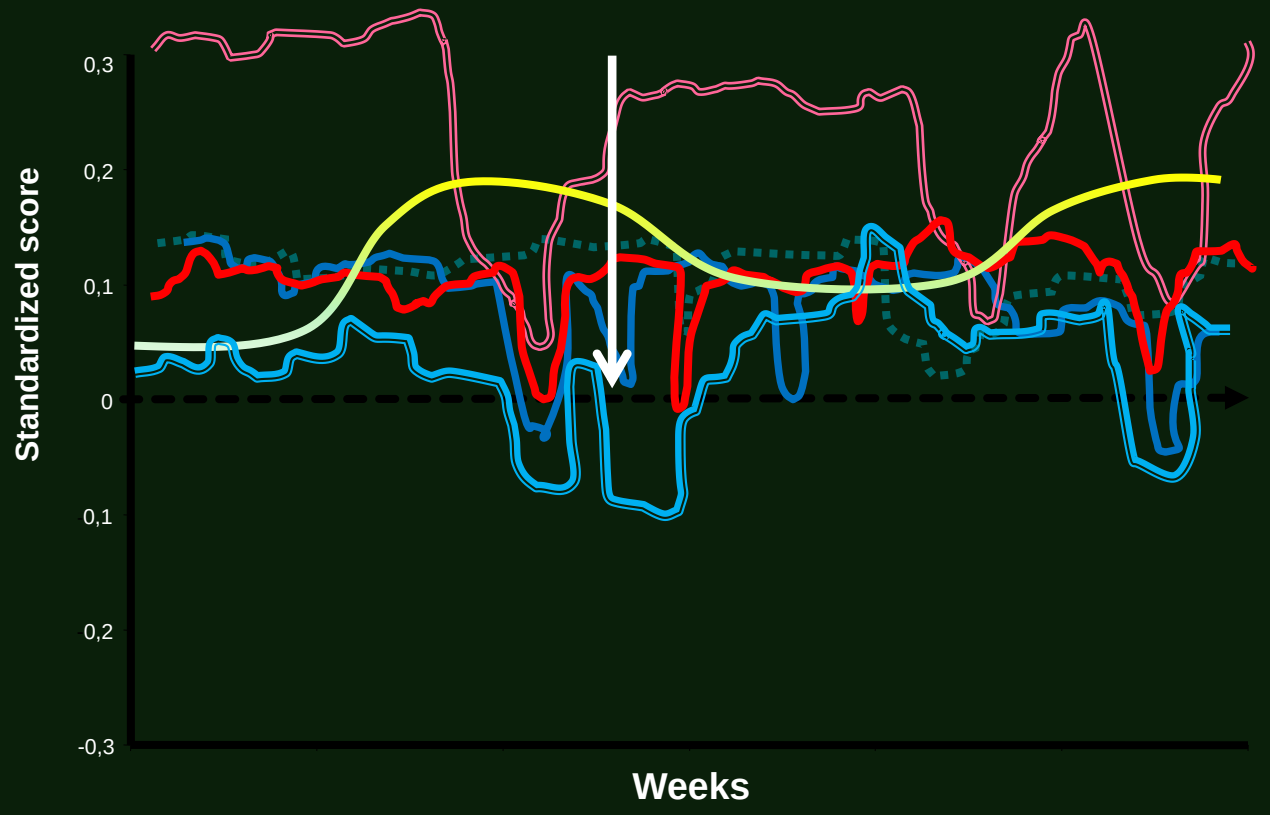


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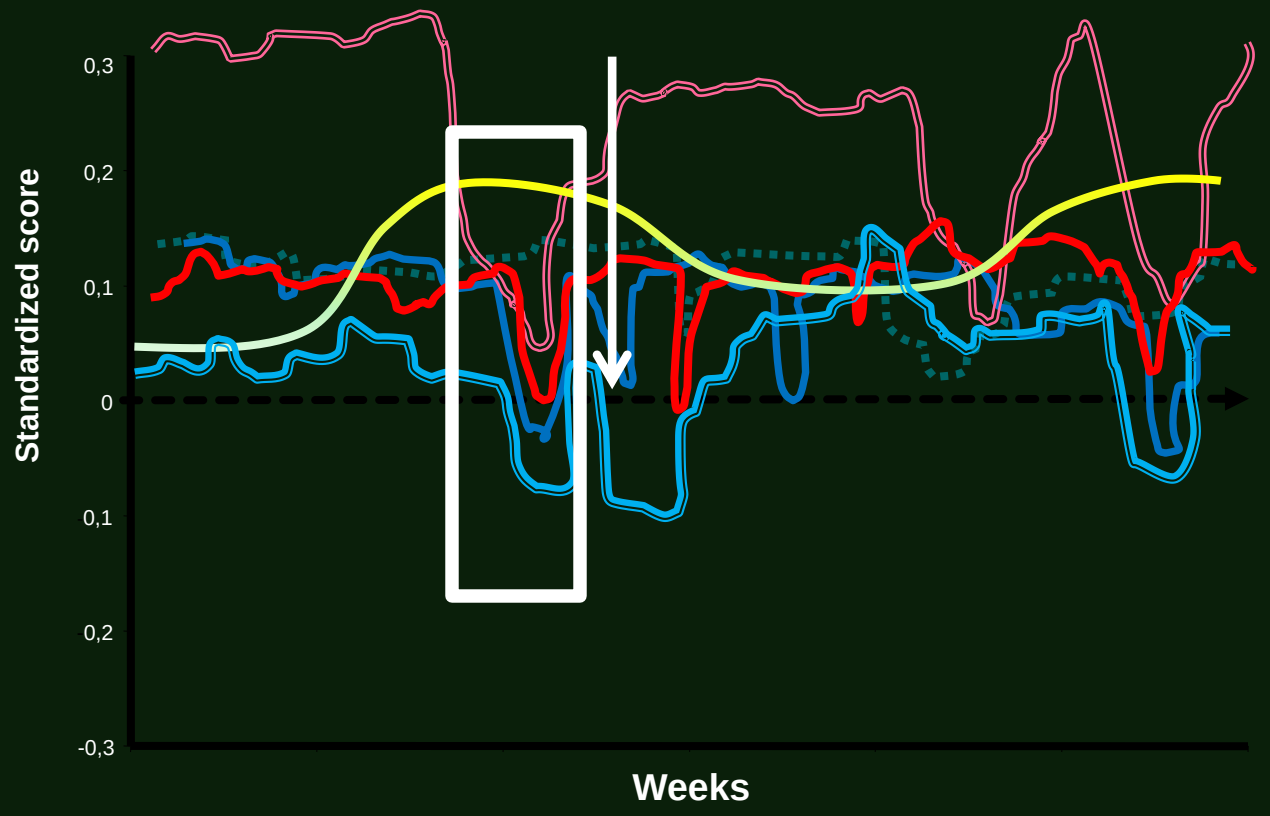


Ben-Zeev et al. (2017). *Psychiatric Rehabilitation Journal*

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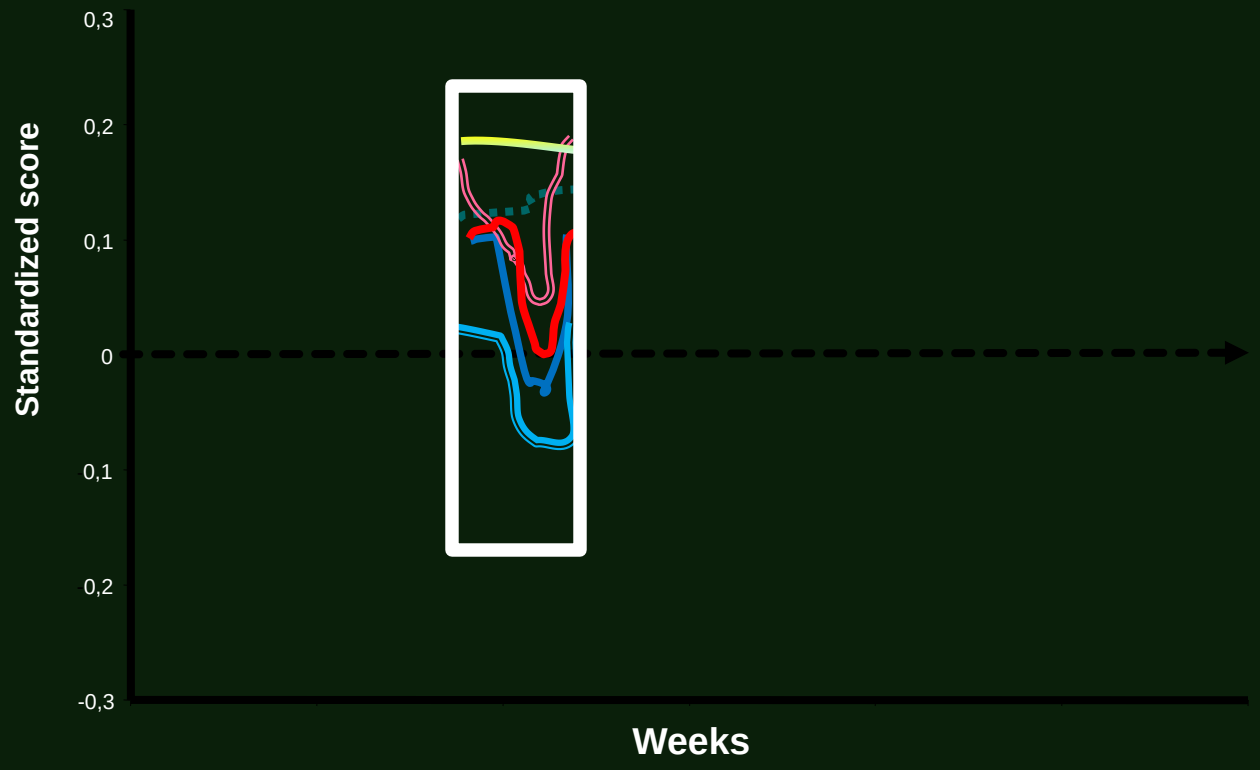


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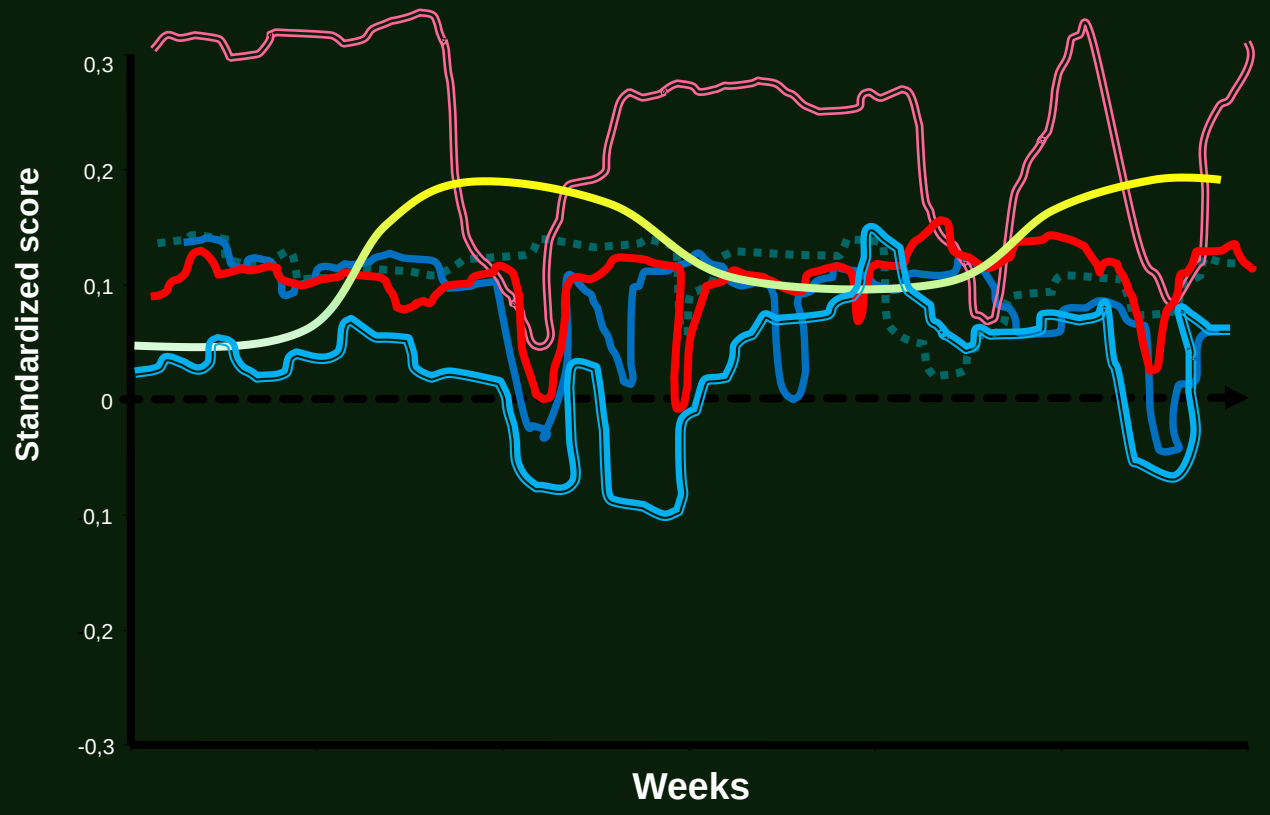


