Digital Acceptance and Commitment Therapy for Health Behavior Change

Maria Karekla, Ph.D.

University of Cyprus

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karekla.maria@ucy.ac.cy

acthealthy

Πανεπιστήμιο Κύπρου
University of Cyprus

What is common to all these conditions?

Maladaptive health-related behaviors

Dysfunctional coping

Dysfunctional emotion regulation

Why have we not yet been successful?

1. Health behaviors tend to be pathologized & classified in outdate systems

2. Ecological fallacy

3. Problems with face-to-face interventions
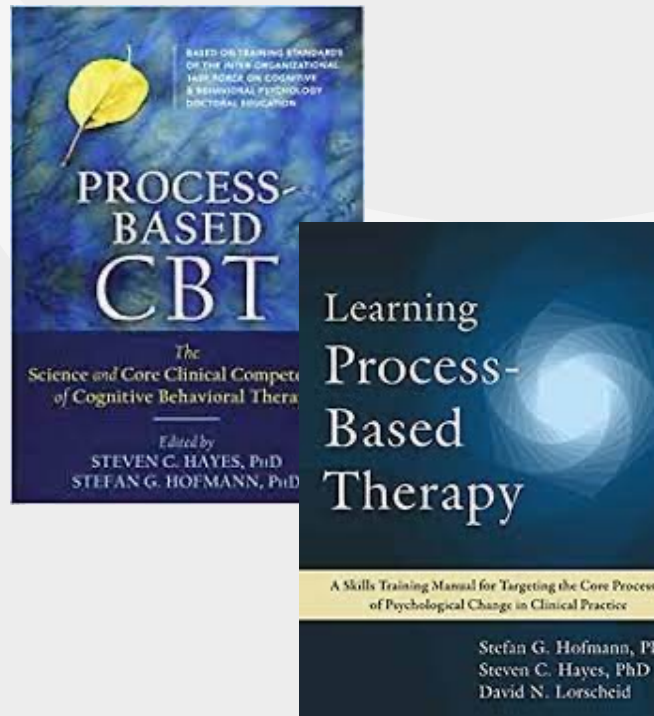
New era

- Extending Paul (1969):

    What core biopsychosocial processes should be targeted with this client given this goal, in this situation, and how can they most efficiently and effectively be changed? (Hofman & Hayes, 2019)
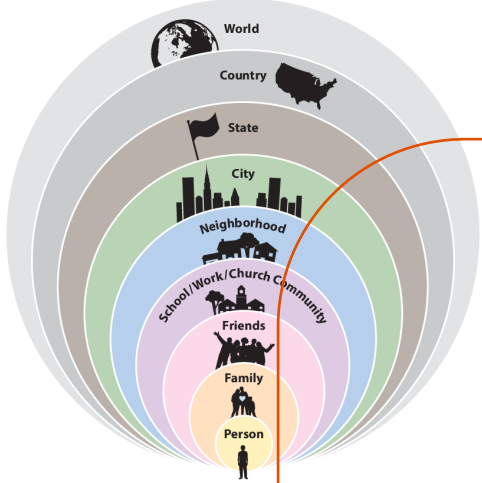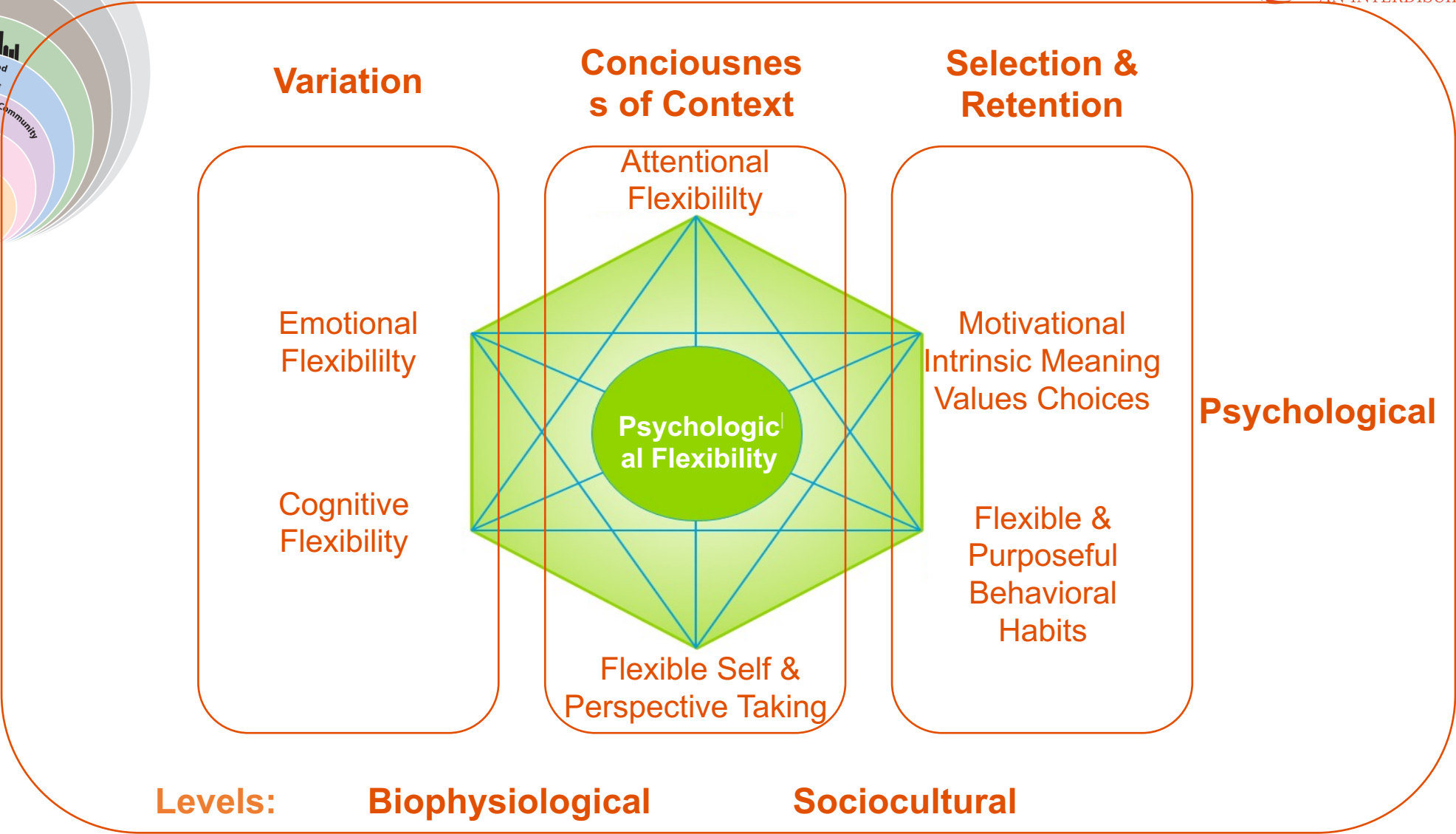
New era

- Process-Based Approach (Hayes & Hoffman,2018; Hofman & Hayes, 2019; Karekla, 2021)

> **Treatment based on the coherent application of changeable evidence-based processes linked to evidence-based procedures that ameliorate the problems and promote the prosperity of people**

Karekla, M. (2021). Shifting our perspective for the future of assessment and intervention science. *Clinical Psychology in Europe, 3*(1), 1-4, Article e6197, https://doi.org/10.32872/cpe.6197

Ong, C. W., Ciarrochi, J., Hofmann, S. G., Karekla, M., & Hayes, S. C. (2024). Through the extended evolutionary meta-model, and what ACT found there: ACT as a process-based therapy. Journal of Contextual Behavioral Science, 32. https://doi.org/10.1016/j.jcbs.2024.100734

2. Ecological fallacy

- Individual members of a group have the average characteristics of the group at large

- Is there such a thing as an average person?

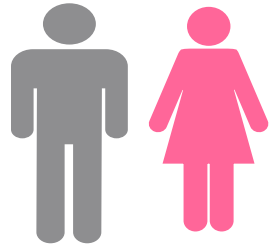On average, Latvian families have 1.57 children

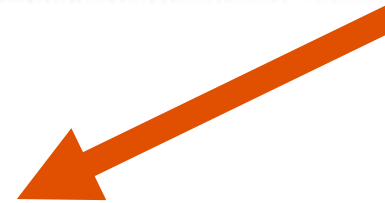Need for Idiographic assessment & treatment approaches

Why have interventions to date not successfully delivered alleviation of suffering?

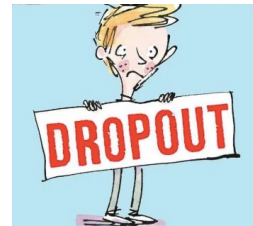3. Problems with face-to-face interventions

50%

10%

15-25%

5-22%

IT FEELS LIKE EVERYONE IN THE WORLD IS LYING TO ME.

