Data-Driven Implications
for Translating Evidence-Based Psychotherapies
into Technology-Delivered Interventions

Jessica Schroeder, Jina Suh, Chelsey Wilks, Mary Czerwinski

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Mental Health Disorders

Leading cause of disability and death

Evidence-based psychotherapy is effective for many disorders

Dialectical Behavioral Therapy (DBT)

Treats people with complex disorders and suicidal ideation

Helps people develop concrete coping skills

Effective for a wide range of disorders

🚧 **Difficult to quantify the effectiveness of skills**

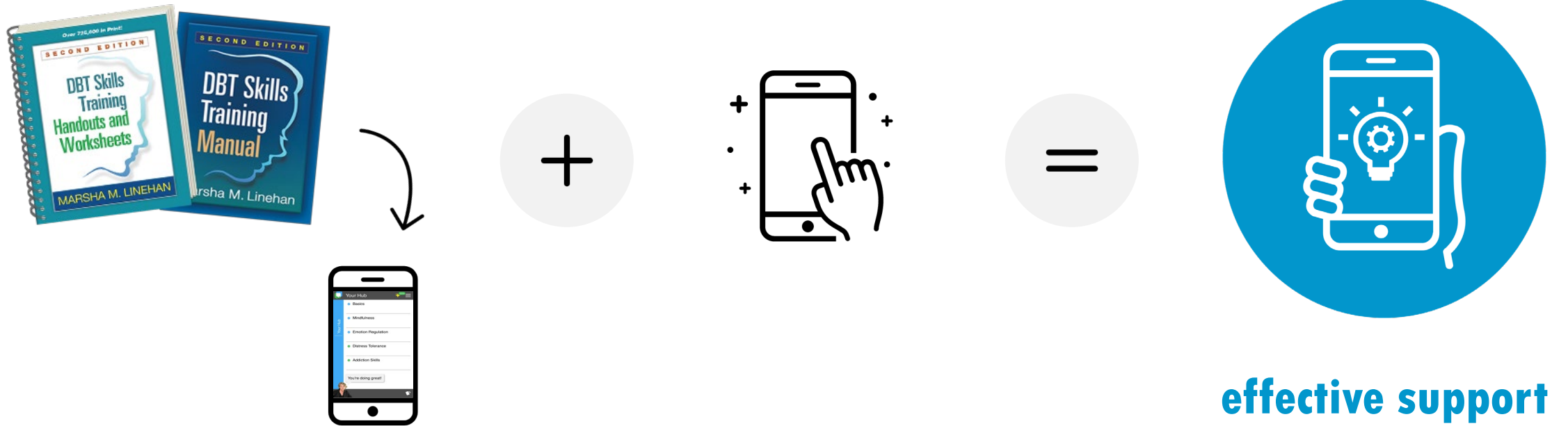# Mobile Mental Health Interventions

Reduce financial and time barriers
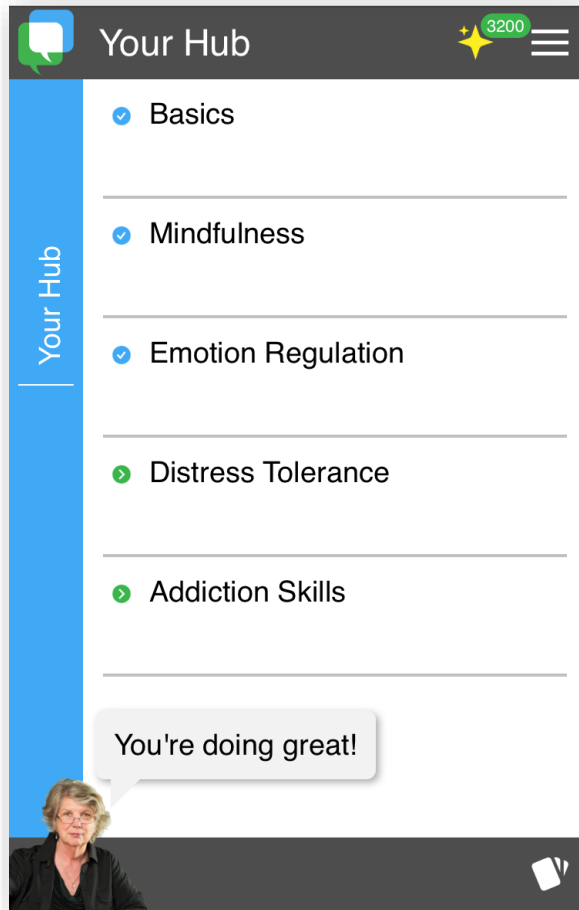
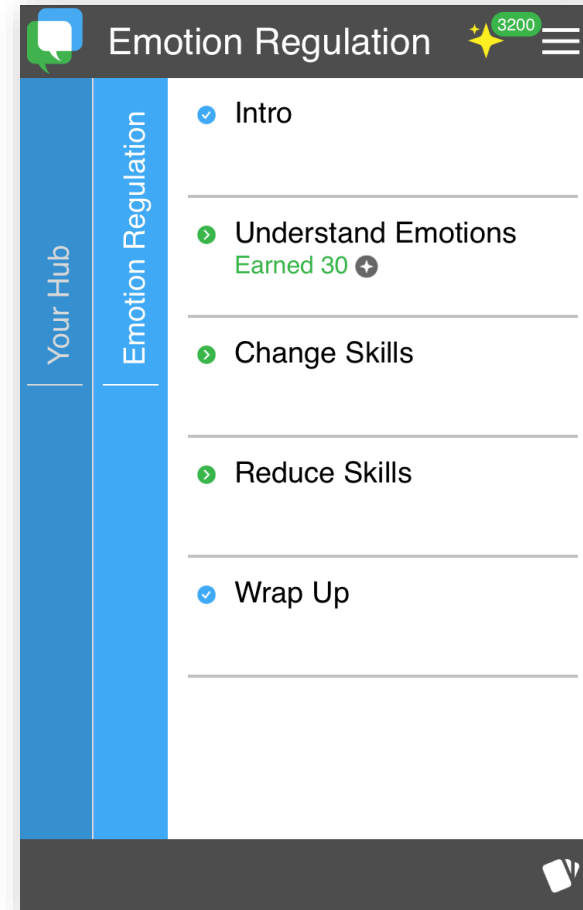**Increase engagement and honest disclosures**