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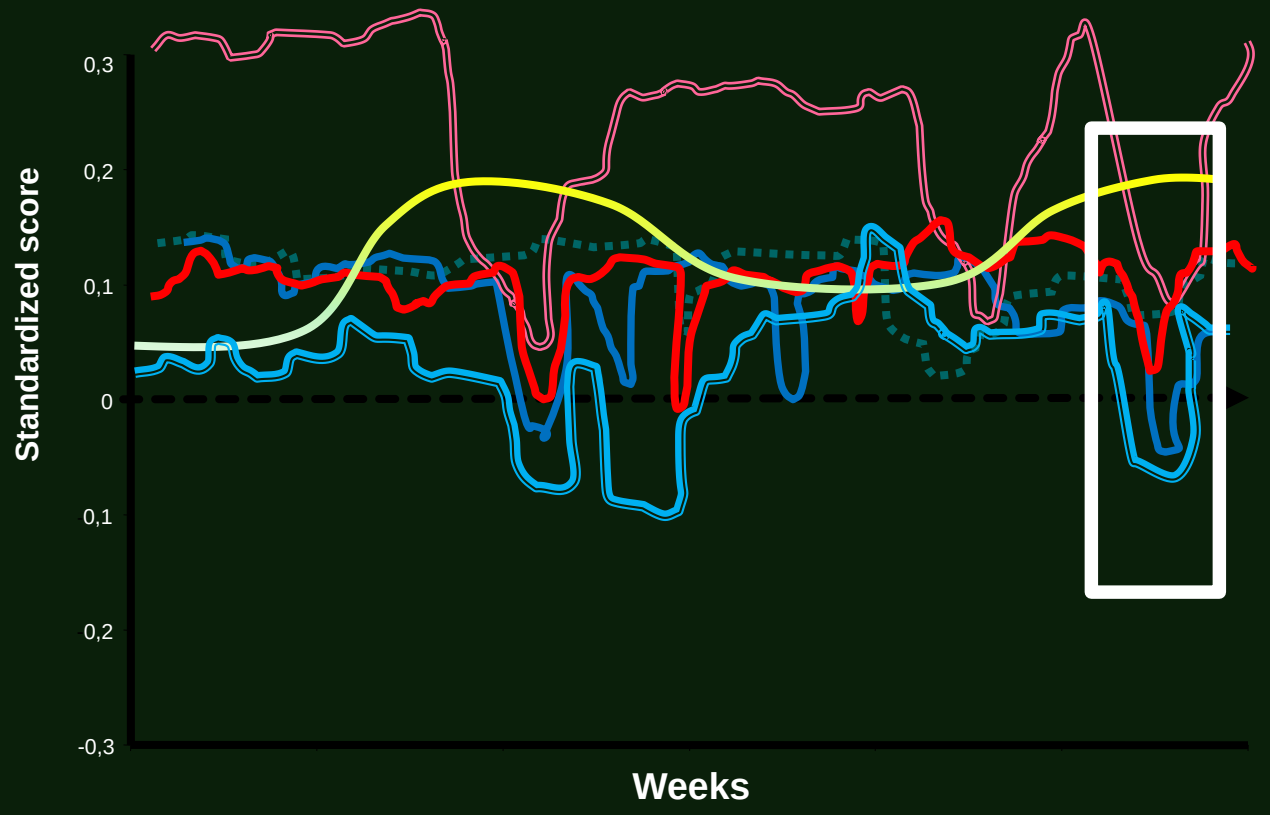


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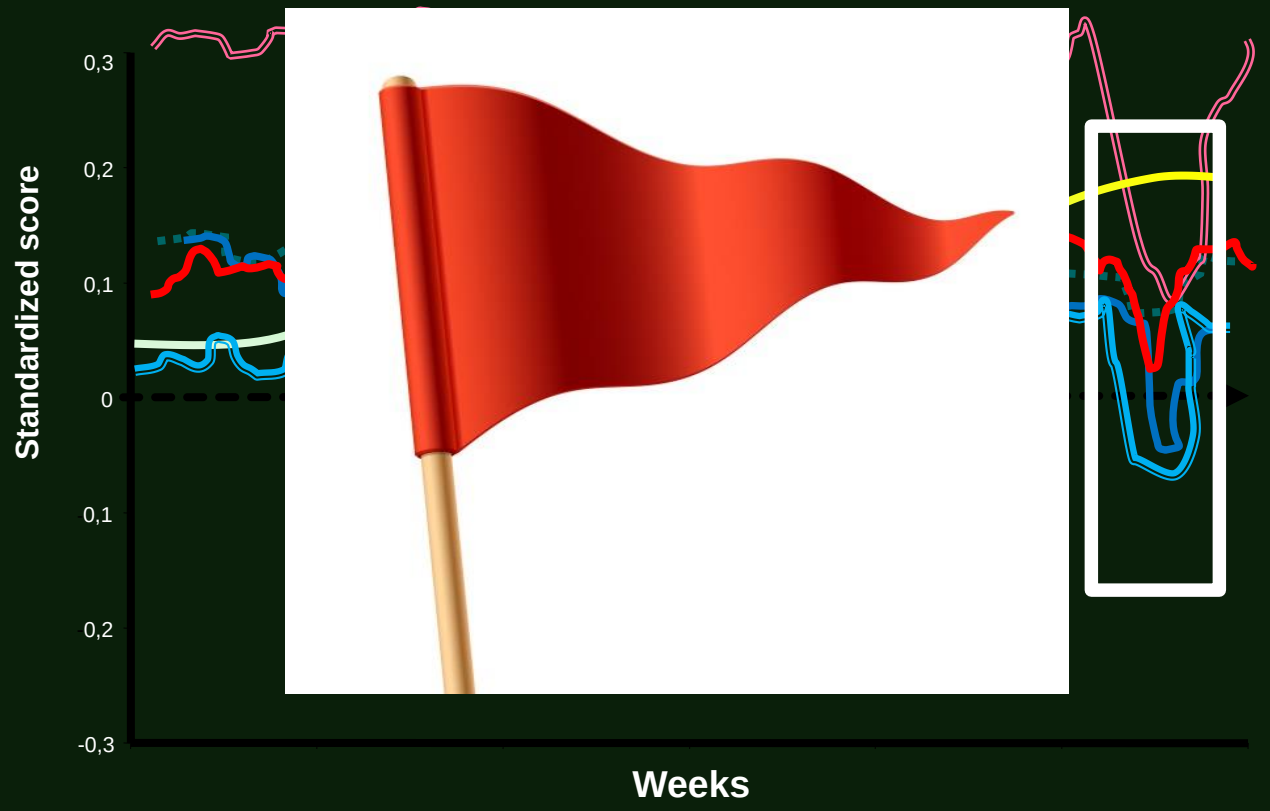


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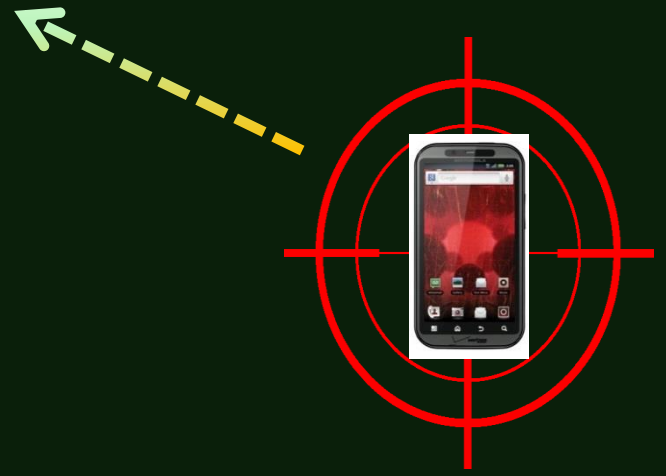

Individual User:
Feedback
Mobile interventions
Prompts to initiate contact

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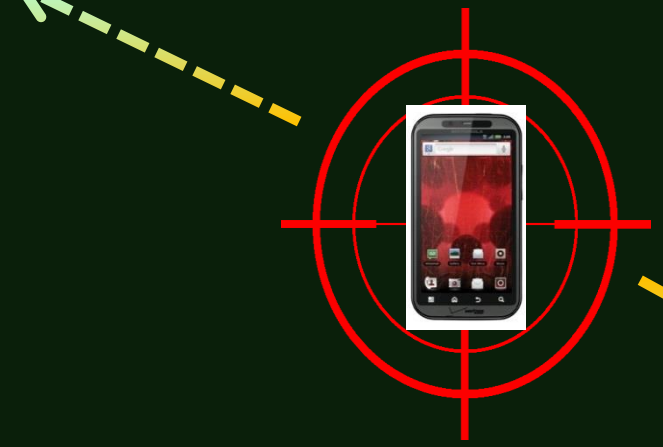
# Remote Monitoring and Notification



Individual User:
Feedback
Mobile interventions
Prompts to initiate contact

Treatment Team:
Outreach
Telehealth/home visit
Medication
Wrap-around care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Schizophrenia Bulletin Open
doi:10.1093/schizbullopen/sgaa060

# Mobile RDoC: Using Smartphones to Understand the Relationship Between Auditory Verbal Hallucinations and Need for Care

Dror Ben-Zeev[*,1], Benjamin Buck[1], Ayesha Chander[1], Rachel Brian[1], Weichen Wang[2], David Atkins[1], Carolyn J. Brenner[1], Trevor Cohen[1,3], Andrew Campbell[2], and Jeffrey Munson[1]

Psychiatric Rehabilitation Journal
2017, Vol. 40, No. 3, 266–275


1095-158X/17/$12.00 http://dx.doi.org/10.1037/prj0000243

# CrossCheck: Integrating Self-Report, Behavioral Sensing, and Smartphone Use to Identify Digital Indicators of Psychotic Relapse

Dror Ben-Zeev, Rachel Brian, Rui Wang, Weichen Wang, and Andrew T. Campbell
Dartmouth College

Min S. H. Aung, Michael Merrill, Vincent W. S. Tseng, and Tanzeem Choudhury
Cornell University

Marta Hauser and John M. Kane
Northwell Health, Great Neck, New York, and Hofstra Northwell School of Medicine

Emily A. Scherer
Dartmouth College

Schizophrenia Research 208 (2019) 167–172

Contents lists available at ScienceDirect

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres

# Relationships between smartphone social behavior and relapse in schizophrenia: A preliminary report

Benjamin Buck[a,b,c,*], Emily Scherer[d], Rachel Brian[c], Rui Wang[e], Weichen Wang[e], Andrew Campbell[e], Tanzeem Choudhury[f], Marta Hauser[g,h], John M. Kane[g,h], Dror Ben-Zeev[c]

JMIR MHEALTH AND UHEALTH Adler et al

Original Paper

# Predicting Early Warning Signs of Psychotic Relapse From Passive Sensing Data: An Approach Using Encoder-Decoder Neural Networks

Daniel A Adler[1], BSc; Dror Ben-Zeev[2], BA, MSc, PhD; Vincent W-S Tseng[1], BSc; John M Kane[3], MD, BA; Rachel Brian[2], MPH; Andrew T Campbell[4], BSc, MSc, PhD; Marta Hauser[5], PhD; Emily A Scherer[6], PhD; Tanzeem Choudhury[1], BSc, MSc, PhD

# Schizophrenia Relapse Prediction Using Mobile Sensing

Bishal Lamichhane[1], Dror Ben-Zeev[2], Andrew Campbell[3], Tanzeem Choudhury[4], Martar Hauser[5], John Kane[5], Mikio Obuchi[3], Emily Scherer[3], Megan Walsh[5], Rui Wang[3], Weichen Wang[3], and Akane Sano[1]

# Assessing the relationship between routine and schizophrenia symptoms with passively sensed measures of behavioral stability

Joy He-Yueya*[1], Benjamin Buck[2], Andrew Campbell[3], Tanzeem Choudhury[4], John M Kane[5], Dror Ben-Zeev[2], and Tim Althoff[1]

# Predicting Symptom Trajectories of Schizophrenia using Mobile Sensing

RUI WANG, Dartmouth College
WEICHEN WANG, Dartmouth College
MIN S. H. AUNG, Cornell University
DROR BEN-ZEEV, University of Washington
RACHEL BRIAN, Dartmouth College
ANDREW T. CAMPBELL, Dartmouth College
TANZEEM CHOUDHURY, Cornell University
MARTA HAUSER, Hofstra Northwell School of Medicine
JOHN KANE, Hofstra Northwell School of Medicine

# The Centroid Cannot Hold: Comparing Sequential and Global Estimates of Coherence as Indicators of Formal Thought Disorder

Weizhe Xu, BS[1], Jake Portanova, BA, BS[1], Ayesha Chander, MRes[2], Dror Ben-Zeev, PhD[2], Trevor Cohen, MBChB, PhD[1]

# Helpful Reviews: Sensing, Natural Language Processing


Mohr, D. C., Zhang, M., & Schueller, S. M. (2017). Personal sensing: understanding mental health using ubiquitous sensors and machine learning. *Annual Review of Clinical Psychology*, 13, 23-47.

Le Glaz, A., Haralambous, Y., Kim-Dufor, D. H., et al. (2021). Machine learning and natural language processing in mental health: Systematic review. *Journal of Medical Internet Research*, 23(5), e15708.

Seppälä, J., De Vita, I., Jämsä, T., et al. (2019). Mobile phone and wearable sensor-based mHealth approaches for psychiatric disorders and symptoms: systematic review. *JMIR Mental Health*, 6(2), e9819.