CONGRESS IS LYING ABOUT THE BUDGET. STOCK ANALYSTS ARE LYING ABOUT THEIR RECOMMENDATIONS. MY BOSS IS LYING...

THIS THERAPY STUFF IS SCIENTIFICALLY PROVEN TO WORK, RIGHT?

IT'S 100% EFFECTIVE.

www.dilbert.com   scottadams@aol.com   © 2001 United Feature Syndicate, Inc.

DROPOUT

Altamura, Buoli, Albano & Dell' Osso, 2010; APA, 2013; Abramowitz, Taylor & McKay, 2009; Olatunji, Davis, Powers & Smits, 2013; Twohig et al., 2010)

Why individuals dropout of treatment?

Mobility Difficulties

- Pain was too severe to sit through sessions
- Lived in remote & isolated areas
- Transportation difficulties
- Difficulties completing the questionnaires
- Work Schedule

Health Issues

- Cancer
- Stroke
- Headaches/migraines
- Other health issues arising
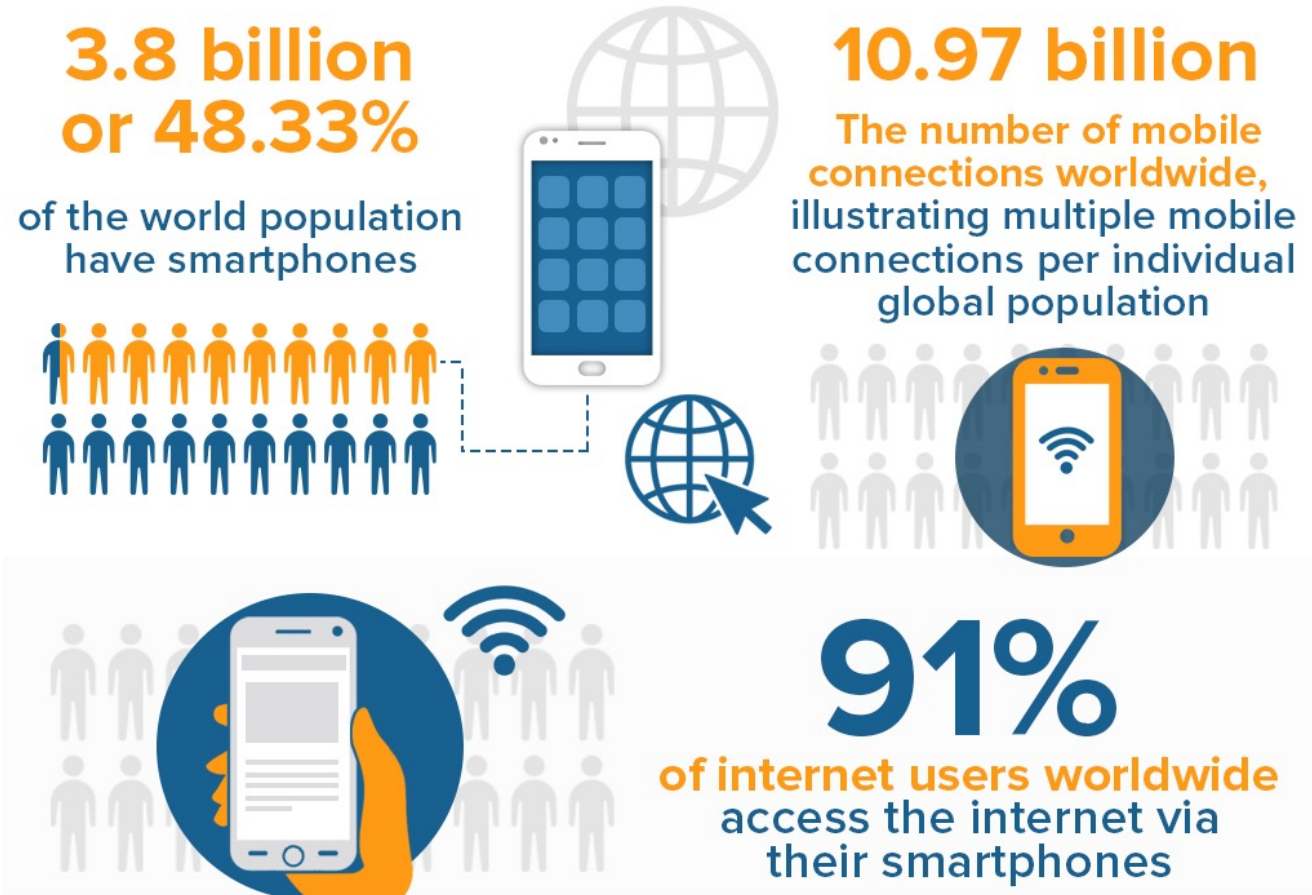- Higher severity and longer time since diagnosis

Poor therapy adjustment

- Not fitting in well with the group
- Preference for individual therapy or different therapist
- Need for a slower pace

Kasinopoulos, Karekla, Vasiliou, Siamata, & Karademas (2015)

Digitized Mode of Intervention

Present day context

- COVID-19
- Digitization
- Globalization

3.8 billion or 48.33% of the world population have smartphones

10.97 billion The number of mobile connections worldwide, illustrating multiple mobile connections per individual global population

91% of internet users worldwide access the internet via their smartphones

Sources: BankMyCell, 2021; We Are Social & Hootsuite, 2020; DataReportal, 2021

FinancesOnline REVIEWS FOR BUSINESS

HEALTH AND PERSONALITY DEVELOPMENT: AN INTERDISCIPLINARY APPROACH

Effectiveness of Digital Interventions

- In general: (0.53) Medium effect size: Similar to face-to-face interventions Barak et al., 2008; Carlbring et al, 2017

- Especially effective for **Anxiety disorders** (.80 – .83), **smoking cessation** (.62), **alcohol** (.48), **eating disorders** (.45) **depression** (.32-.90), **losing weight** (.17) Barak et al., 2008; Carlbring et al, 2017
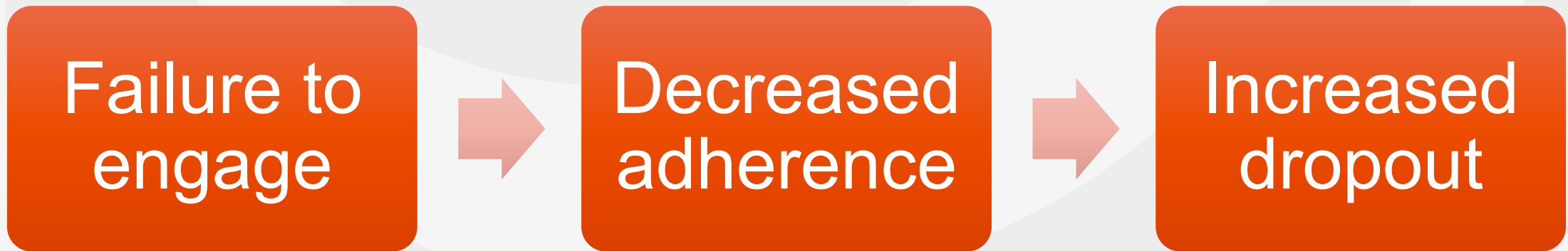
- **Chronic pain** (small-medium effect sizes)

Difficulties with using digital technologies

- What is of quality or empirically supported?
  - Largely unregulated

- How to decide on which program or app to try?
  - Lack of skills & experience to evaluate accuracy of information or quality

- How much technological support needed?

- High dropout rates:
 - 2X more compared to face-to-face interventions (Macea et al., 2010)

HEALTH AND PERSONALITY
DEVELOPMENT:
AN INTERDISCIPLINARY APPROACH

Also…

Failure to engage → Decreased adherence → Increased dropout

Why individuals dropout of digitized treatments?