🚧 **Do not follow evidence-based principles**

Digitally Translated Interventions

effective support
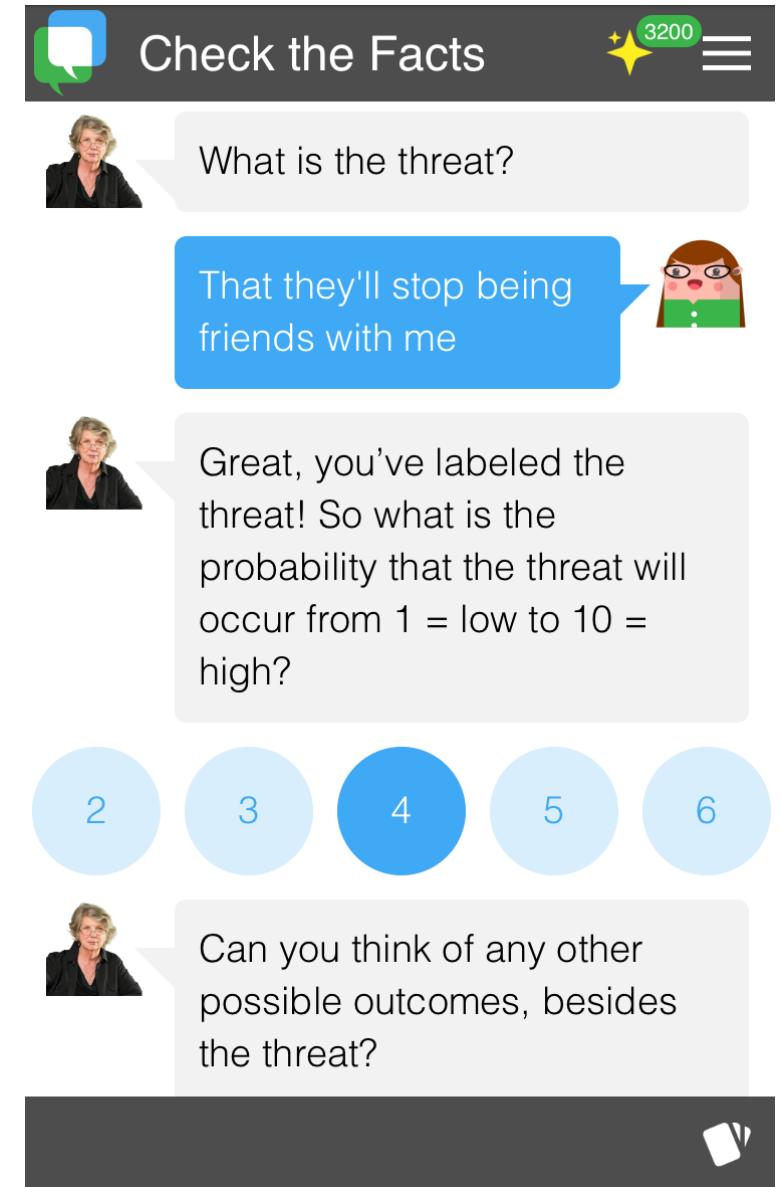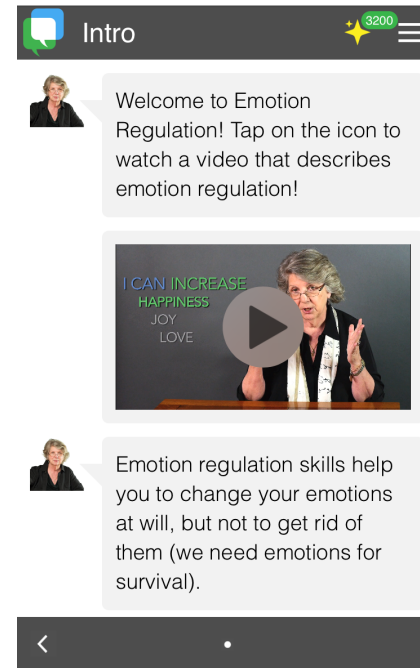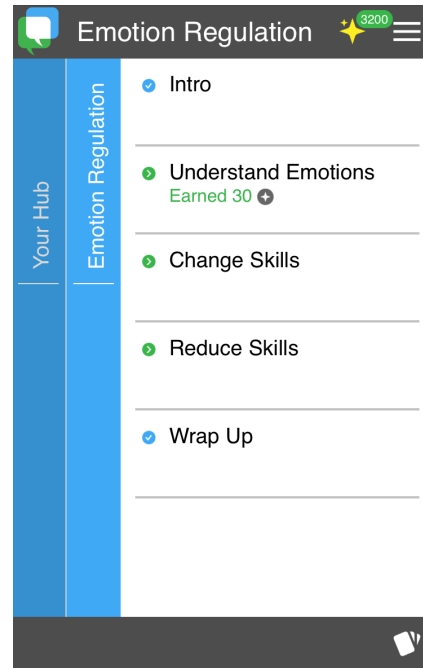
Pocket Skills

Modules

Skills

Schroeder, J., Wilkes, C., Rowan, K., Toledo, A., Paradiso, A., Czerwinski, M., Mark, G. and Linehan, M.M. "Pocket Skills: A Conversational Mobile Web App to Support Dialectical Behavioral Therapy." CHI 2018