# Automated Interventions:

# FOCUS
# A Smartphone App for People with Serious Mental Illness


BRiTE CENTER

pcori

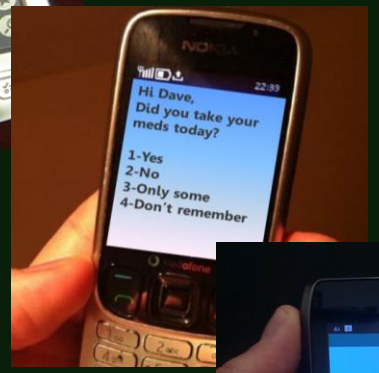
NIH National Institute of Mental Health

CMS CENTERS FOR MEDICARE & MEDICAID SERVICES CENTER FOR MEDICARE & MEDICAID INNOVATION

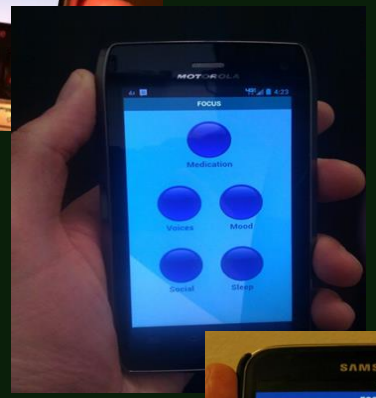
VA U.S. Department of Veterans Affairs

# User-Centered Development Process

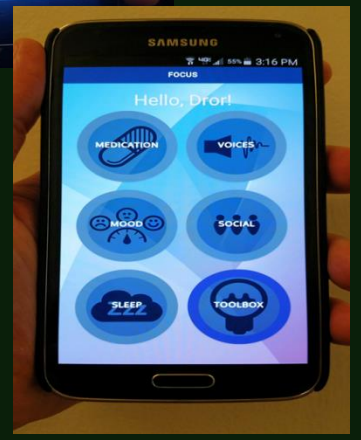
**Stage 1: Needs Assessment**
- Client survey (n=904)
- Practitioner interviews (n=18)
- CMHC leaders




**Stage 2: Intervention Development**
- Assemble multidisciplinary team
- Technology selection
- Content development
- Programming




**Stage 3: Usability testing**
- Usability cycle 1
- Intervention adaptation
- Usability cycle 2
- Intervention refinement…

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# FOCUS: Intervention Description

- 3 Daily prompts
- "On-demand" resources
- Native app
- 5 targets: voices, social, meds, sleep, mood


BRiTE CENTER

Ben-Zeev, Kaiser, Brenner, Begale, Duffecy, & Mohr (2013). *Psychiatric Rehabilitation Journal*.

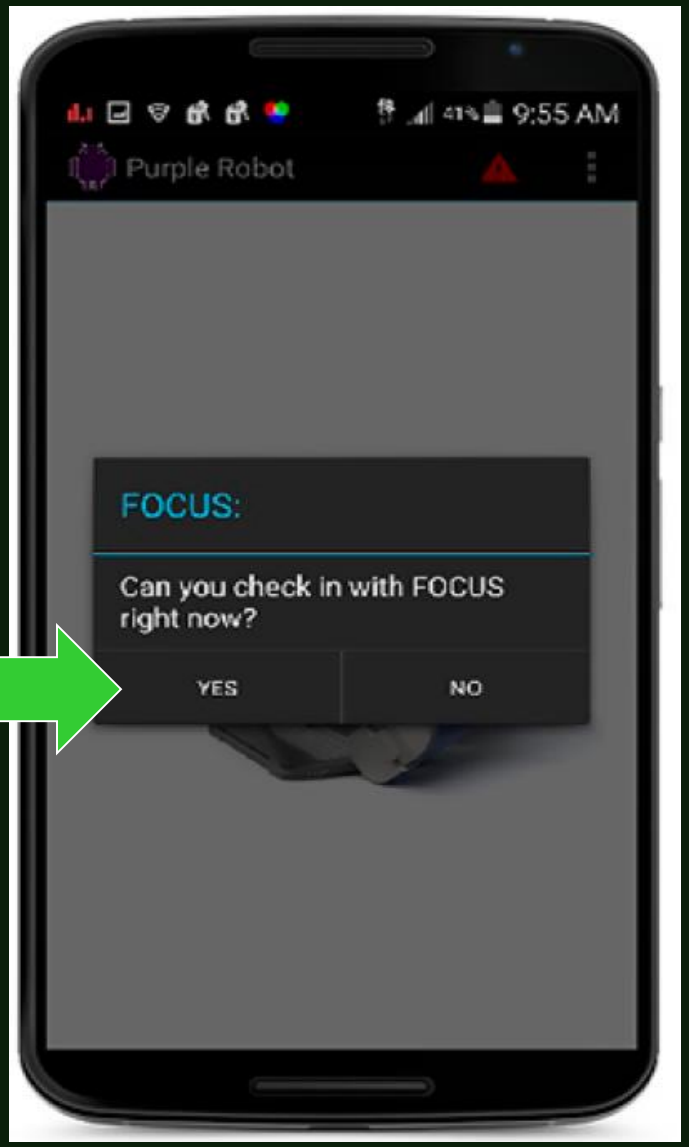
# FOCUS: Prompt

- System prompt:

  3 times daily

- Patient launched:

  On demand 24/7

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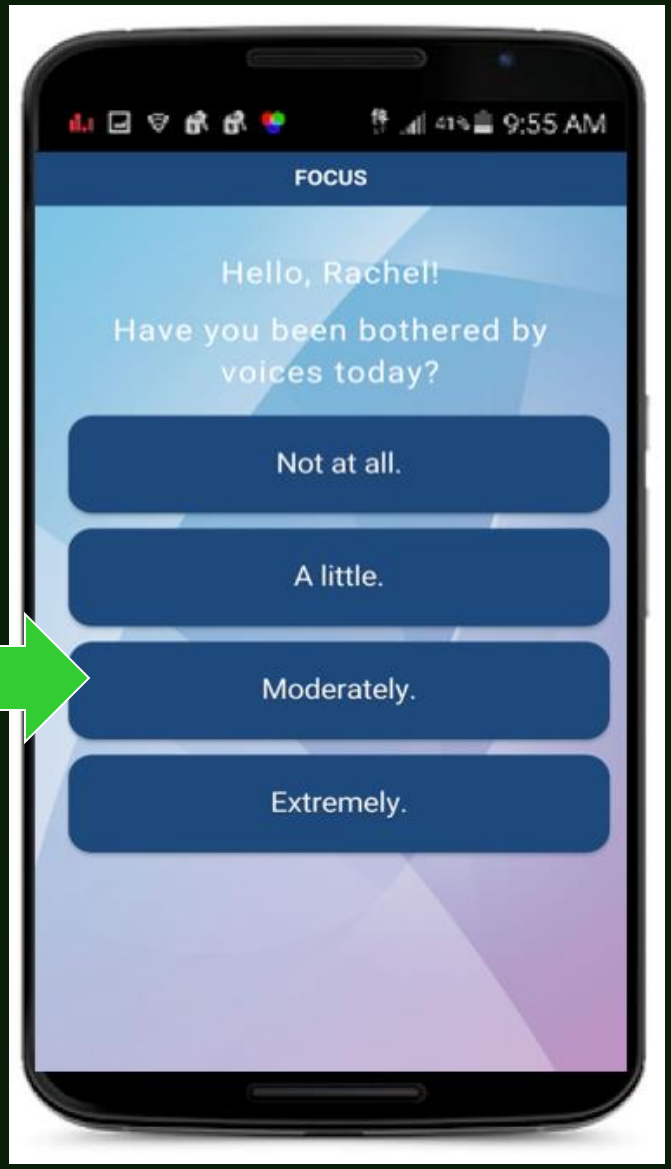
# FOCUS: Clinical Status Assessment

- 6th Grade reading level
- Simple geometry
- Low working memory load
- Intuitive

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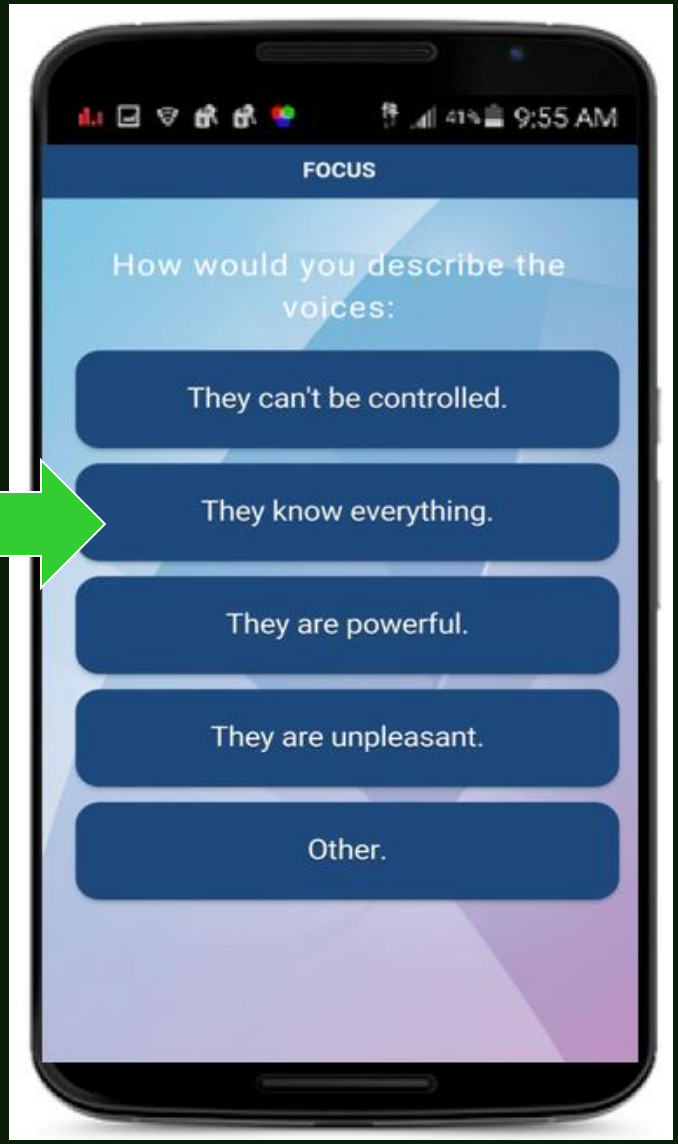
# FOCUS: Cognitive Assessment

- Multiple wording variations
- Common dysfunctional beliefs

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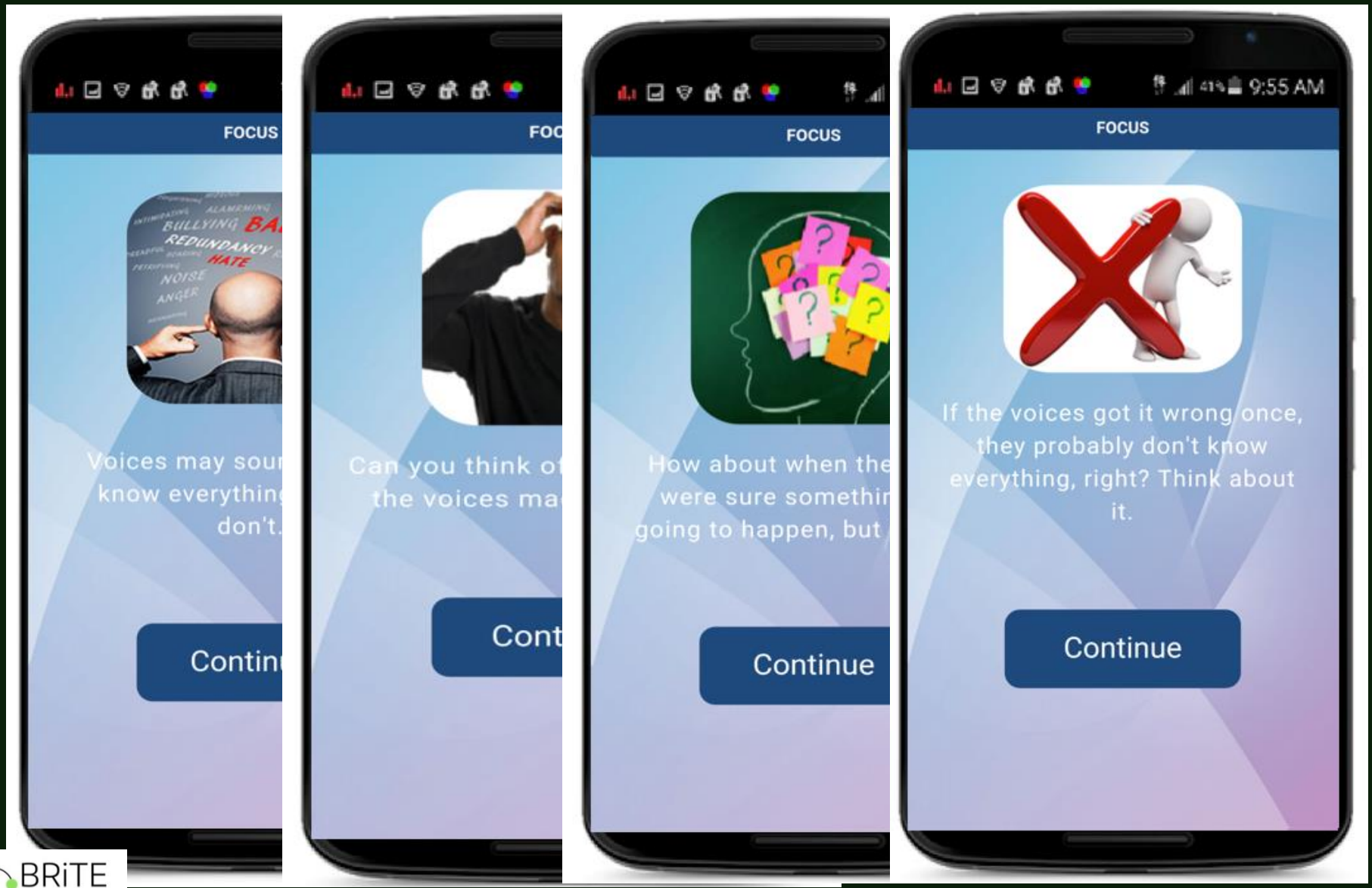
# FOCUS: Intervention

