Digital Mental Health and Addiction Interventions for Adolescents, Young Adults and Families

Produced in Partnership:

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TRANSITIONAL AGE YOUTH (TAY)
webinar series

1) The Impact of Substance Use on the Developing Adolescent Brain

2) Who's Doing What? The Epidemiology of Adolescent Substance Use

3) Substance Use Interventions for Adolescents and Transitional Age Youth

4) Integrating Stigmatized Loss and Disenfranchised Grief into the SBIRT Model

amersa.org/resources/tay-webinar-series

TRANSITIONAL AGE YOUTH (TAY)
webinar series

5) Substance Use in Adolescents and Transitional Age Youth: Justice Involvement and Homelessness

6) **Digital Mental Health and Addiction Interventions for Adolescents, Young Adults and Families**

amersa.org/resources/tay-webinar-series

Webinar Presenter

Fred Muench, Ph.D.
President,
Partnership to End
Addiction
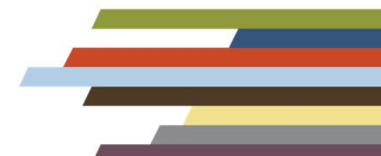
Partnership to End Addiction

Partnership to End Addiction is a national nonprofit that exists to:

- Empower families

- Advance effective care

- Shape public policy

- Change culture

We help the helpers

REDUCING STIGMA

FINDING QUALITY TREATMENT

SUPPORTING RECOVERY

RISK AND PROTECTIVE FACTORS

ADVOCATING FOR FUNDING

Presentation Acknowledgements

- Patricia Aussem
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- Shankar Ramkellawan
- Jack Sykstus
- Partnership Staff (lots of people!)

*No conflicts of interest related to addiction services. I have several patents on using passive stimulation to create cardiovascular resonance.

Presentation Objectives

- Ingredients of successful digital interventions

- The landscape of digital SUD interventions in general and for adolescents, young adults (AYA), and families

- Research on digital technologies from prevention to recovery for AYA

- Existing and low hanging fruit opportunities for practitioners and researchers

Technology is a Tool

The simplest form of technology is the development and use of basic tools.

The prehistoric discovery of how to control fire and the later Neolithic Revolution increased the available sources of food, and the invention of the wheel helped humans to travel in and control their environment.

Developments in historic times, including the printing press, the telephone, and the Internet, have lessened physical barriers to communication and allowed humans to interact freely on a global scale.

Tools can create new tools

https://en.wikipedia.org/wiki/Technology

But we have to use it the right way

HikingArtist.com
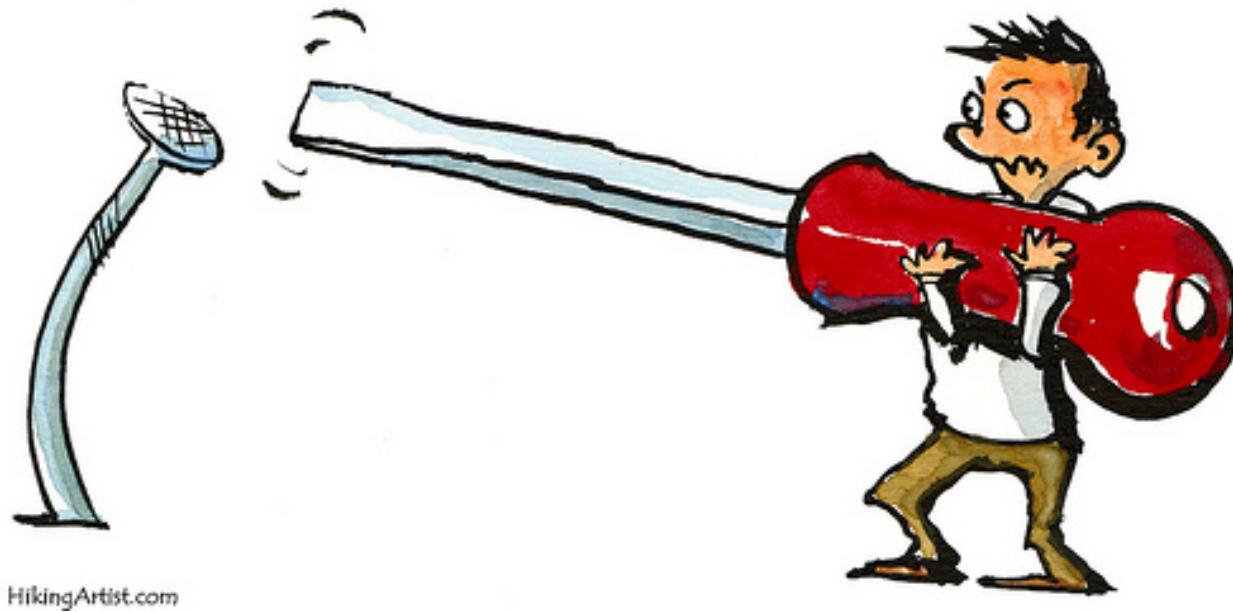
And be mindful of its power and downside