- Client socio-demographics
  - Poor health literacy, lower education level, being male, and condition severity

- In traditional RCTs: several levels of clinical filtering prior to treatment- indication of commitment level? (Eysenbach 2005)

- Developers' approach to technology

Karekla et al (2019). European Psychologist

How to engage user increase adh digitalized

CHALLENGE
ACCEPTED
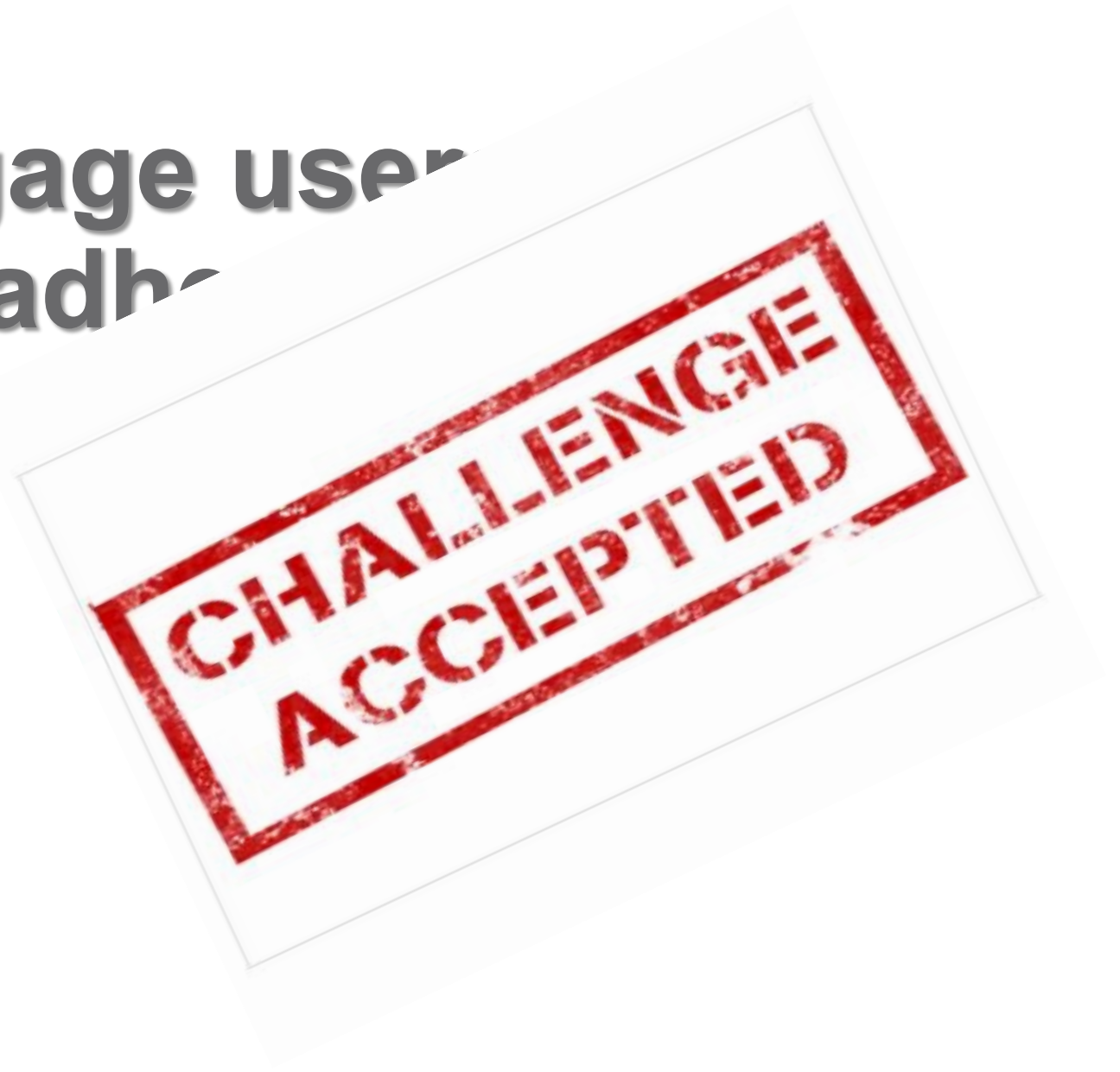
4 Dimensional Recommendations
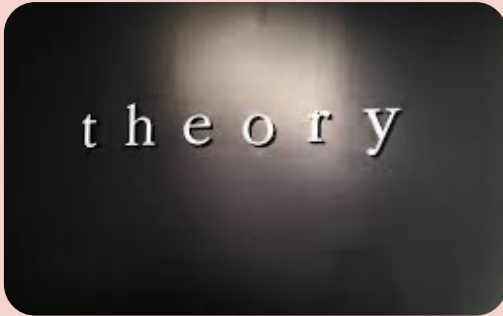
A-priory theoretical Planning

1) Utilize digital theory

2) Consist of theory driven evidence-based psychological intervention content

3) Take into account relevant ethical considerations

Human-Computer Interaction

1) Apply theory-driven and empirically supported technological characteristics

2) Include human or a sense of human contact

3) Frequent content update

User-Related Characteristics

1) Take into account known user characteristics that improve adherence

2) Assess computer knowledge and experience & provide assistance

Active Assessment of usage

1) Simple and direct instructions

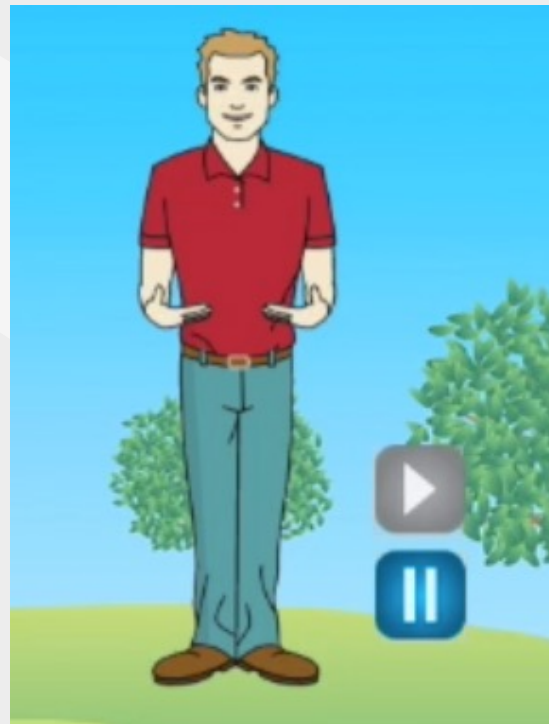2) Utilize web-metrics to assess and monitor adherence of disengaged users

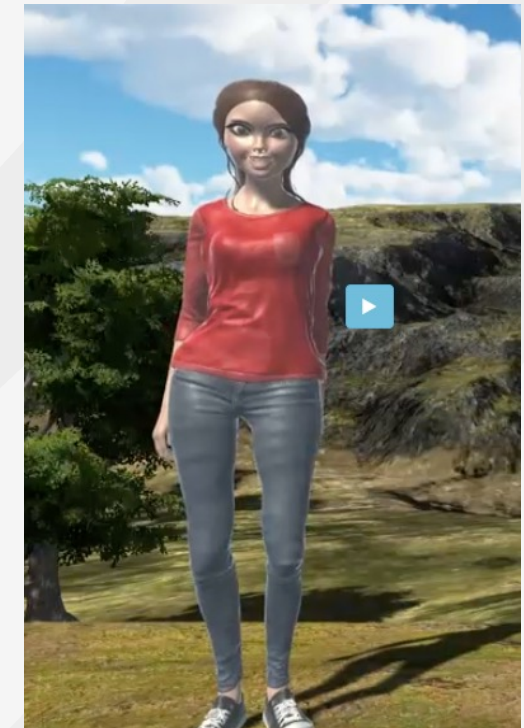Karekla et al. (2019). *European Psychologist*

Examples from some of our studies

#FlexiQuit

Acceptance and Commitment Therapy for Smoking Cessation among adolescents and young adults
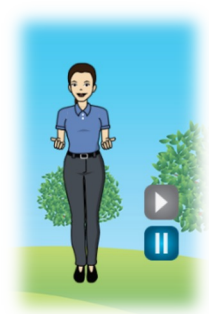
Version1
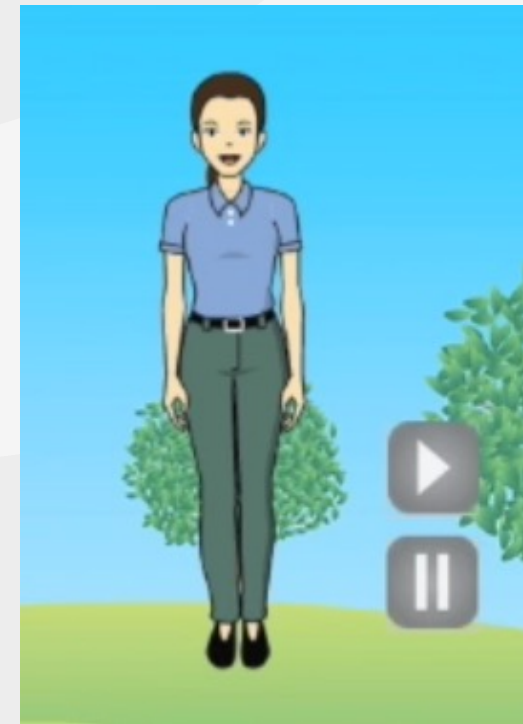
Version2