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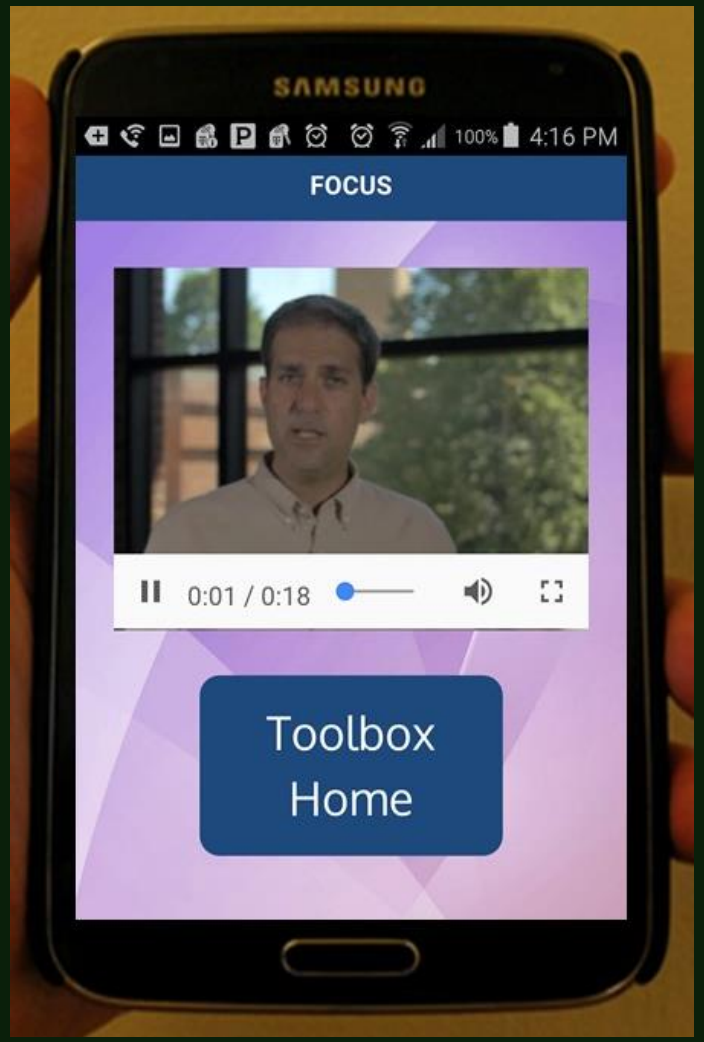
# Bringing the “Pocket Therapist” to Life: FOCUS AV




Ben-Zeev, Brian, Aschbrenner, Jonathan, & Steingard. (2016). *Psychiatric Rehabilitation Journal*.

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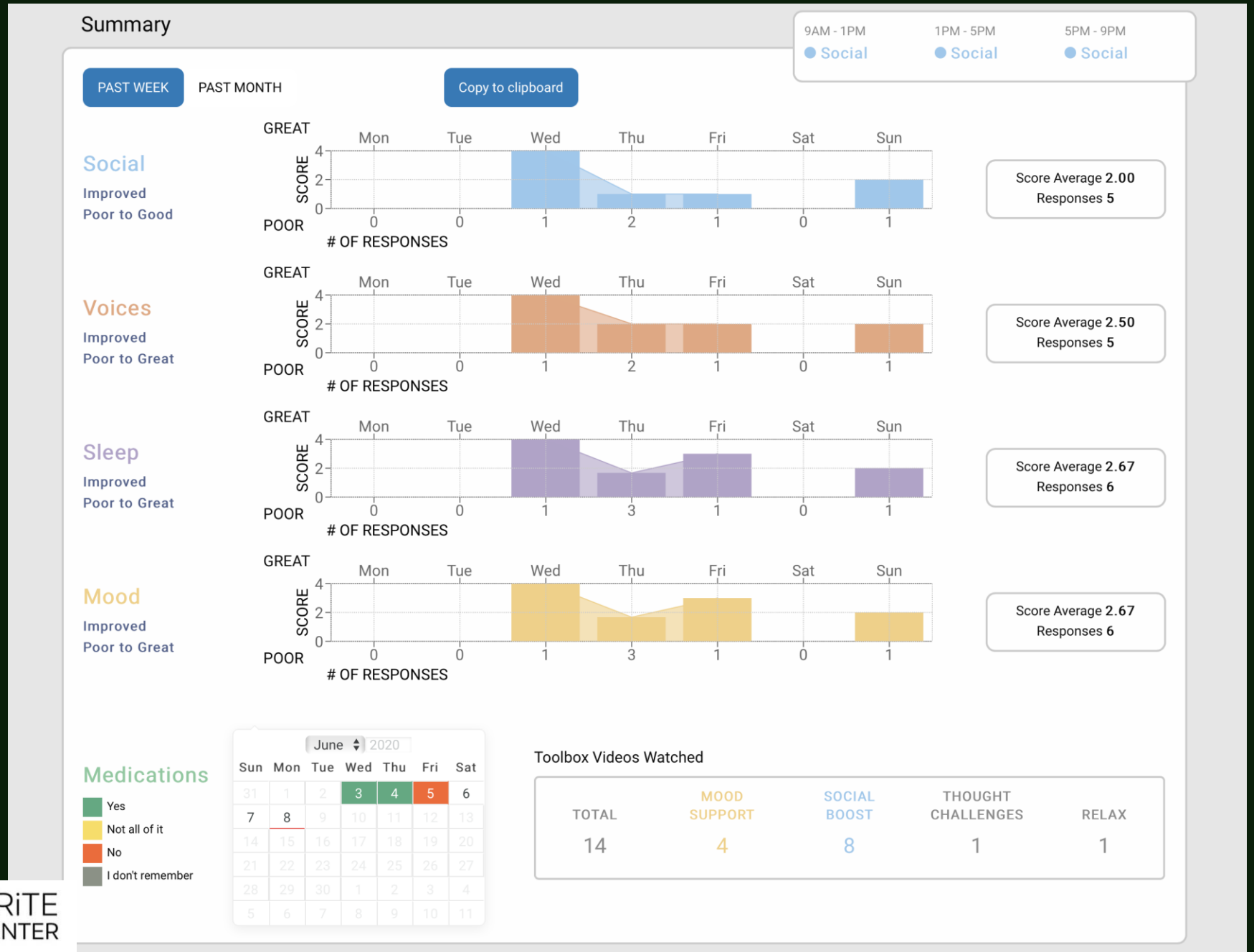
BRiTE CENTER

# 24/7 Web-Based Provider Dashboard

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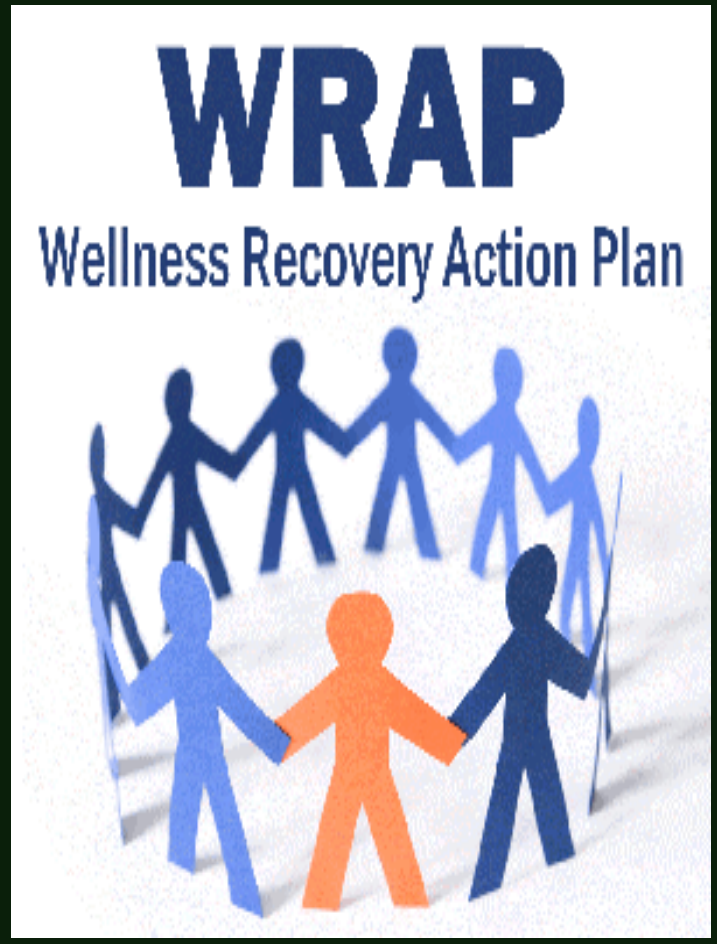
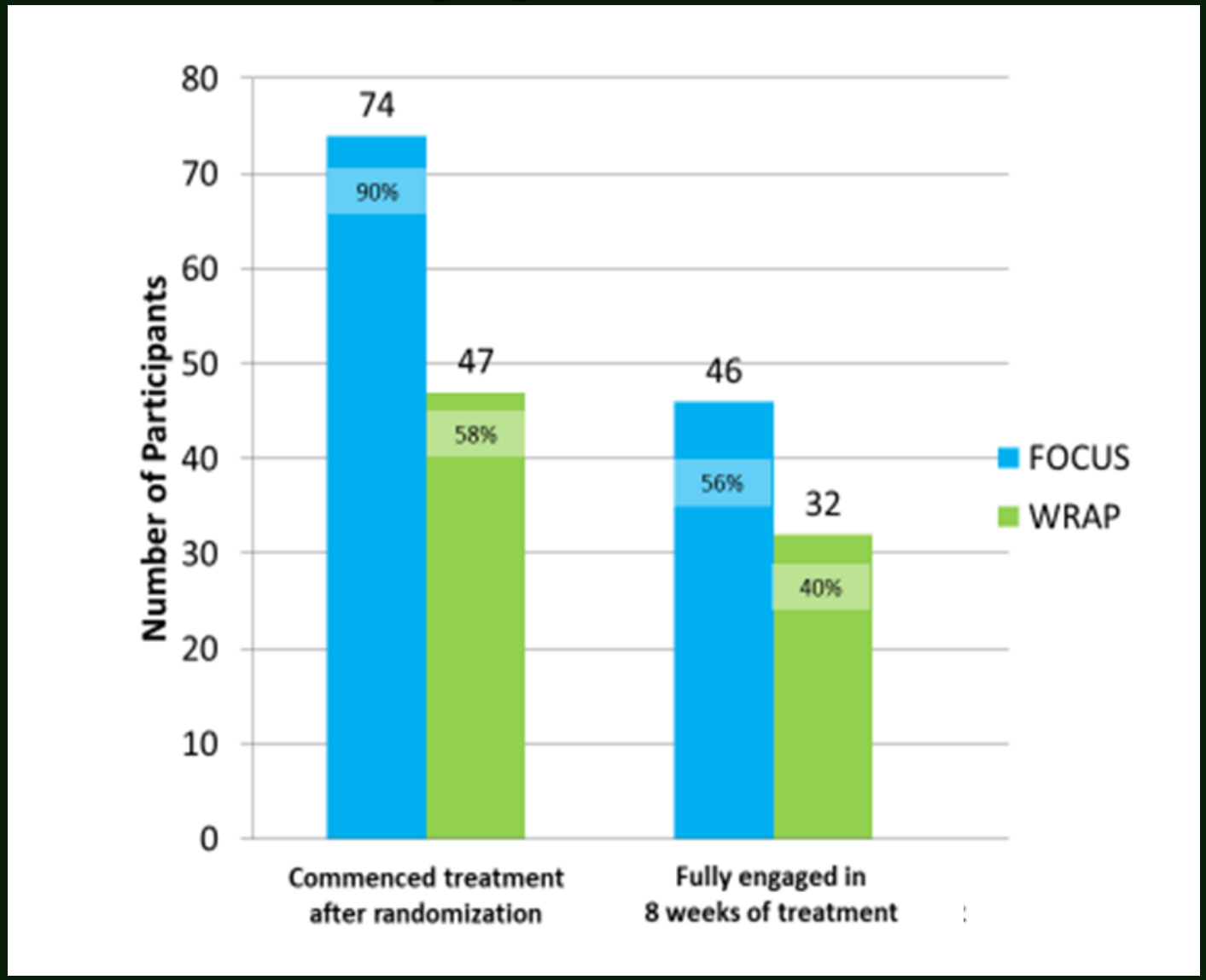
# FOCUS: Comparative Effectiveness Trial (12 Week RCT)