Barriers/Service Limitations

Intervention Target
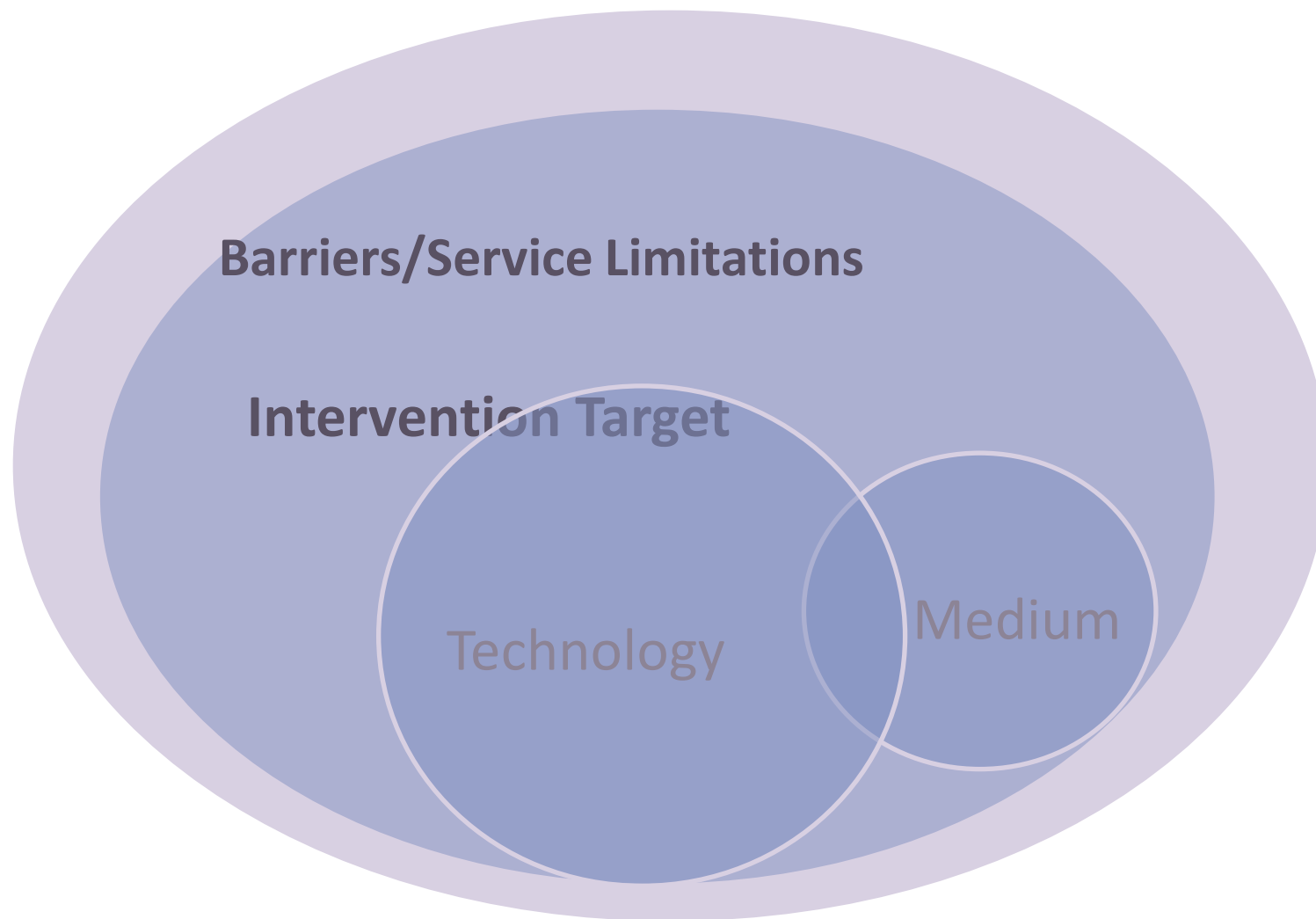
Technology

Medium

Technology mediums / modes offer enhanced opportunities to connect and intervene based on how people live

Episodic and **continuous**
Synchronous and **asynchronous**
Automated and human
Passive and active
Captured and ephemeral

*__Effortless__ and **Salient**

Technology Features & Applications

Feature	Applications
Voice & Text	• SMS, IVR, push alerts, emotional tone, natural language processing, vocal prosody, repeated brief assessment, psycho-edu, information, peer and specialist support, virtual agents, therapy, etc.
Camera & Video	• Telepsych, modeling, environmental monitoring, visual analysis, biomonitoring
Gyroscope & Activity Monitoring	• Activity monitoring, behavioral activation, sleep monitoring, arm movement
Geolocation	• Location, triggers, activity scheduling, etc.
Ambient Light, Sound, environmental Sensors	• Improved understanding of environment (eg bar versus home, dark versus light)
Proximity Sensors	• Other phones, social gathering, peer triggers
Add-ons & Wearables	• Physiological monitoring, reaction and arousal, alcohol sensing, drug sensing, passive stimulation for guidance and intervention

Technology mediums / modes have evolved to offer new opportunities that build off one-another