Savvides dissertation (2015). Evaluating an internet-based, avatar led, Acceptance and Commitment Therapy intervention for smoking cessation in youth; Karekla & Savvides (2019). *Translation Behavioral Medicine.* Karekla, Savvides & Gloster (revise & resubmit); Theofanous thesis (2019).
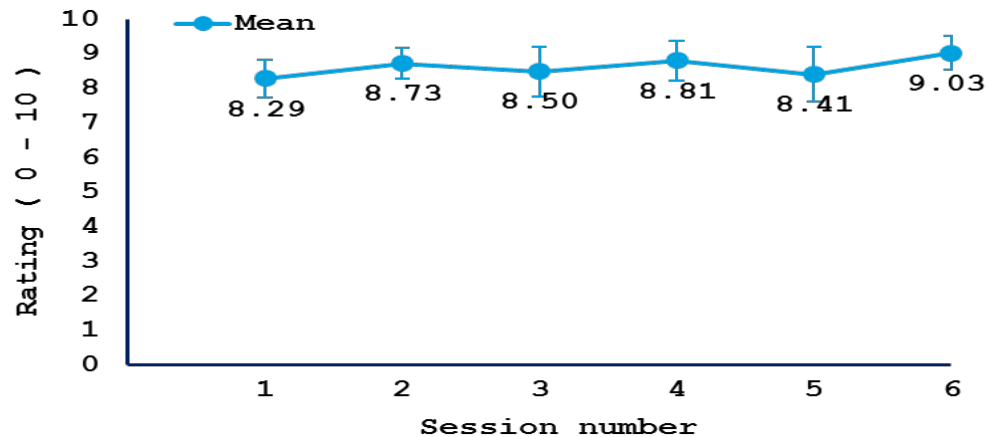
#FlexiQuit

Program session evaluation

Smoking cessation rates among adolescents and young adults:

0% to 11% - mean 3%

Quit rate 51.9%

After intervention:
Mean cessation rate: 14%

Vs. 14.3% in wait-list control
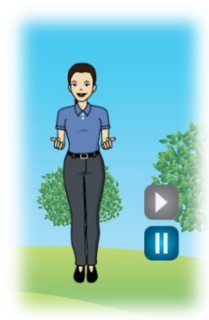
Karekla & Savvides (2019). *Translation Behavioral Medicine.* Karekla, Savvides & Gloster (2020), Annals of Behavioral Medicine; Theofanous thesis (2019).

#FlexiQuit

Nicotine dependence

Number of cigarettes smoked per day over the past week
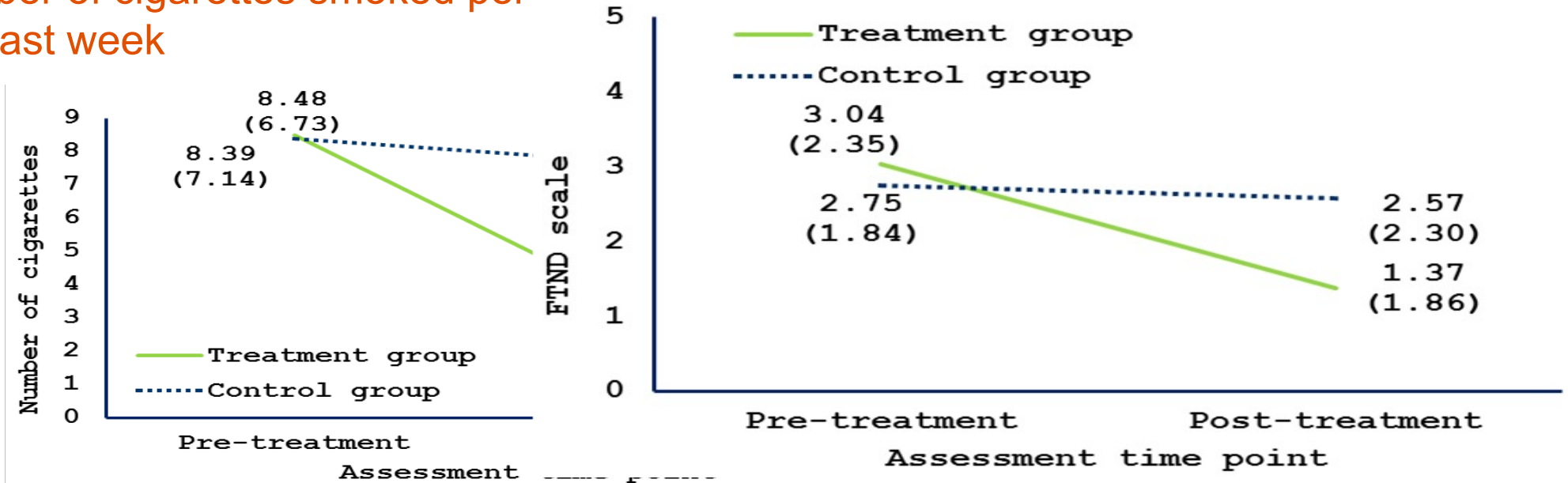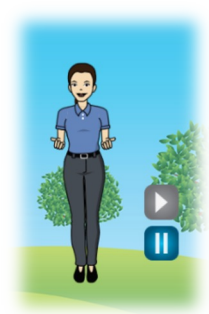
Karekla & Savvides (2019). *Translation Behavioral Medicine.* Karekla, Savvides & Gloster (2020), Annals of Behavioral Medicine; Theofanous thesis (2019).

#FlexiQuit

Contemplation ladder: Stages of change

$b=-2.25$

Smoking cessation
self-efficacy

$=.77$

$-15.43, -1.80]$

Karekla & Savvides (2019). *Translation Behavioral Medicine.* Karekla, Savvides & Gloster (2020), Annals of Behavioral Medicine; Theofanous thesis (2019).
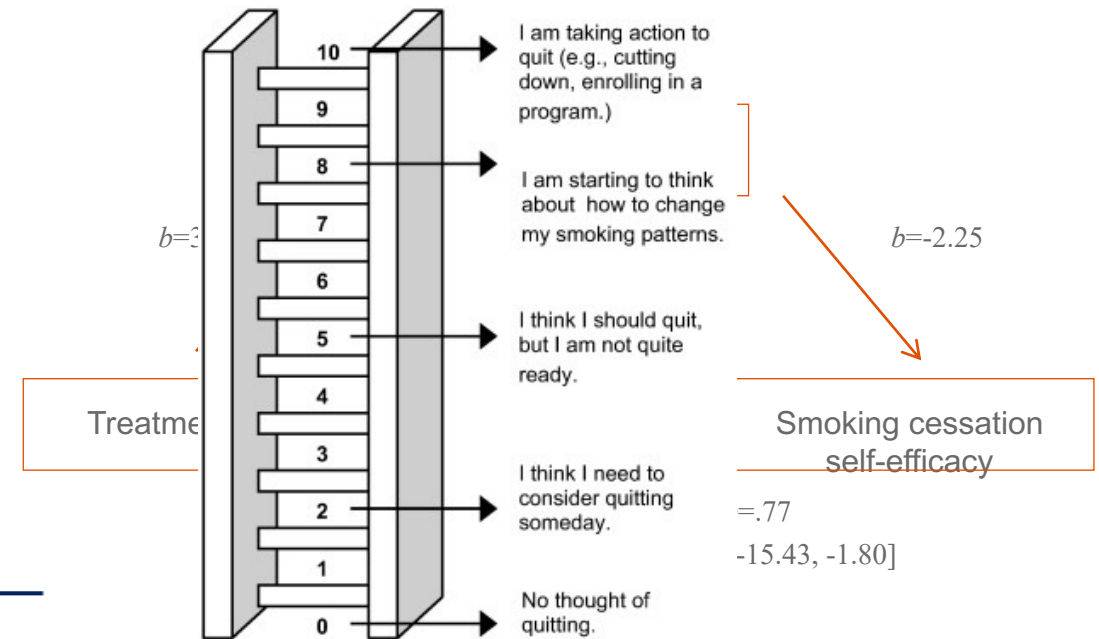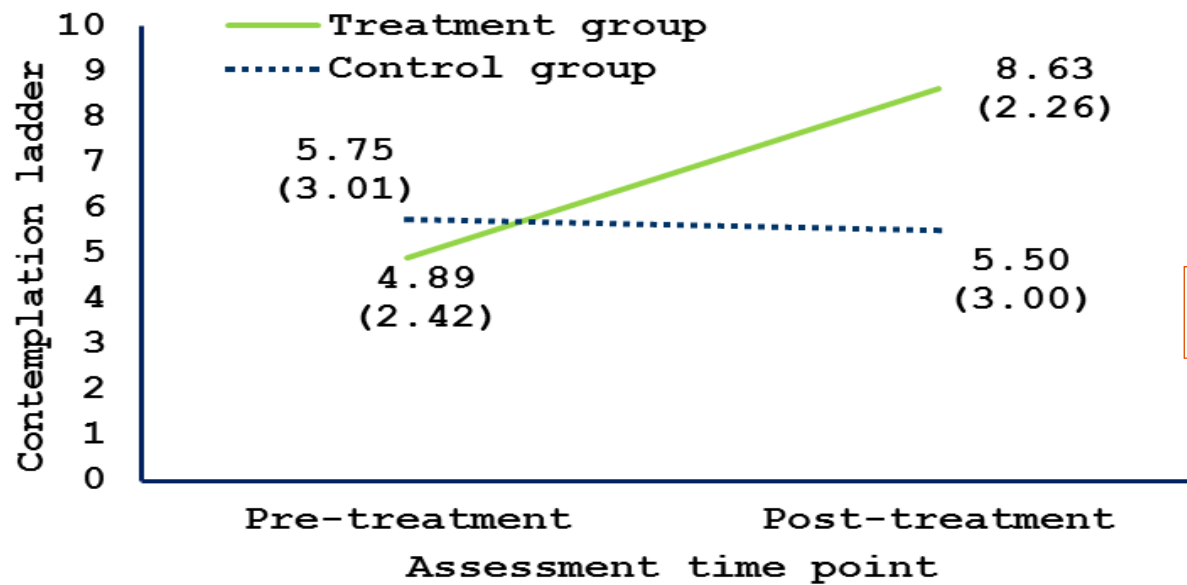
LGBT Flexiquit-Project EQQUAL & **VET FLEXIQUIT**