No Difference in Clinical Outcomes or Satisfaction Ratings Between Conditions

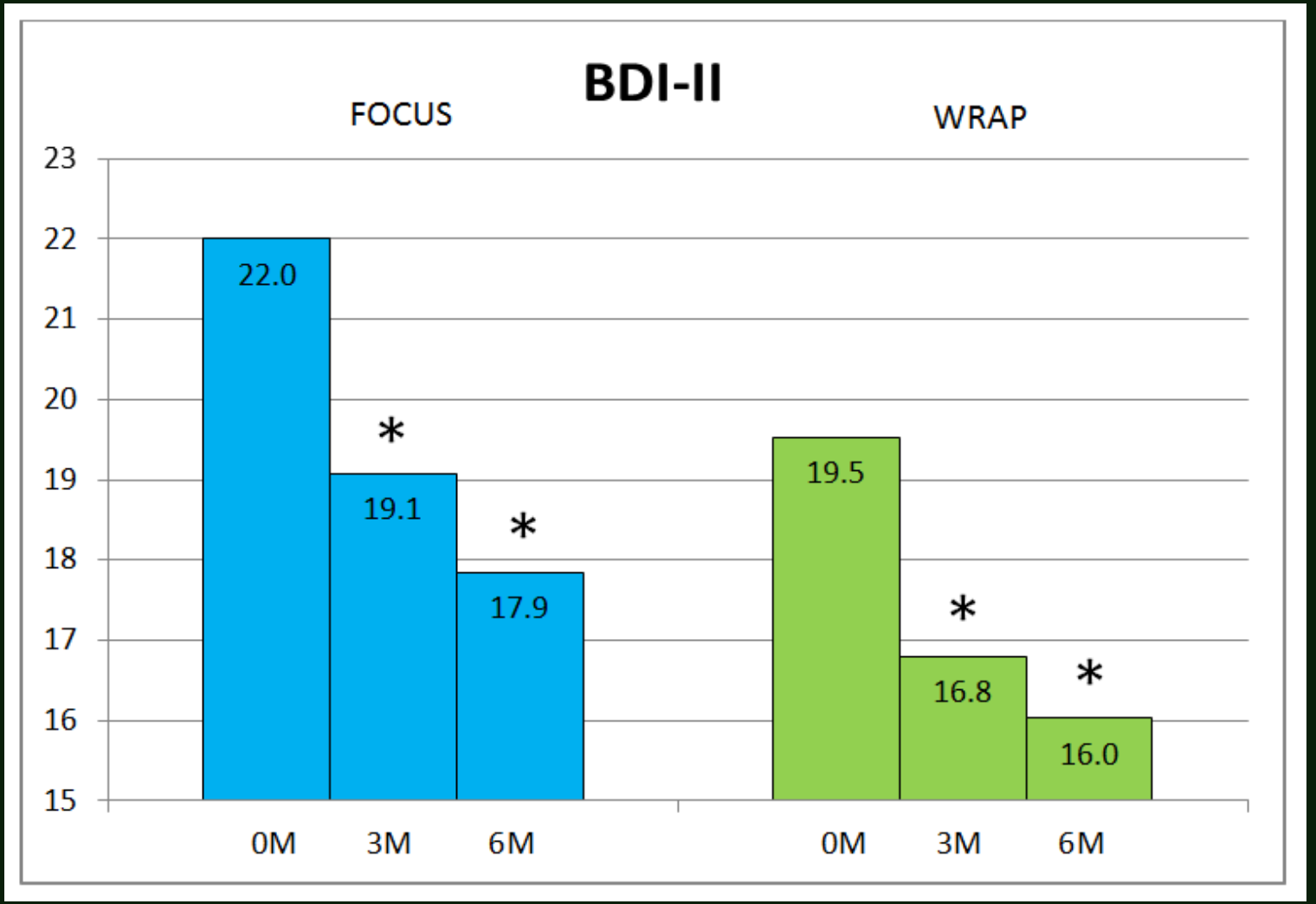
# FOCUS: Engagement Over Time




Ben-Zeev et al. (2018) *Psychiatric Services.*

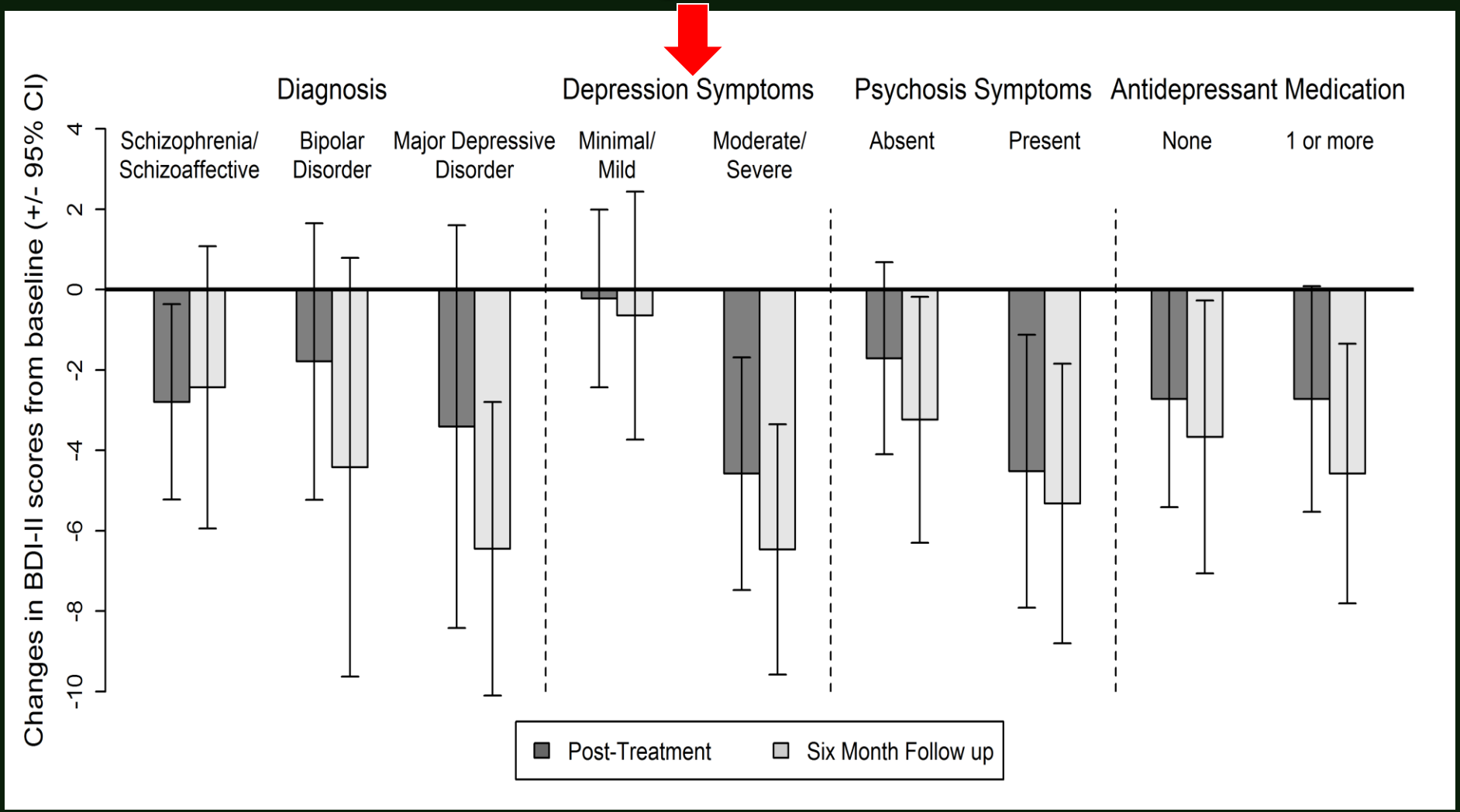
BRiTE CENTER

# FOCUS: Depression (12 Week RCT)




Ben-Zeev et al. (2018) *Psychiatric Services.*

# FOCUS: Depression Transdiagnostic Effects

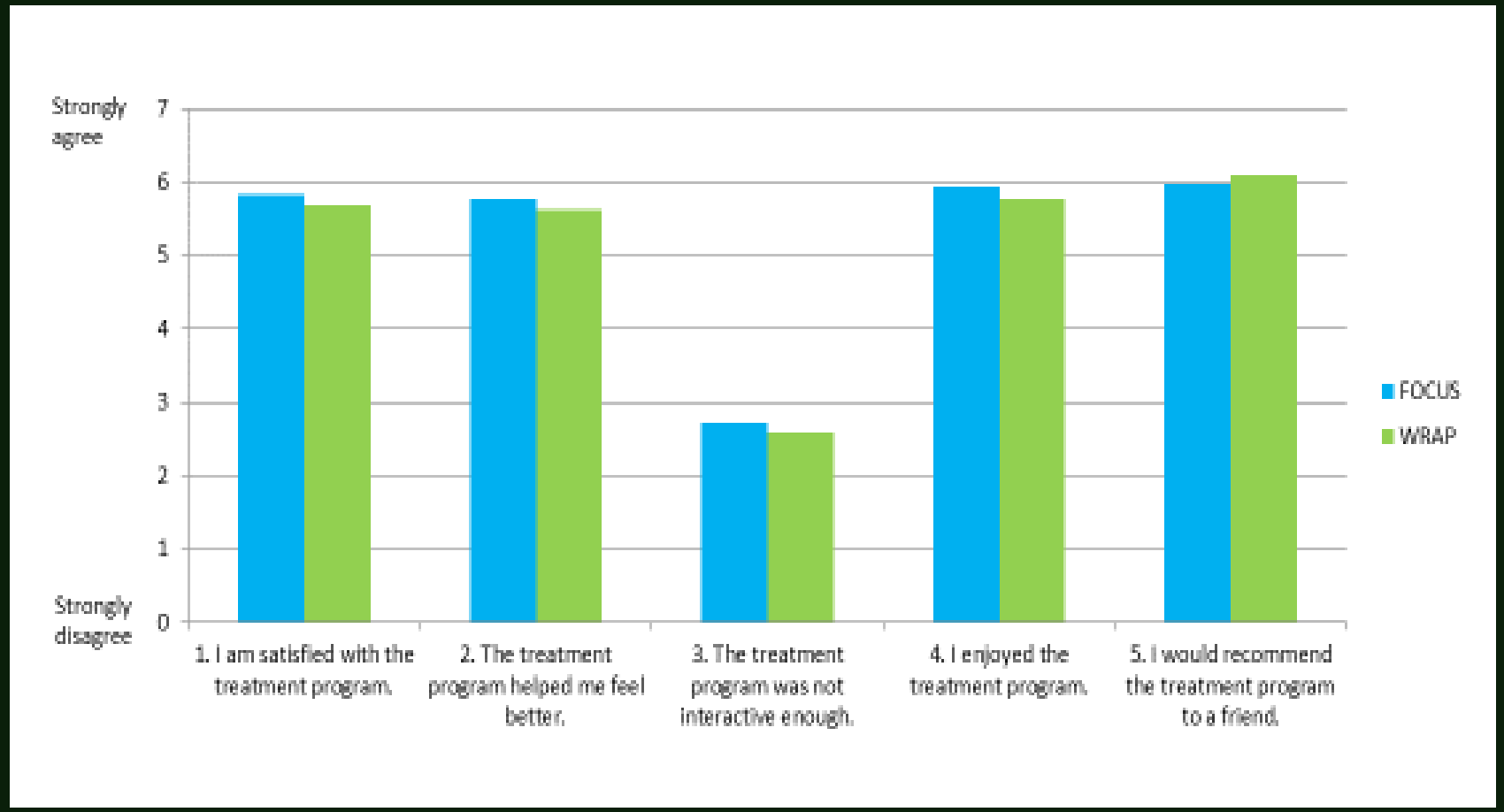



Ben-Zeev et al. (2019) *JMIR Mental Health.*

# FOCUS: Recovery (12 Week RCT)


Ben-Zeev et al. (2018) *Psychiatric Services.*

# FOCUS: Treatment Satisfaction (12 Week RCT)




BRiTE CENTER

Ben-Zeev et al. (2018) *Psychiatric Services.*

# FOCUS costs HALF of Group Intervention

## Cost of mHealth Versus Clinic-Based Care for Serious Mental Illness: Same Effects, Half the Price Tag

Dror Ben-Zeev, Ph.D., Lisa A. Razzano, Ph.D., Nicole J. Pashka, M.S., L.C.P.C., Carol E. Levin, Ph.D.

**Objective:** This study compared the costs of implementing a smartphone-delivered mobile health (mHealth) intervention (called FOCUS) with the costs of implementing a clinic-based group intervention (Wellness Recovery Action Planning [WRAP]) for serious mental illness. Treatments were delivered in parallel in a randomized controlled trial and produced comparable clinical outcomes.

**Methods:** Retrospective cost data were collected by using mixed-methods, top-down expenditure analysis with microcosting procedures. Costs were organized by input categories, including personnel, supplies, equipment, overhead, and indirect costs. All estimates are reported in US$.

**Results:** The average annual cost to providers was $78,212 for WRAP and $40,439 for FOCUS. In both groups, labor accounted for the largest cost, followed by indirect costs and overhead costs. When indirect costs were excluded, WRAP cost $520 per client per month, compared with $256 for FOCUS.

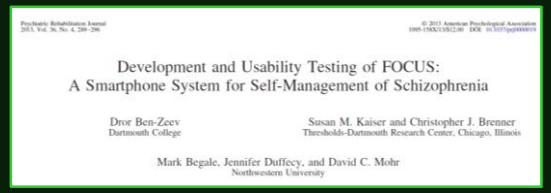
**Conclusions:** mHealth produced the same patient outcomes as clinic-based group treatment at approximately half the cost.

*Psychiatric Services in Advance* (doi: 10.1176/appi.ps.202000349)

- $256 vs $520 per client, per month

Ben-Zeev et al. (2021). *Psychiatric Services*.