TV
- Reach/Dissemination/Scale
- Standardization

CD ROM
- Interactivity
- Personalization/Tailoring
- Adaptability

Web
- Data capture/Analytics
- Social interaction
- Stigma reduction
- Disclosure

Mobile Phone
- Salience/Triggers
- Effort
- Just-in-time adaptability

Sensors
- Precision
- Objectivity (relative)

What is tech good – and less good at doing?

Good	Concerns
Reach	Dehumanization
Disclosure	Reliance
Salience	Information Overload
Analytics-Predict	Messy/unreliable data
Personalization	Privacy
Adaptation	Security
Connectivity/Just-in-time	Maintenance

Acceptability & Comfort

- Youth use technology and like it

- Youth prefer digital health connections for stigmatizing topics

- There is no digital divide by race, ethnicity or SES in youth

- The greatest digital divide is in older adults and lack applications in different languages

Reach / Connection

Cognitive Salience
Emotional Salience
Behavioral Salience
Environmental Salience
Social Salience
Object Salience

Disclosure

- Youth and adults disclose significantly more to digital platforms than in person.
- Digital mental health communication vs. in-person preferences moderated by condition (anxiety) and type of disclosure (stigmatizing)
- Youth **prefer** to talk about **sensitive topics** over text but in-person for less stigmatizing topics.