- N=22 young adults 18-30years old
- **Abstinence**: 3X higher than only other digital program targeting this population & 6-13X higher than not targeted programs

Acceptability	EQQUAL
Treatment satisfaction	93% (14/15)
Utilization (# logins)	M=5.5
Program motivated you to quit?	100% (15/15)
Cotinine confirmed abstinence at 2 months post	23% (5/22)

VET FLEXIQUIT vs. SmokefreeVET
- N=49 veteran smokers
- 6 sessions fully automated and self-guided
- Self-reported smoking abstinence was biochemically verified using saliva cotinine

| Acceptability	Vet Flexiquit	Smokefre eVET
Treatment satisfaction	100% (17/17)	95% (18/19)
Utilization (# logins)	M=3.7	M=3.2
Program motivated you to quit?	90% (18/20)	78% (14/18)
Cotinine confirmed abstinence at 3months post (30 day prevalence)	25%	25%

Heffner, J., Watson, N., Serfozo, E., Kelly, M., Reilly, E., Kim, D., Baker, K., Scout, N., & Karekla, M. (2021). An Avatar-Led Digital Smoking Cessation Program for Sexual and Gender Minority Young Adults: Intervention Development and Results of a Single-Arm Pilot Trial. *Journal of Medical Internet Reaserch, 5* (7);
Heffner, J., Kelly, M., Reilly, E., Reece, S., Claudio, T., Serfozo, E., Baker, K., Watson, N., & Karekla, M. (2023). An Avatar-Led Web-Based and SMS Text Message Smoking Cessation Program for Socioeconomically Disadvantaged Veterans: Pilot Randomized Controlled Trial. JMIR Formative Research, 7, 1-17.

ACT-based game for the prevention of Eating disorders
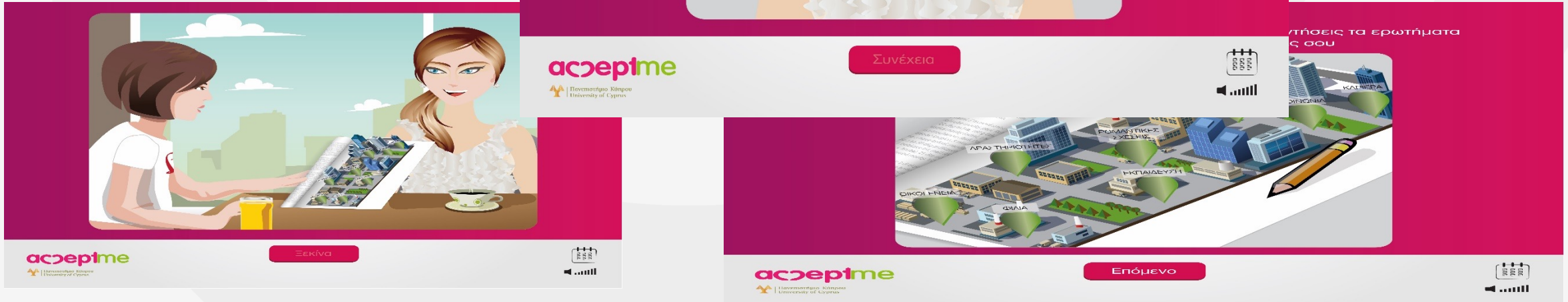
Nicolaou, P., Merwin, R., Karekla, M. (2022). AcceptME: Acceptability and Feasibility of a gamified digital eating disorder selective prevention program based on Acceptance and Commitment Therapy (ACT). *JCBS*, 26, 36-43.
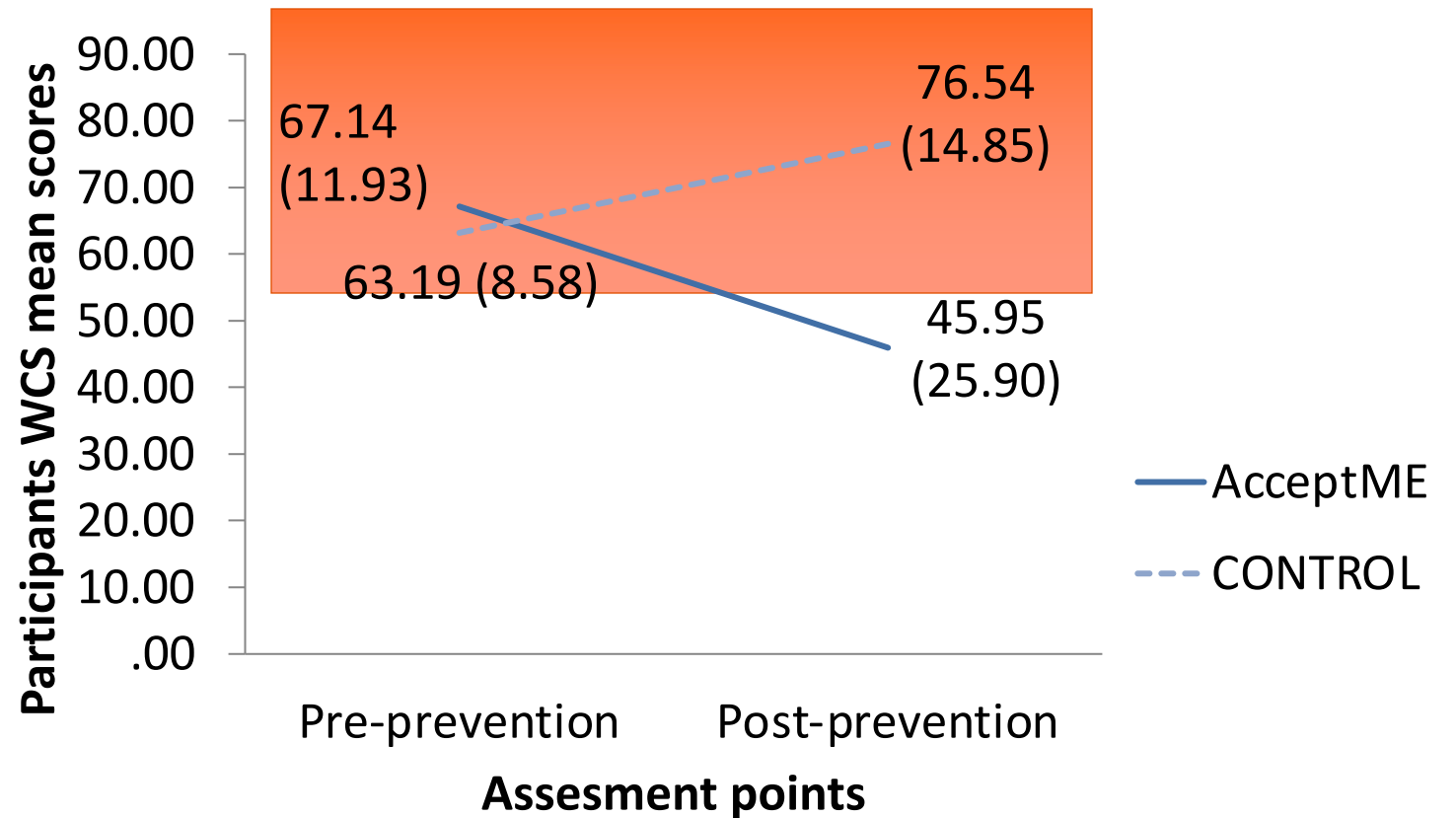
Karekla, M., Nicolaou, P., & Merwin, R. (2022). Randomized clinical trial evaluating a digital gamified Acceptance and Commitment early intervention program for individuals at high-risk for eating disorders.*Journal of Clinical Medicine,* 11 (7), 1775.