# FOCUS: Peer-Reviewed Evidence Base

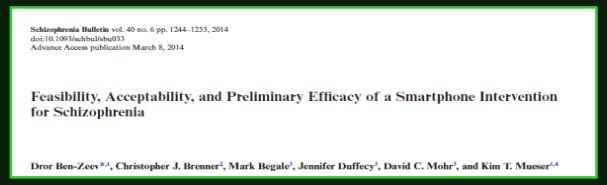


Development and Usability Testing of FOCUS: A Smartphone System for Self-Management of Schizophrenia

Dror Ben-Zeev, Dartmouth College

Susan M. Kaiser and Christopher J. Brenner, Thresholds-Dartmouth Research Center, Chicago, Illinois

Mark Begale, Jennifer Duffecy, and David C. Mohr, Northwestern University



Schizophrenia Bulletin vol. 40 no. 6 pp. 1244–1253, 2014
doi:10.1093/schbul/sbu033
Advance Access publication March 8, 2014

Feasibility, Acceptability, and Preliminary Efficacy of a Smartphone Intervention for Schizophrenia

Dror Ben-Zeev[*,1], Christopher J. Brenner[2], Mark Begale[3], Jennifer Duffecy[2], David C. Mohr[3], and Kim T. Mueser[1,4]

JMIR MENTAL HEALTH — Ben-Zeev et al

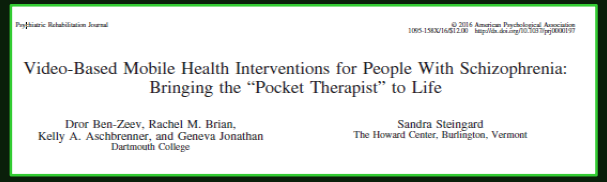
Original Paper

mHealth for Schizophrenia: Patient Engagement With a Mobile Phone Intervention Following Hospital Discharge

Dror Ben-Zeev[1], PhD; Emily A Scherer[1], PhD; Jennifer D Gottlieb[2], PhD; Armando J Rotondi[3,4], PhD; Mary F Brunette[5], MD; Eric D Achtyes[6], MD; Kim T Mueser[7], PhD; Susan Gingerich[7], MSW; Christopher J Brenner[8], MPH; Mark Begale[8]; David C Mohr[8], PhD; Nina Schooler[9,10], PhD; Patricia Marcy[10]; Delbert G Robinson[10,11], MD; John M Kane[10,11], MD

Health Technology Intervention After Hospitalization for Schizophrenia: Service Utilization and User Satisfaction

Amit Baumel, Ph.D., Christoph U. Correll, M.D., Marta Hauser, Ph.D., Mary Brunette, M.D., Armando Rotondi, Ph.D., Dror Ben-Zeev, Ph.D., Jennifer D. Gottlieb, Ph.D., Kim T. Mueser, Ph.D., Eric D. Achtyes, M.D., Nina R. Schooler, Ph.D., Delbert G. Robinson, M.D., Susan Gingerich, M.S.W., Patricia Marcy, B.S.N., Piper Meyer-Kalos, Ph.D., John M. Kane, M.D.

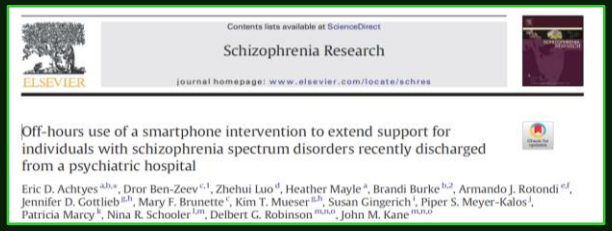


Psychiatric Rehabilitation Journal

Video-Based Mobile Health Interventions for People With Schizophrenia: Bringing the "Pocket Therapist" to Life

Dror Ben-Zeev, Rachel M. Brian, Kelly A. Aschbrenner, and Geneva Jonathan, Dartmouth College

Sandra Steingard, The Howard Center, Burlington, Vermont



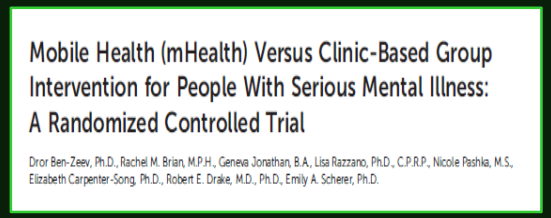
Contents lists available at ScienceDirect

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres

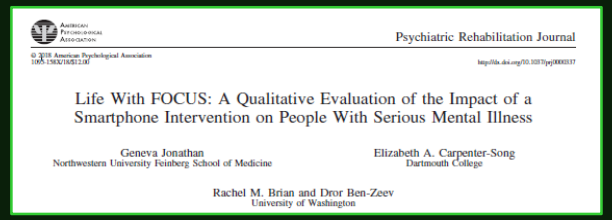
Off-hours use of a smartphone intervention to extend support for individuals with schizophrenia spectrum disorders recently discharged from a psychiatric hospital

Eric D. Achtyes[a,b,*], Dror Ben-Zeev[c,1], Zhehui Luo[d], Heather Mayle[a], Brandi Burke[b,2], Armando J. Rotondi[e,f], Jennifer D. Gottlieb[g,h], Mary F. Brunette[i], Kim T. Mueser[g,h], Susan Gingerich[1], Piper S. Meyer-Kalos[1], Patricia Marcy[k], Nina R. Schooler[l,m], Delbert G. Robinson[m,n,o], John M. Kane[m,n,o]



Mobile Health (mHealth) Versus Clinic-Based Group Intervention for People With Serious Mental Illness: A Randomized Controlled Trial

Dror Ben-Zeev, Ph.D., Rachel M. Brian, M.P.H., Geneva Jonathan, B.A., Lisa Razzano, Ph.D., C.P.R.P., Nicole Pashka, M.S., Elizabeth Carpenter-Song, Ph.D., Robert E. Drake, M.D., Ph.D., Emily A. Scherer, Ph.D.



American Psychological Association

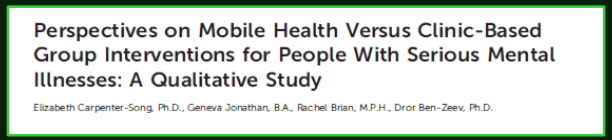
Psychiatric Rehabilitation Journal

Life With FOCUS: A Qualitative Evaluation of the Impact of a Smartphone Intervention on People With Serious Mental Illness

Geneva Jonathan, Northwestern University Feinberg School of Medicine

Elizabeth A. Carpenter-Song, Dartmouth College

Rachel M. Brian and Dror Ben-Zeev, University of Washington



Perspectives on Mobile Health Versus Clinic-Based Group Interventions for People With Serious Mental Illnesses: A Qualitative Study

Elizabeth Carpenter-Song, Ph.D., Geneva Jonathan, B.A., Rachel Brian, M.P.H., Dror Ben-Zeev, Ph.D.

Effect of Mobile Health on In-person Service Use Among People With Serious Mental Illness

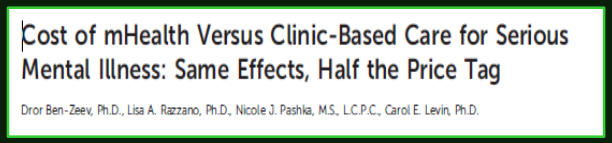
Dror Ben-Zeev, Ph.D., Benjamin Buck, Ph.D., Kevin Hallgren, Ph.D., Robert E. Drake, M.D., Ph.D.

JMIR MENTAL HEALTH — Ben-Zeev et al

Original Paper

Transdiagnostic Mobile Health: Smartphone Intervention Reduces Depressive Symptoms in People With Mood and Psychotic Disorders

Dror Ben-Zeev[1], PhD; Benjamin Buck[1,2,3], PhD; Phuonguyen Vu Chu[1], BA; Lisa Razzano[4,5], CPRP, PhD; Nicole Pashka[5], MS, CRC, CPRP, LCPC; Kevin A Hallgren[1], PhD



Cost of mHealth Versus Clinic-Based Care for Serious Mental Illness: Same Effects, Half the Price Tag

Dror Ben-Zeev, Ph.D., Lisa A. Razzano, Ph.D., Nicole J. Pashka, M.S., L.C.P.C., Carol E. Levin, Ph.D.

# Statewide Implementation


UNIVERSITY of WASHINGTON
PSYCHIATRY & BEHAVIORAL SCIENCES

NIH
National Institute of Mental Health

Washington State Health Care Authority

# Helpful Reviews: Intervention Apps

Torous, J., Bucci, S., Bell, I. H., et al. (2021). The growing field of digital psychiatry: current evidence and the future of apps, social media, chatbots, and virtual reality. *World Psychiatry*, 20(3), 318-335.

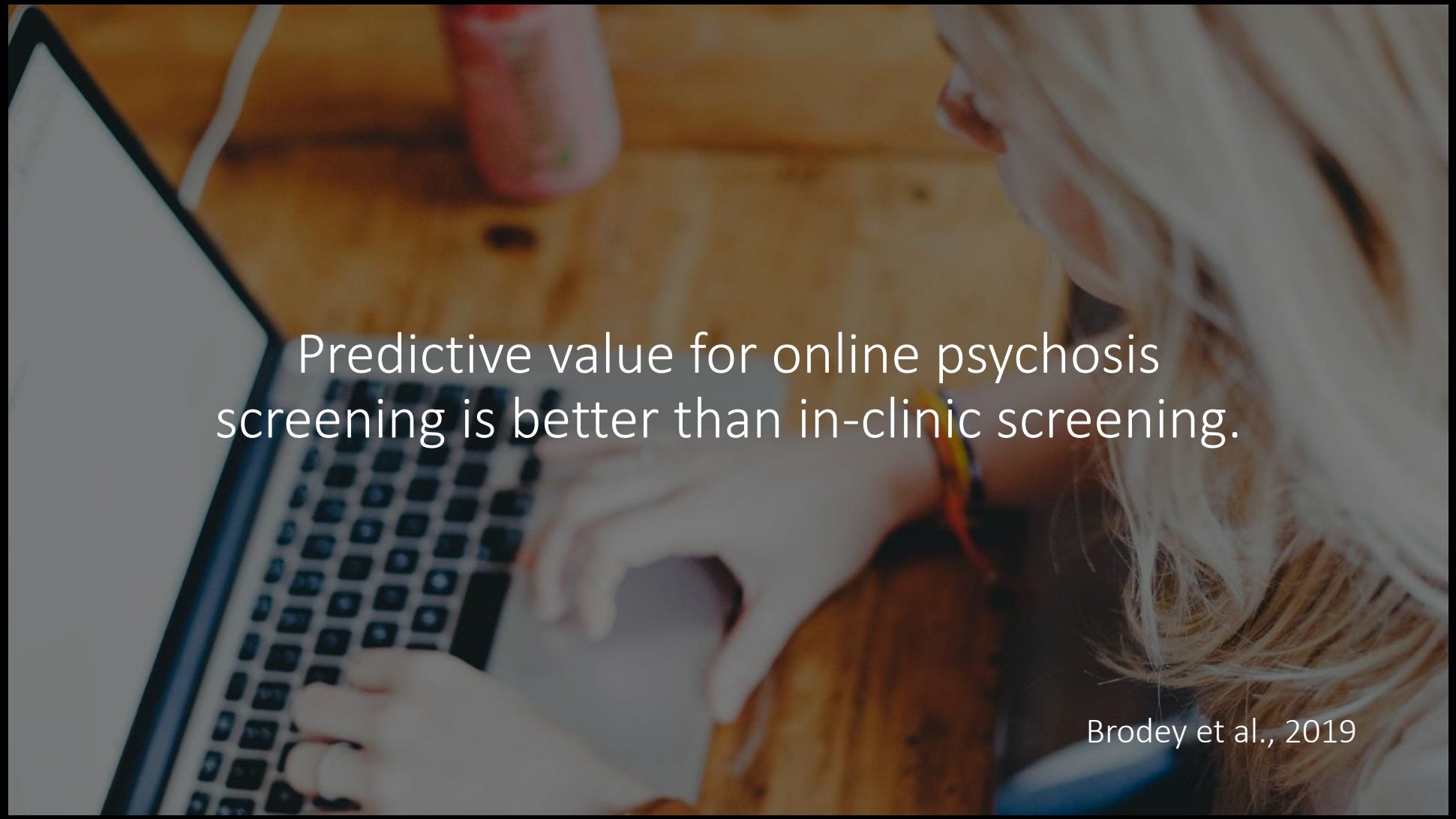
Chivilgina, O., Wangmo, T., Elger, et al. (2020). mHealth for schizophrenia spectrum disorders management: A systematic review. *International Journal of Social Psychiatry*, 66(7), 642-665.

Linardon, J., Cuijpers, P., Carlbring, P., Messer, M., & Fuller-Tyszkiewicz, M. (2019). The efficacy of app-supported smartphone interventions for mental health problems: A meta-analysis of randomized controlled trials. *World Psychiatry*, 18(3), 325-336.