Social Penetration Theory

Passive & Active Data in the Real World

Passive & Active Data
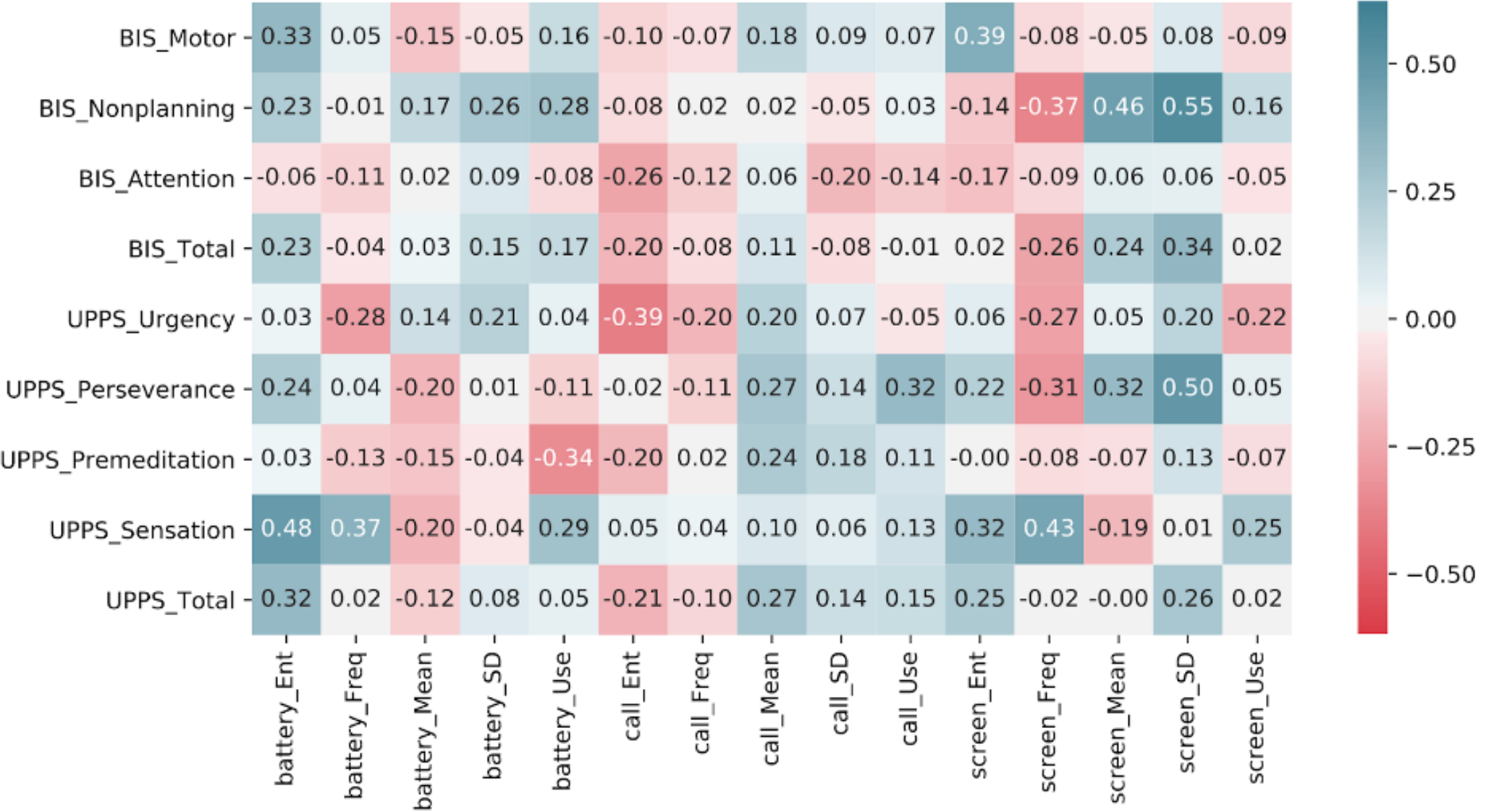