Pocket Skills

eMarsha: Encouraging Engagement

Dr. Marsha Linehan

eMarsha

Pocket Skills: A Conversational Mobile Web App To Support Dialectical Behavioral Therapy
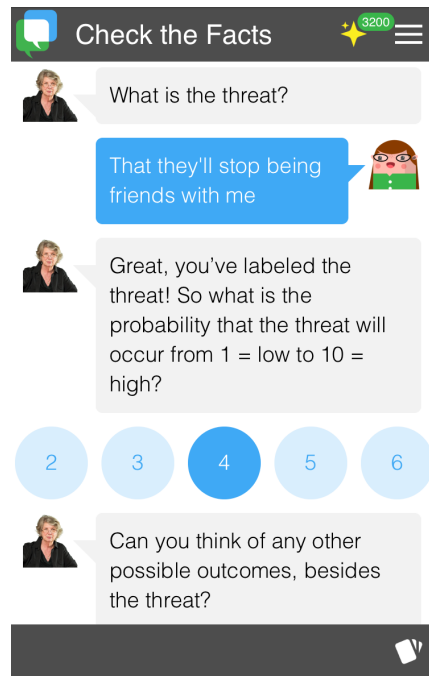
Scale	Percent Recovered	Percent Improved
OASIS	41.7	8.3
PHQ-9	22.2	4.2
Skills Use	6.9	12.5
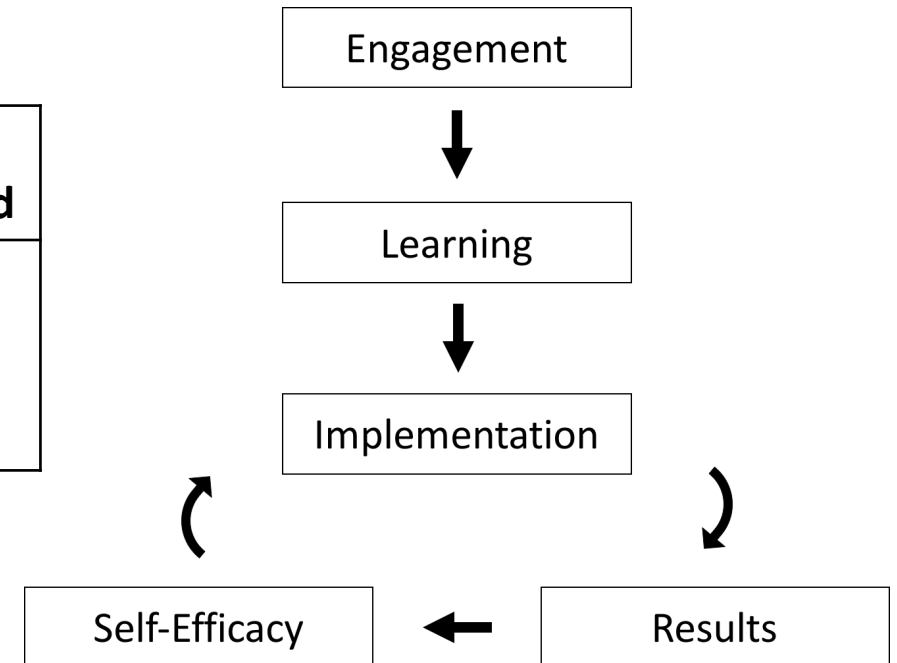
Study and Methods

Field Study

4 weeks
100 participants

Survey

Demographics
Validated mental health scales
Disorder types, personal preferences

Analysis

Statistical methods
Machine learning

App Usage

Navigation and skill use
Ratings before and after skill use

Research Questions

RQ1. When did study participants use the skills?

RQ2. Were particular skills more or less effective?

RQ3. Were skills more or less effective for different subgroups?

RQ4. Did skill-level effectiveness influence overall depression, anxiety, or skill use improvement throughout the study?

RQ5. Can we predict a particular skill's effectiveness, given participant and skill characteristics?

RQ1 When did study participants use the skills?

82.6% skills with pre-skill distress ratings ≥ 3 (out of 5)

Skills were used **in the moment**

Design for Emotional Context
Guide towards most feasible skill in the moment and support discovery and development of new skills

RQ2   Were particular skills more or less effective?

DT Self-Soothe skills result in less skill improvement by 0.63 to 0.9 points ($p<0.05$) than other skills

Some skills are helpful if you can complete them

Design for Environmental Context
Solicit feasibility, snooze activities, give choices

RQ3 **Were skills more or less effective for different subgroups of people?**

Significant differences based on age, education, disorder type, medication, close by family

RQ3 Were skills more or less effective for different subgroups of people?