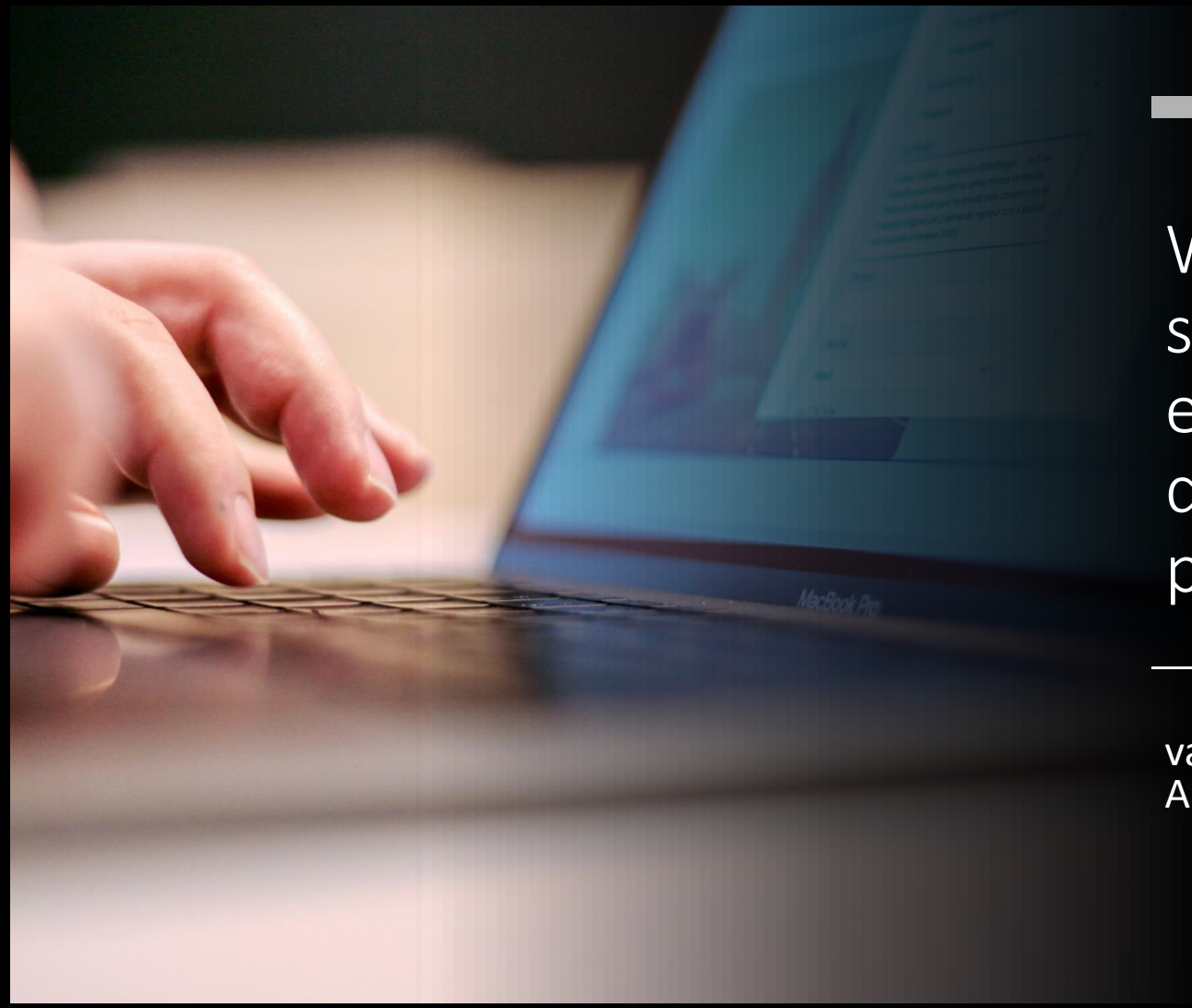
# Technology-Assisted Life of Recovery

# Annie:
# A day in the life


1 in 3 Americans seek mental health information online.
Fox & Duggan, 2013


Predictive value for online psychosis screening is better than in-clinic screening.
Brodey et al., 2019


Natural Language Processing (NLP) helps predict psychotic risk.
Bedi et al 2015; Rezaii, Walker & Wolf 2019

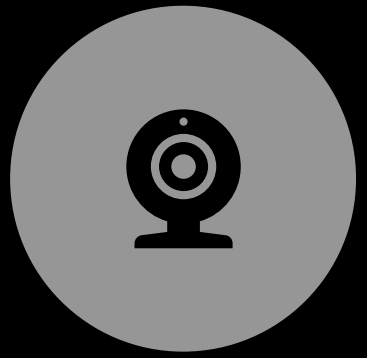


# Web-based support tool enhances shared decision-making practices

van Der Krieke, Emerencia, Aiello & Sytema, 2012

RECEIVE PERSONALIZED DIGITAL HEATH DASHBOARD

ORIENTATION OF HEALTH TOOLS



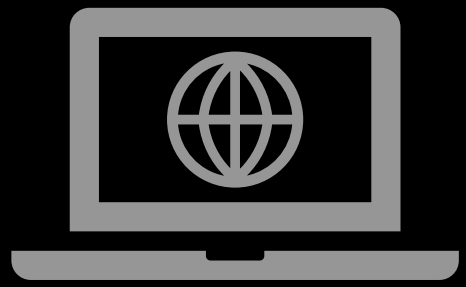
PRIMARY TELEHEALTH APPOINTMENT


# Text message medication reminders are feasible and usable.

Firth et al, 2015; Kannisto, Adams, Kolvunen, Katajisto & Valimaki, 2015; Montes, Medina, Gomez-Beneyto & Maurino, 2012

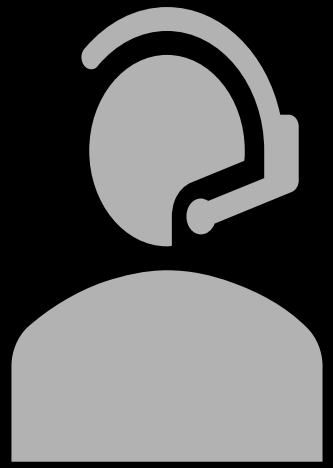
**Community-based case managers use texting to effectively support daily activities**

Ben-Zeev, Kaiser & Krzos, 2014



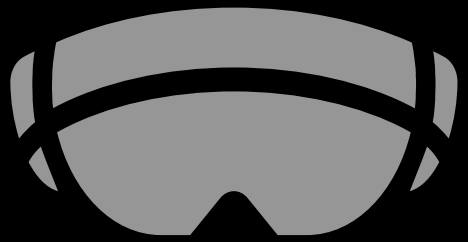
**Computer-based cognitive remediation training improves ability to focus**

McGurk, Twamley, Sitzer, McHugo & Mueser, 2007; Wykes, Huddy, Cellard, McGurk & Czobor 2011



**App-connected supported employment specialist provides on-the-job guidance**

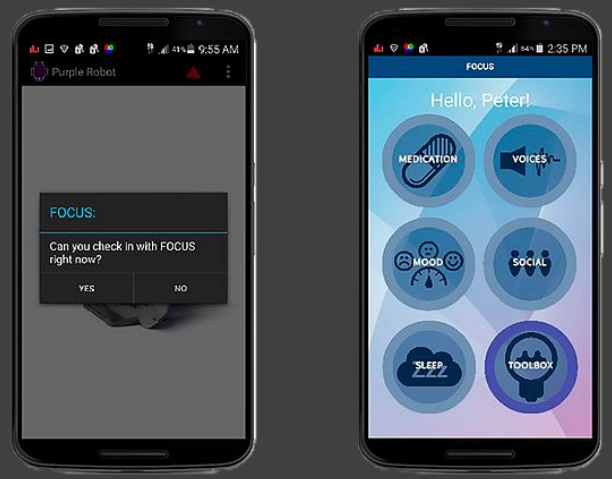
Nicholson, Wright, Charlisle, Sweeney & McHugo, 2018



**VR job interview trainings improve job attainment in randomized control trials**

Smith et al, 2015

# FOCUS mHealth Intervention




Usable

Feasible

Engaging

Clinically Effective

Ben-Zeev et al, 2013; 2014; 2018; 2019; 2020

Web-based family and client online psychoeducation

Feasible & Acceptable

Glynn, Randolph, Garrick & Lui, 2010

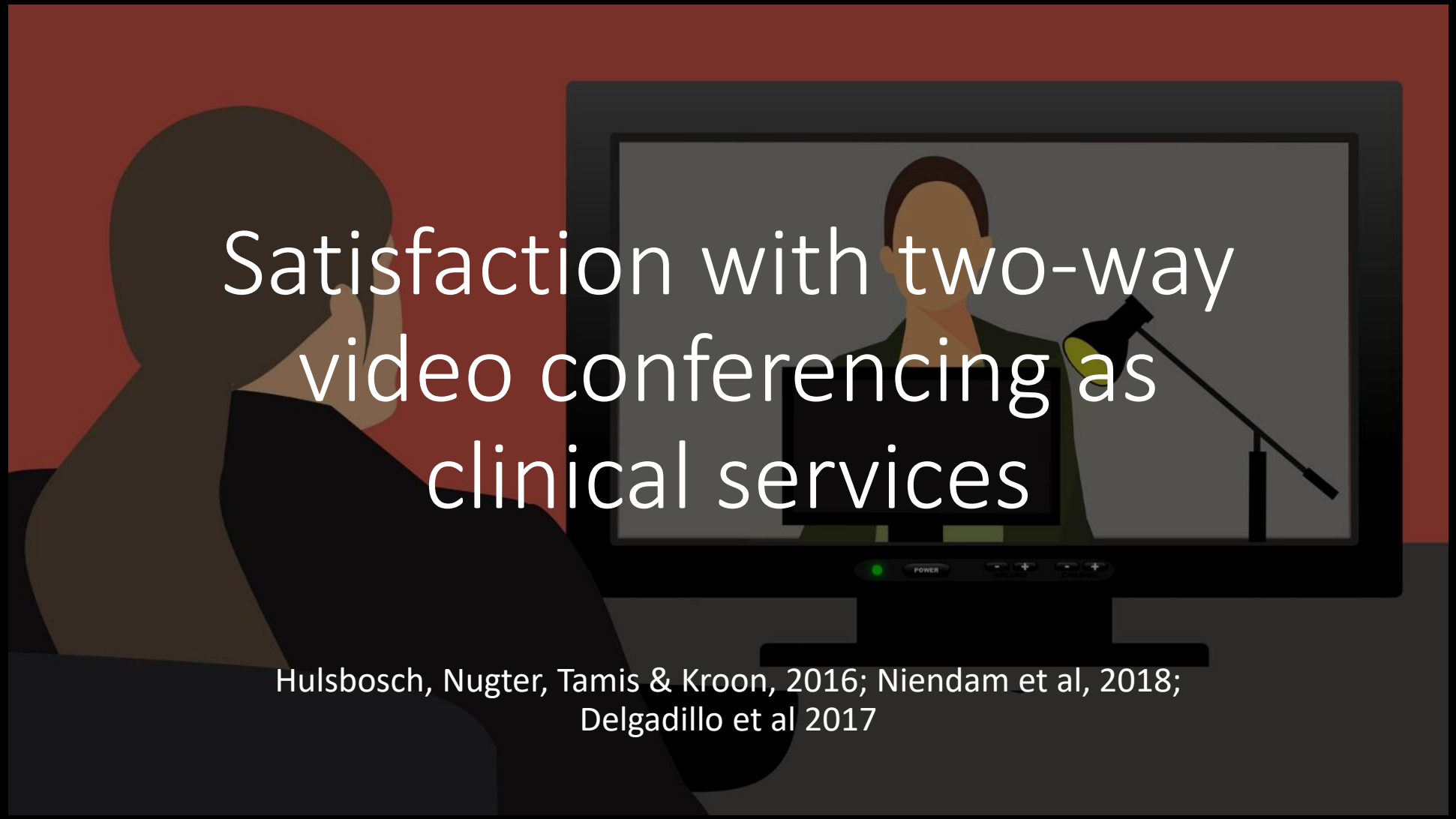
Improves symptom management and knowledge about schizophrenia

Rotondi et al, 2010

# Virtual Reality (VR) Cognitive Therapy

## Reduction in paranoid belief conviction and distress

Freeman, 2008; Freeman et al., 2016



# Satisfaction with two-way video conferencing as clinical services

Hulsbosch, Nugter, Tamis & Kroon, 2016; Niendam et al, 2018; Delgadillo et al 2017

# Voices Avatars

Computerized treatment designed to engage in dialogue with representations of hallucinations

Leff, Williams Huckvale, Arbuthnot & Leff, 2013; Criag et al, 2018; du Sert et al, 2018