Personalization
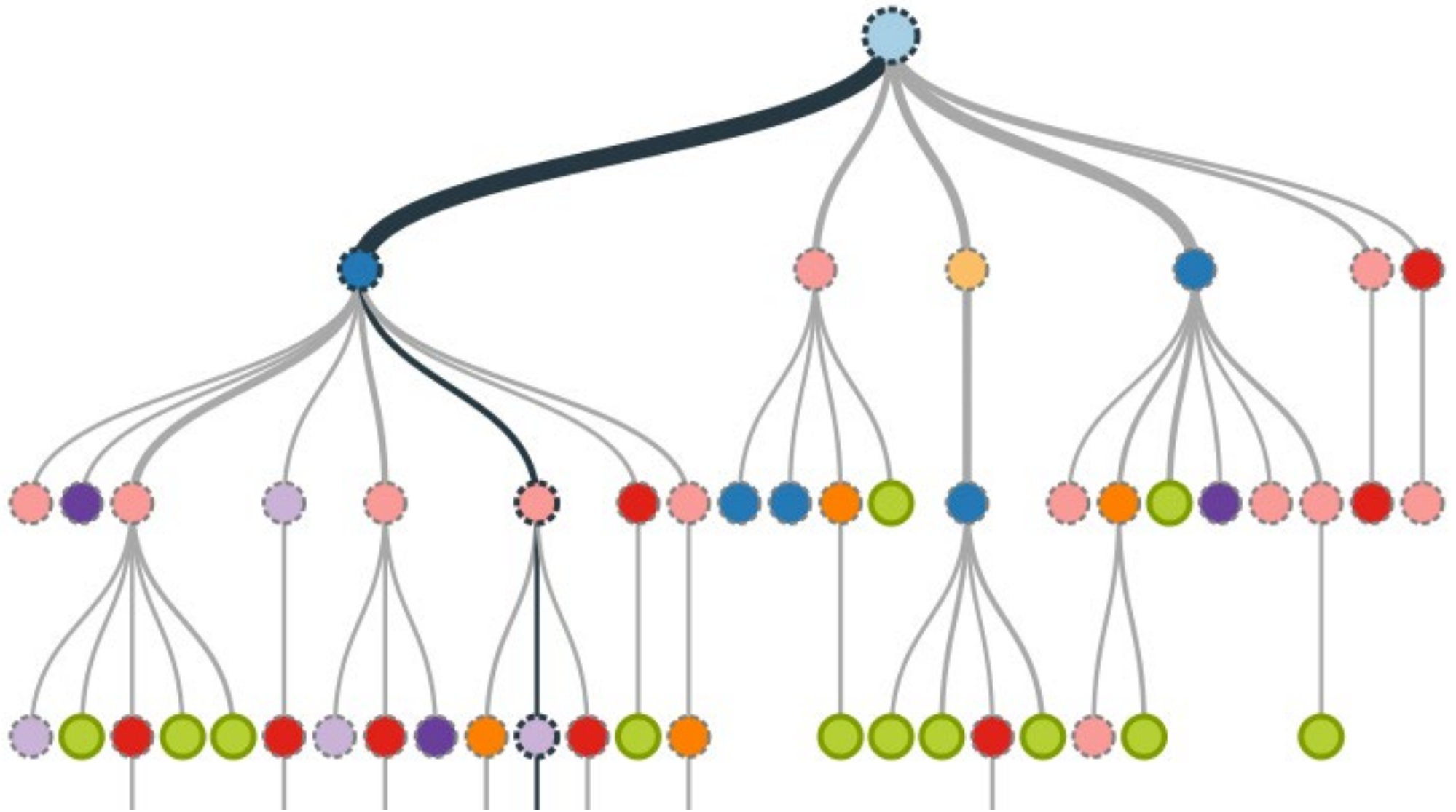
Mixed Just-in-Time Adaptive Models
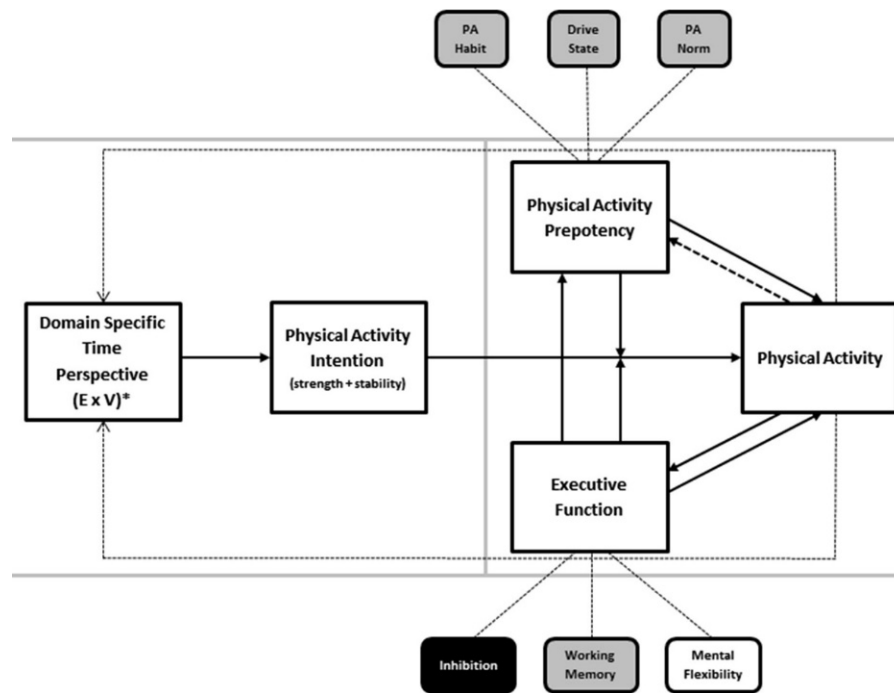