Having a 4-year degree correlated with over 0.4 points ($p < 0.01$) less improvement than other education groups
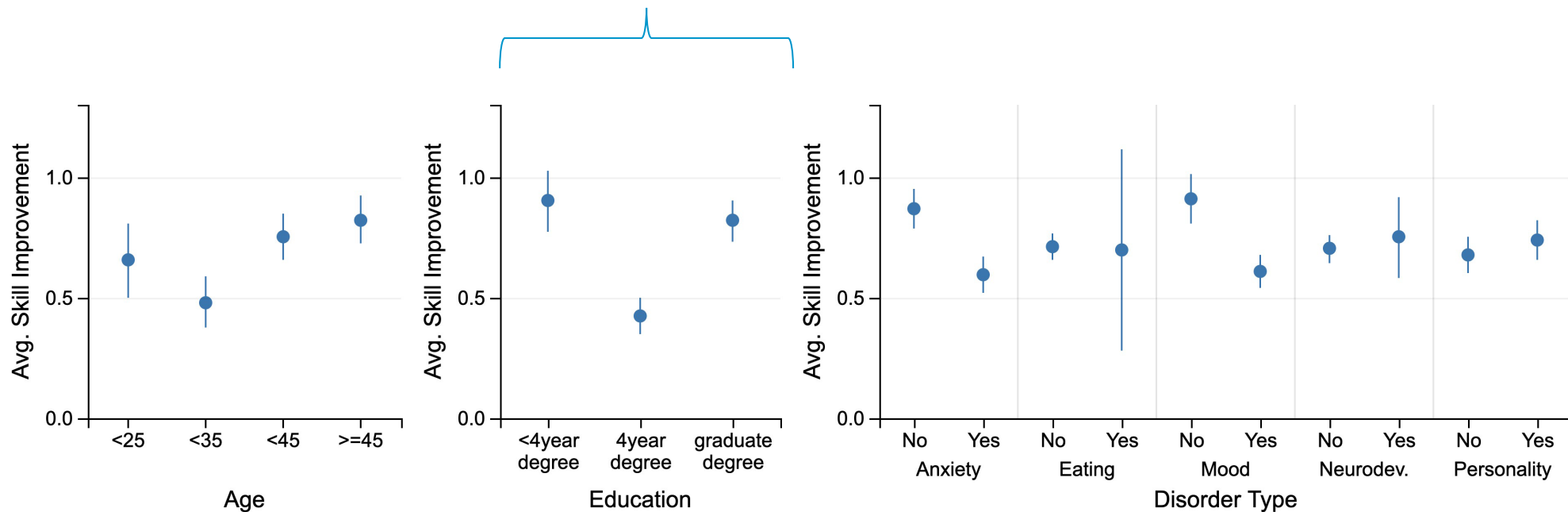
RQ3 **Were skills more or less effective for different subgroups of people?**

Significant differences based on age, education, disorder type, medication, close by family

Individual characteristics are important for effectiveness

Design for Personal Context
Account for individual differences in intervention activities

RQ4 **Did skill-level effectiveness influence overall depression, anxiety, or skill use improvement?**

Larger best skill improvement resulted in significantly more depression improvement

Skills that work lead to improvement

Design for Personalized Skills

Help discover skills that are more likely to reduce distress and improve mindfulness

RQ5 Can we predict a particular skill's effectiveness?

Classifiers predicted skill effectiveness with 72.1% test accuracy (over 57.4% base rate)

💡 **Effective skills can be predicted**

Design for Intelligent Support

Recommend skills based on emotional, personal, and environmental context from data and expert feedback

Data-Driven Design Implications Summary

FINDINGS FROM DATA

Skills are used in the moment, some are more useful than others, and their effectiveness are influenced by individual characteristics.

Skills that work leads to overall improvement, and skill effectiveness can be predicted using individual and skill use characteristics.

DESIGN IMPLICATIONS

Design for Emotional, Environmental, Personal Context

Design for Intelligent Support with Personalized Skills Recommendations

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