- **Large effect sizes (*Cohen's d=.92*)**

Odds of at-risk being 14.5 times higher in control vs. AcceptME

## Risk of developing an eating disorder

67.14 (11.93)

76.54 (14.85)

63.19 (8.58)

45.95 (25.90)

Participants WCS mean scores

Pre-prevention   Post-prevention

Assesment points

—— AcceptME
- - - CONTROL

Nicolaou, P., Merwin, R., Karekla, M. (2022). *JCBS*, 26, 36-43.; Karekla, M., Nicolaou, P., & Merwin, R. (2022). *Journal of Clinical Medicine,* 11 (7), 1775.

Risk of developing an eating disorder

Participants Mean WCS Scores

66.60 (11.27)

46.18 (24.64)

41.94 (21.50)

Pre-prevention   Post-prevention   After-one month

Nicolaou, P., Merwin, R., Karekla, M. (2022). *JCBS*, 26, 36-43.; Karekla, M., Nicolaou, P., & Merwin, R. (2022). *Journal of Clinical Medicine,* 11 (7), 1775.
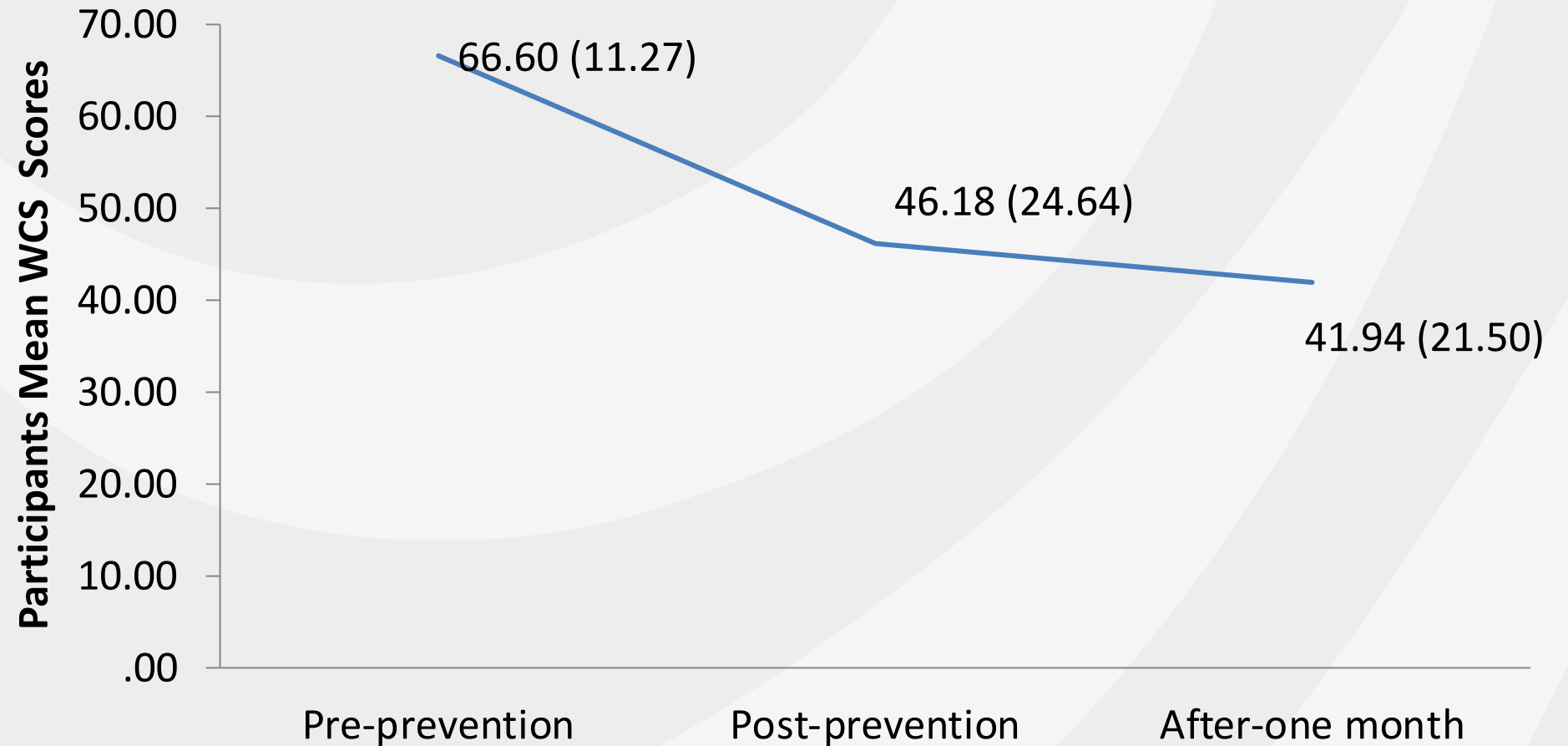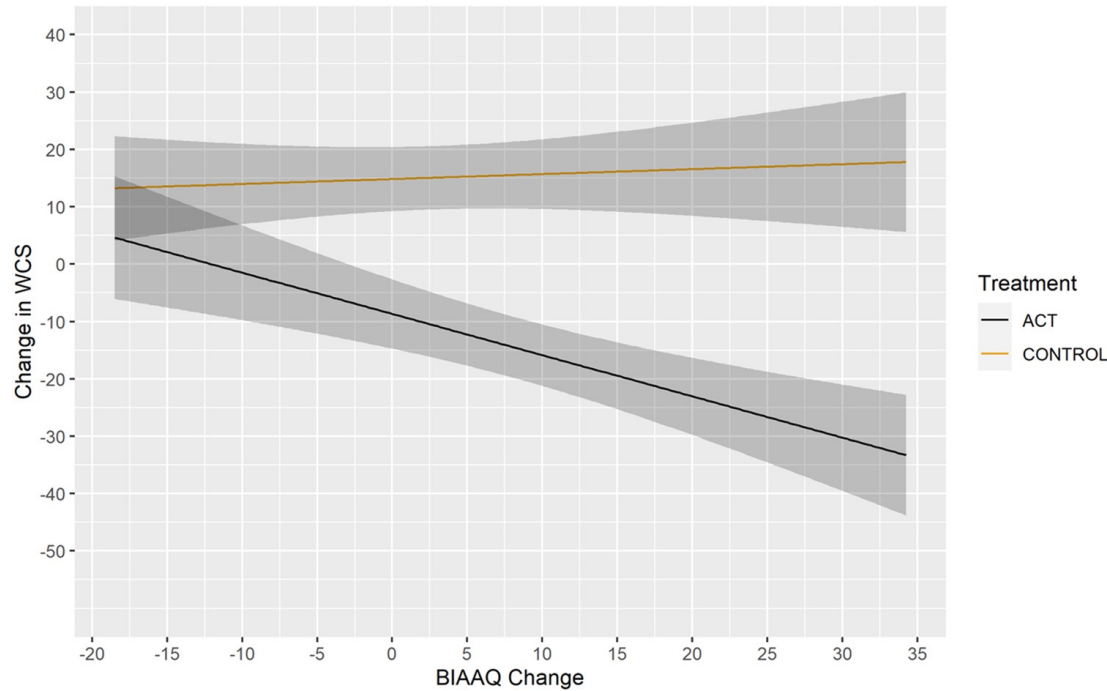
Treatment by Change in BI-AAQ Interaction Predicting Post-Treatment WCS, adjusted for baseline WCS levels.

Change in B-IAAQ Predicting 1-Month EDE-Q global score, Adjusting for Baseline Levels (AcceptME Group Only).
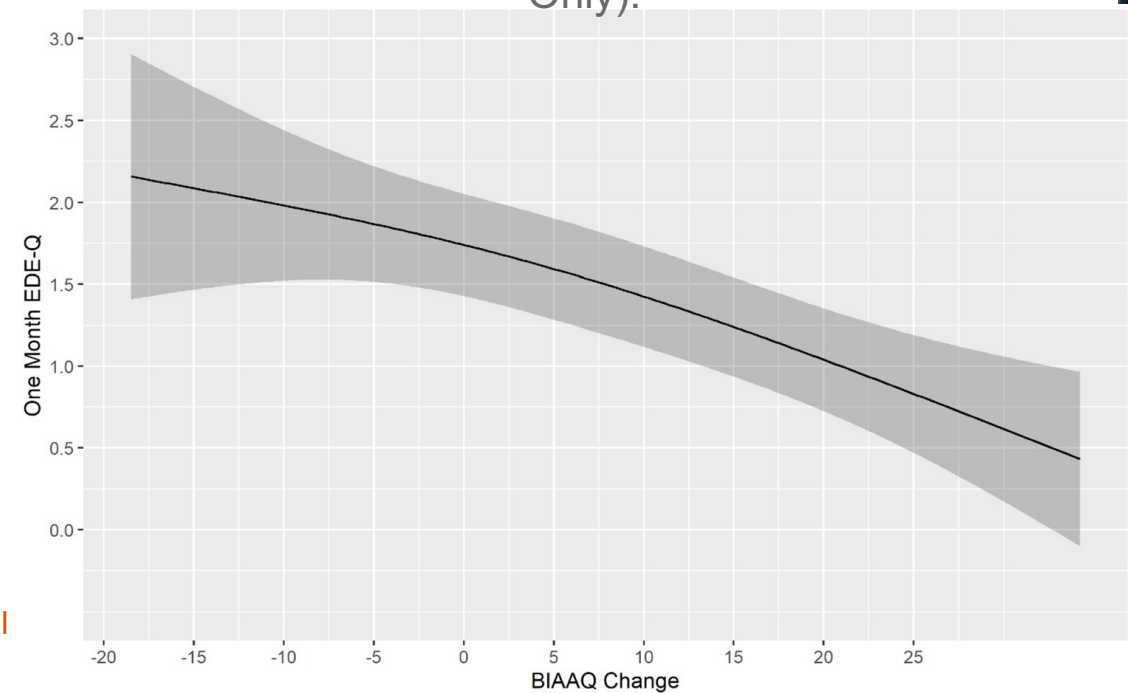
Merwin, R.M., Nikolaou, P. Moskovich, A.A., Babyak, M., Smith, P.J., & Karekla, M. (2023). Change in body image flexibility and correspondence with outcomes in a digital early intervention for eating disorders based on acceptance and commitment therapy. *Body Image, 44*, 131-135