Self-Regulation Theory
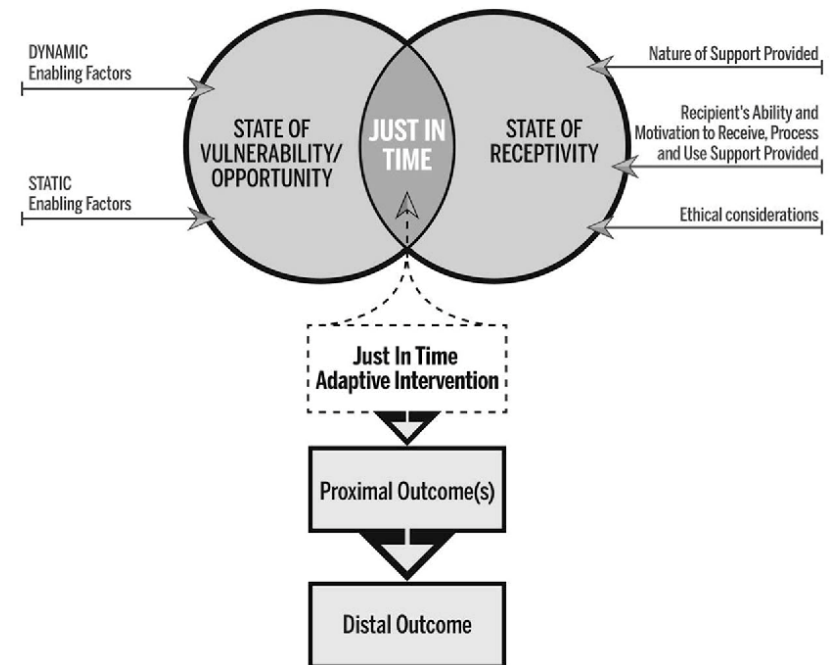
Nahum-Shani, Hekler, Spruijt-Metz, 2015