# Substance Use Recovery Support

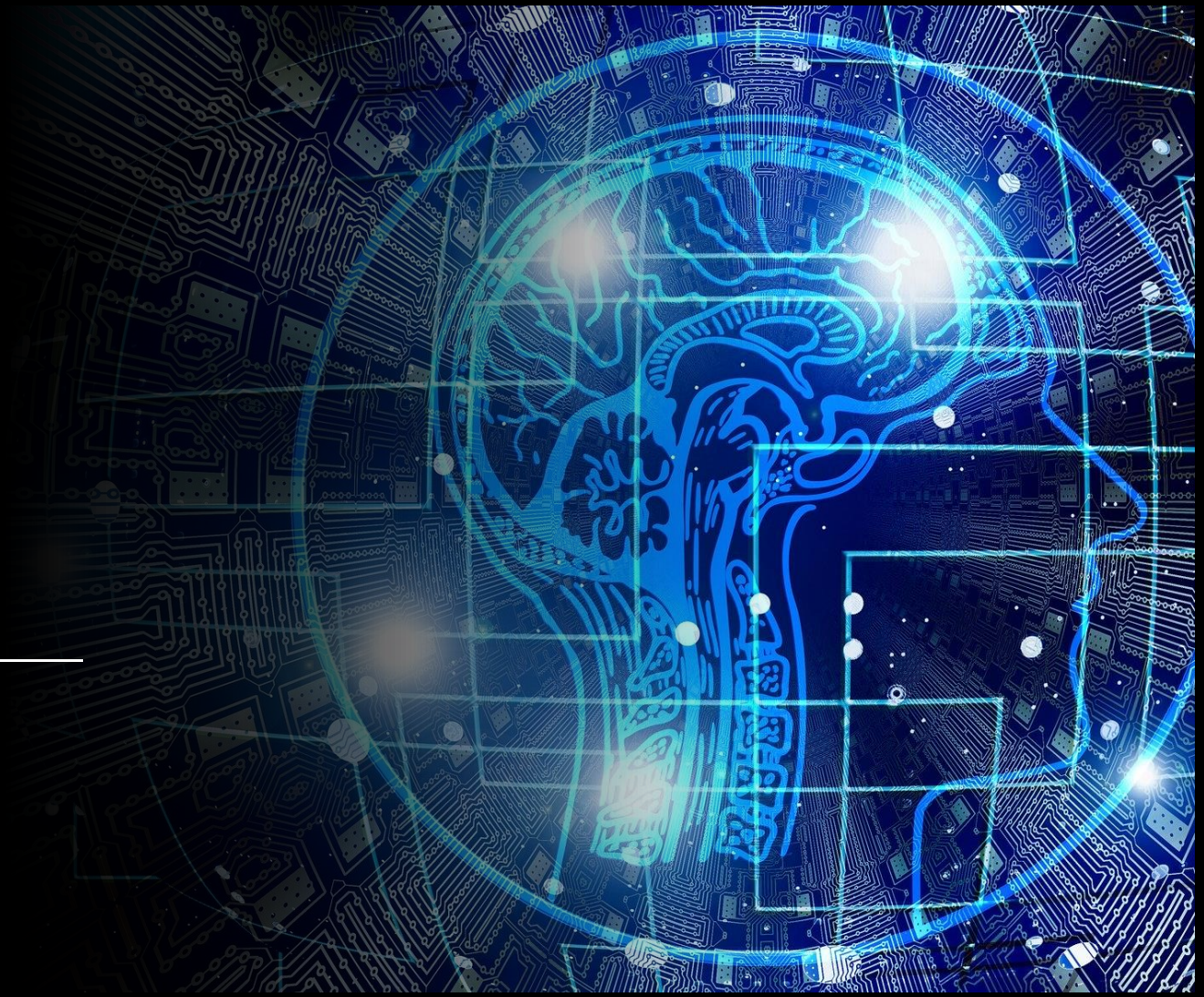
GPS DETECTS HIGH RISK LOCATIONS

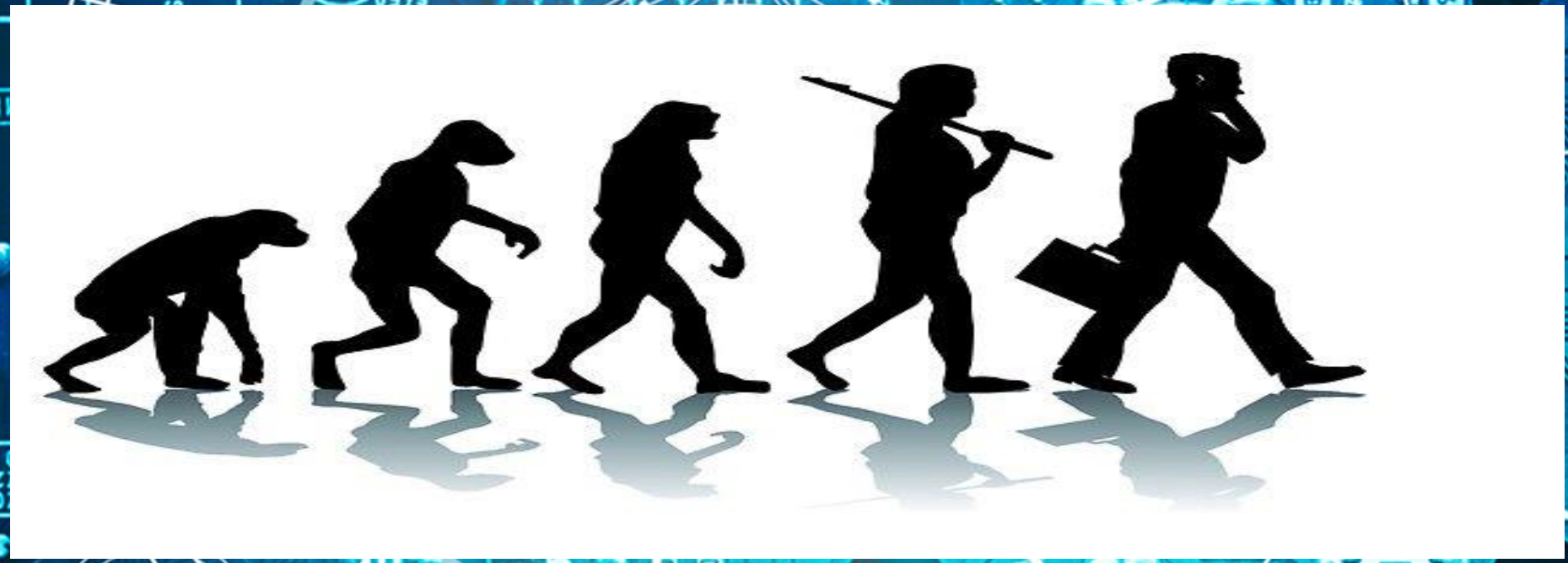
PROVIDES INFORMATION AND SUPPORT

Gustafson et al, 2014

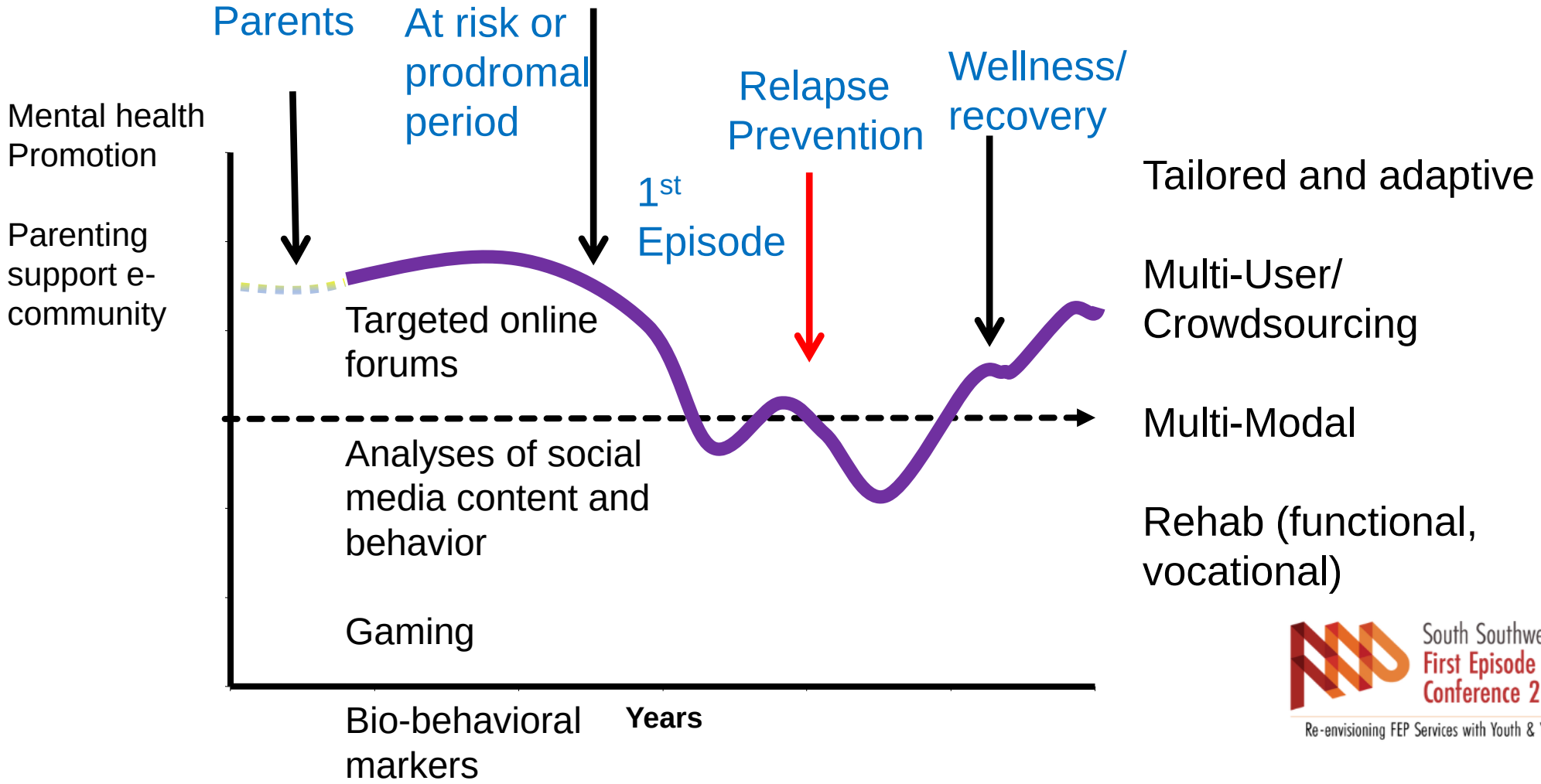

YOUTUBE
• Primary source of information
• Virtual community support system
Lal et al, 2015; Naslund, Grande, Aschbrenner, & Elwyn, 2014

# An Ideal?





# The transformation I want to see is…

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Ben-Zeev, Meller, Snyder, et al. (2021). *JMIR Mental Health*.

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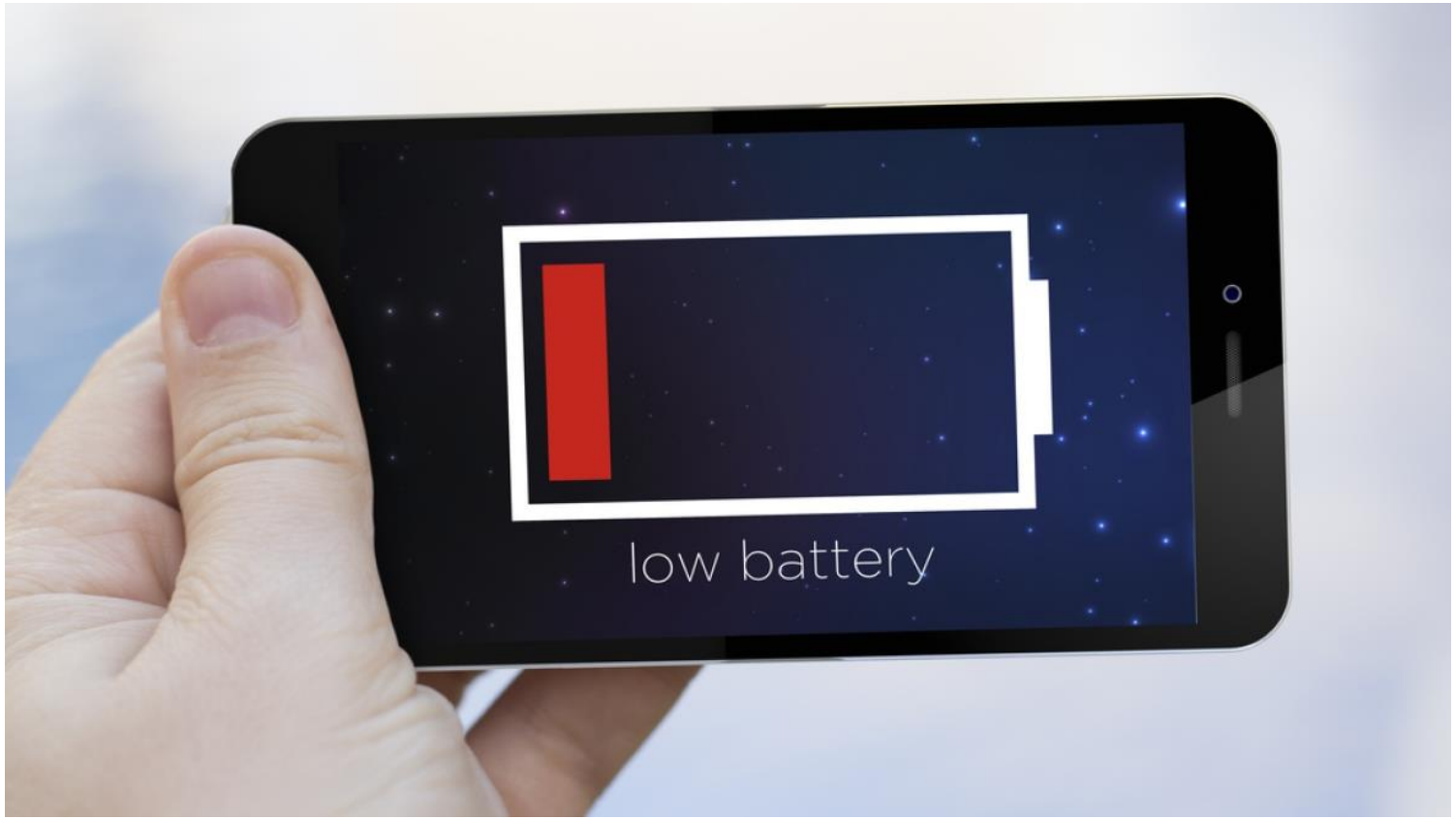


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