**ALGEA project:
ACT for Chronic
Pain
& Headache**

Kasinopoulos (2019). AlgeaApp: ACT based digitalized program for the treatment of chronic pain.

Designing for Adherence

Do the research!

D1:R1-R2

Application of theory-driven technological characteristics: (Similarity D2: R4)

Provide easy tutorials and technical assistance (D3:R8)

Dimension 1: A-priori theoretical planning

Dimension 2: Human-Computer interaction

Active Assessment of usage via web-metrics (D4:R10)

Dimension 3: Tailoring and targeting to user groups

Dimension 4: Active Assessment of usage

Βήμα 1:

Κατεβάστε την εφαρμογή ALGEApp για **MAC OSX** από την διεύθυνση:

http://algeapp.com/

Metrics	Intervention users	
	Mean	SD
Total time spent (minutes)	230.11	194.19
*Average time spent per module (minutes)	40.67	12.15
No. of logins	4.16	0.60
No. of exercises downloaded	3.41	2.54
No. of exercises viewed	1.86	1.92
**No. of Correct MCQs (/18)	15.26	1.87

Client Satisfaction Questionnaire (CSQ-8)

89.2% → "Highly Satisfied from the intervention"

94.6% → "Helped to a good/great extend by this intervention"

97.3% → *"Would recommend this type of intervention to a friend"* and *"Would return back if I needed help in the future"*

*"I urge you to **continue this program**, it is really **helpful**! It's a pity for people who suffer to **miss on such opportunities** out of **stigma** and **fear**! Thank you for this opportunity!"*

*"I managed to see life through **a different angle and I re-evaluated my values** and **goals**. Nowadays, **pain is present** but **I manage!"***

*"I feel the pain but **actually being able to manage it without medication, was beyond my expectations. Thanks!"***
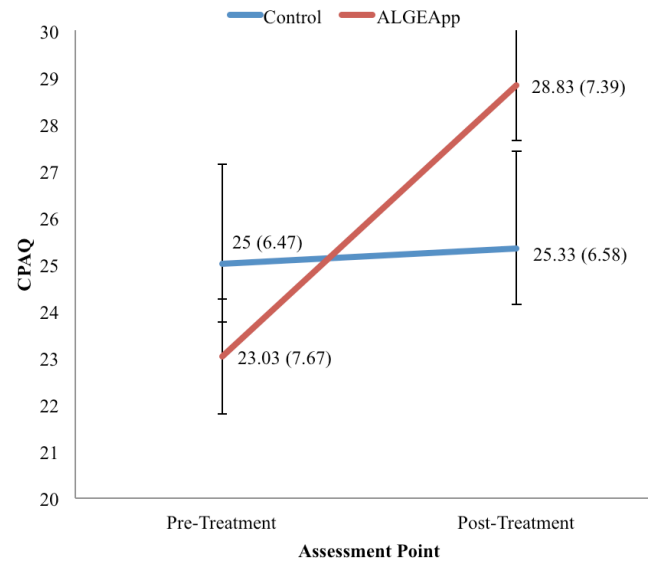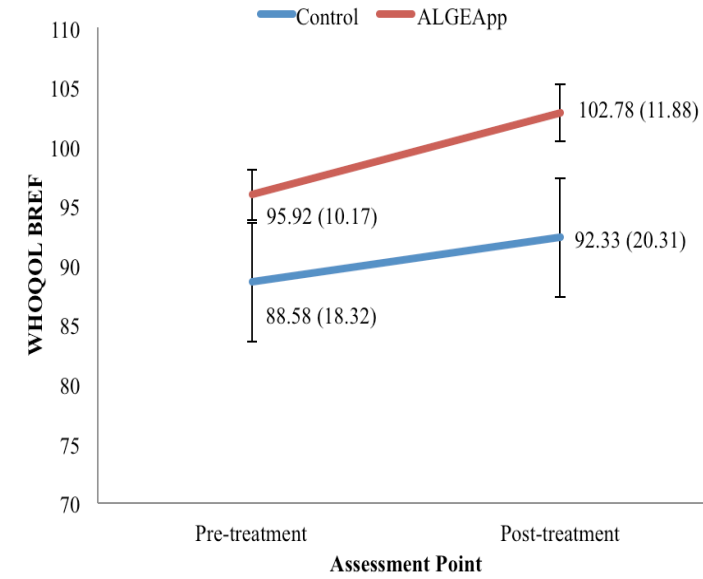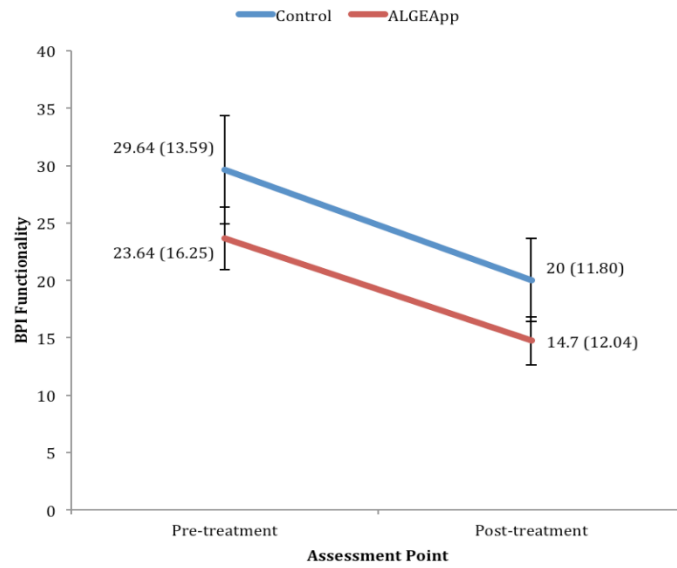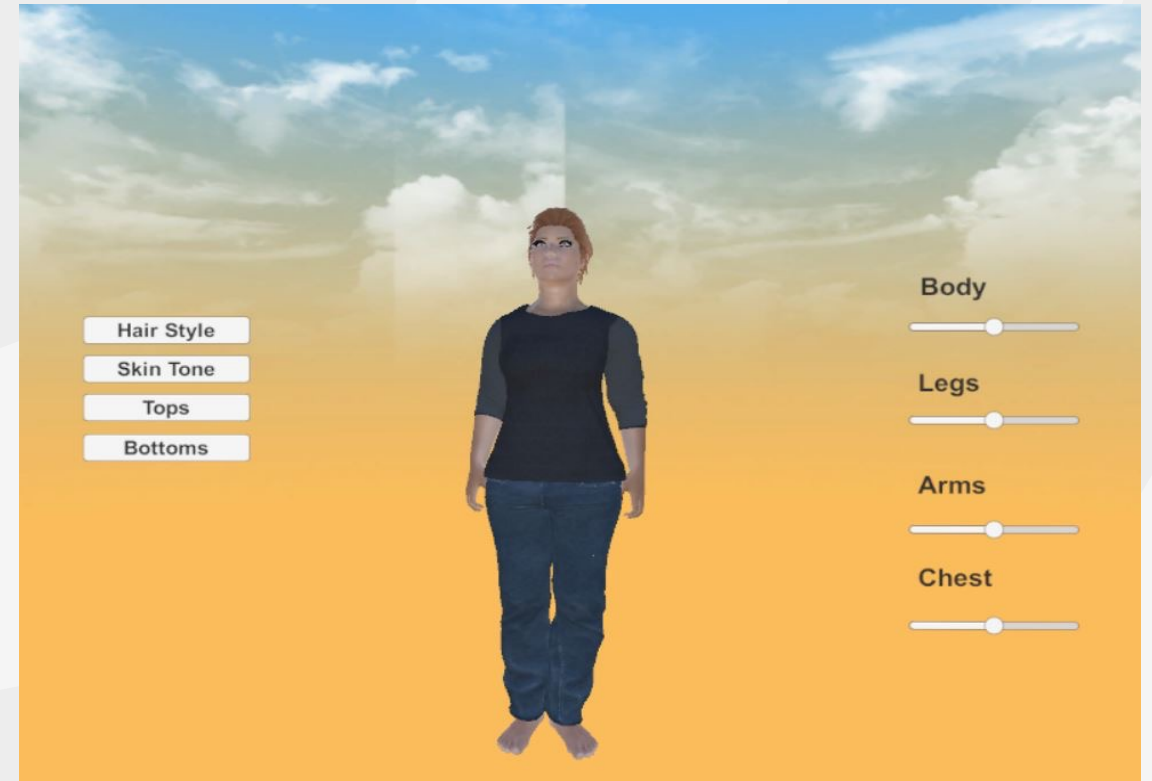
Multi-user Virtual Reality

- Anonymity
- Limits social stigma
- Presence of real therapist
- Potential to improve therapy engagement
- Eliminates travel and waiting time
- Flexible scheduling
- Strong social presence

Gorini, 2007; Gorini, Gaggioli, Vigna, & Riva, 2008.

Matsangidou, M., Otkhmezuri, B., Ang, C.S., Avraamides, M., Riva, G., Gaggioli, A., Iosif, D., & Karekla, M. (2020). "Now i can see me" designing a multi-user virtual reality remote psychotherapy for body weight and shape concerns. *Human–Computer Interaction.*

MUVR CO-DESIGN PROCESS OUTCOMES

Matsangidou, M., Otkhmezuri, B., Ang, C.S., Avraamides, M., Riva, G., Gaggioli, A., Iosif, D., & Karekla, M. (2020). "Now i can see me" designing a multi-user virtual reality remote psychotherapy for body weight and shape concerns. *Human–Computer Interaction.*

Values-based intervention for Body weight & Shape concerns

Participants:
- University undergraduate female students
- High-risk for developing an eating disorder (based on the Weight Concern Scale)
- N=14- Random assignment to either Values vs. Play therapy MUVR (7 in each condition)
- Mage=20 years (M=19.93, SD=1.77), with a Mweight=64.36 kg (SD=10.68; Range: 47.30 kg to 86.00 kg) and mean Body Mass Index (BMI)=24.25 kg (SD=3.23)
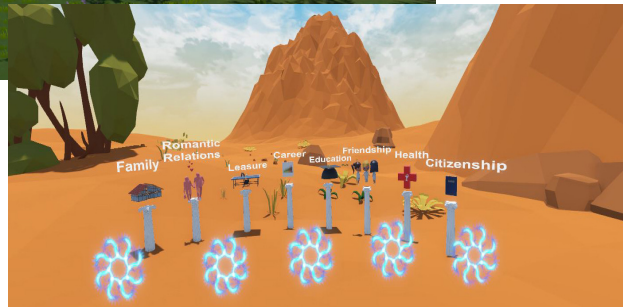
P#2: Yes, it is important to accept thoughts, but I think it is also important to try to decrease these thoughts and try to turn them into more positive ones. For example, I should try to lose weight and then of course I will not have these thoughts

P#4: When I take into consideration my values, and accept my unwanted thoughts, I do not place so much emphasis on the different parts of my body. My values prevail over anything else. This is a helpful experience and it helped me make sense of stuff in my life and clarified what is worth emphasizing in life.

P#6: It was very nice, I can realize that my weight is not the most important thing in the world, but i will not promise that I will never think about it.

P#5: I found it difficult to create my own avatar in order to look like me. It was emotionally difficult to look at my reflection in a mirror and realize that my appearance does not match with my desires.

- Quality rated as excellent, will definitely recommend to others, very satisfied, very useful, would go through this program again, achieved new learning from the program, good length of the program.

VALUEFLY Project

Comparing two values-based interventions for Flying Phobia
- **Personally meaningful values story vs. prosocial (help a child)**
- Higher number of steps completed in the VR exposure task = Greater approach behaviour
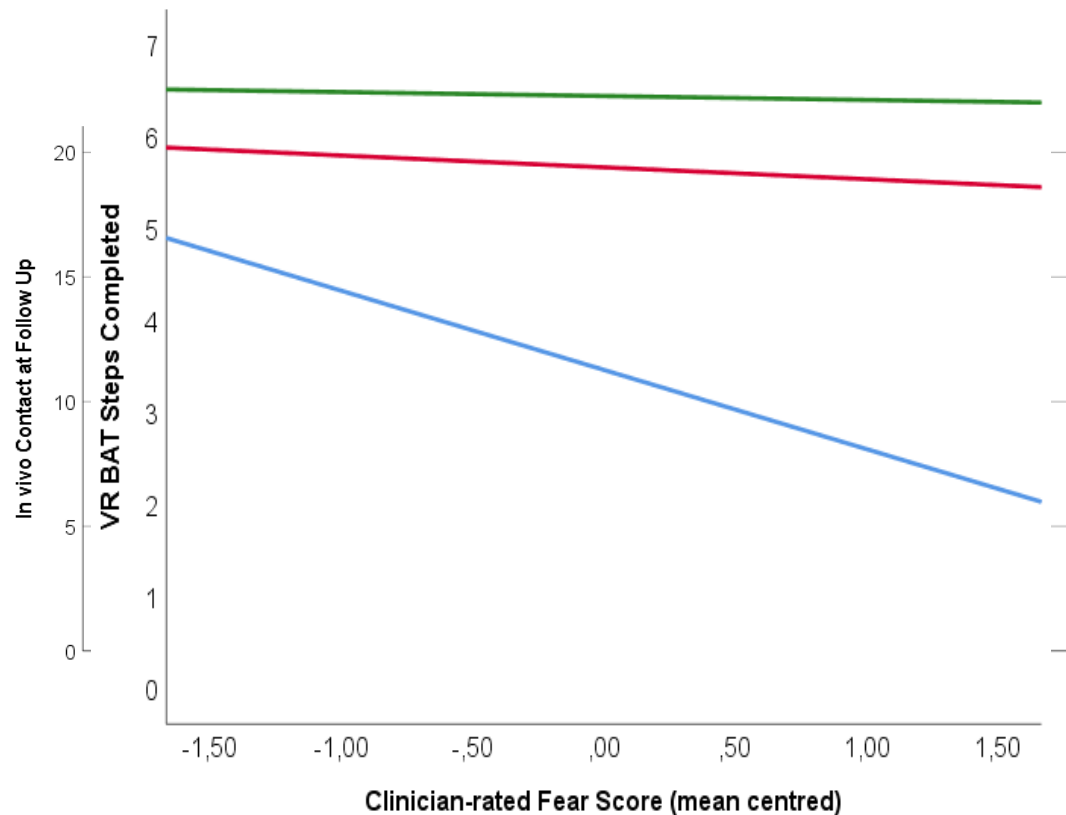
Have we developed the "perfect" therapist?

- Acceptable and feasible

- Effective (medium to high effect sizes)

- Engaging and may improve adherence and treatment dropout
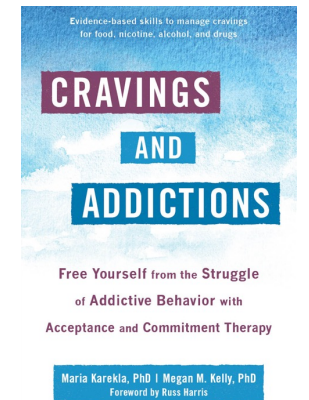
- Still have ways to go…

Next steps

- Expanding our programs & their reach

- Analyzing and publishing all the data collected

- Proceeding with our newest projects

  – Just-in-time and Just-right intervention

- Digitizing our ACT-based books

  – Prevention programs for children

  – ACT for cravings
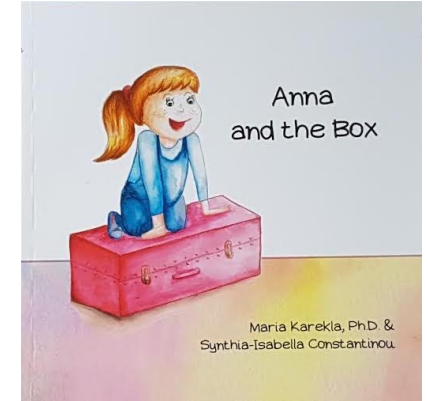
To order a copy of the book:
https://www.jccsmart.com/e-bill/invoices/2491/pay

Thank you!

To all the internal and external collaborators friends/perfect therapists all over the world

To our funders and all our participants

acthealthy

www.acthealty.org
www.algea.com.cy
mkarekla@ucy.ac.c