Message Timing and Drinking

Muench F., van Stolk-Cooke K, Kuerbis A, Stadler G, Baumel A, Shao S, et al. (2017). A Randomized Controlled Pilot Trial of Different Mobile Messaging Interventions for Problem Drinking Compared to Weekly Drink Tracking. PLoS ONE 12(2): e0167900. PMC5287456

Ongoing Connection

Engage

Sustain
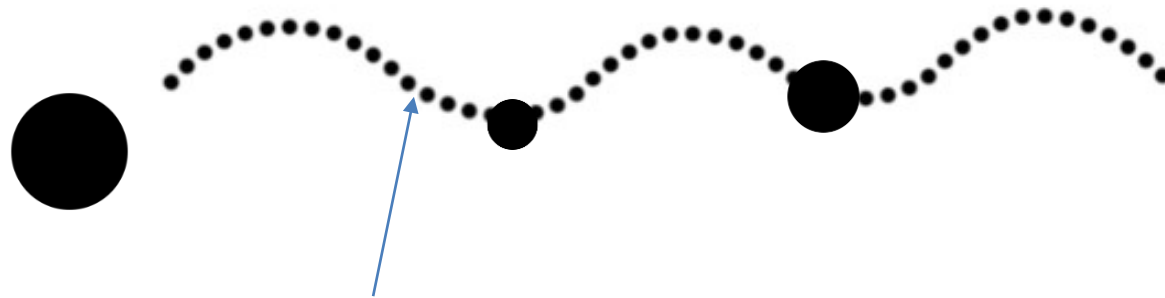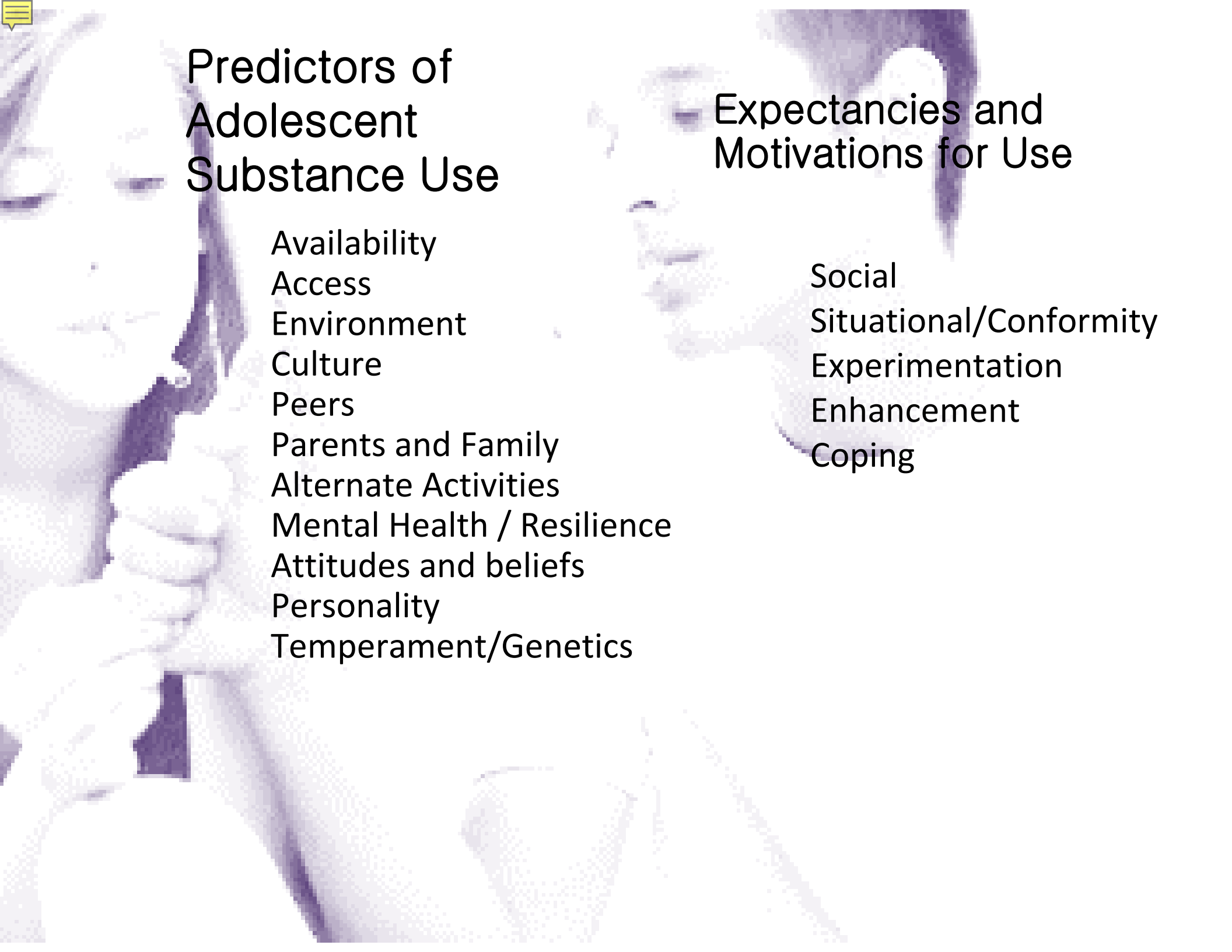
Micro interventions foster salience and timely support

Adolescent Developmental Needs

- Peer connection
- Independence
- Exploration
- Resilience/Confidence
- Identity formation
- Security

Predictors of Adolescent Substance Use

Availability
Access
Environment
Culture
Peers
Parents and Family
Alternate Activities
Mental Health / Resilience
Attitudes and beliefs
Personality
Temperament/Genetics

Expectancies and Motivations for Use

Social
Situational/Conformity
Experimentation
Enhancement
Coping

Technology Aligns with Developmental Reinforcers

- Social connections
- Entertainment
- Information-seeking
- Passing time
- Reinforcement
- Affective learning
- Mastery & Self-efficacy

c.f. Giovanelli A, Ozer EM, Dahl RE. Leveraging Technology to Improve Health in Adolescence: A Developmental Science Perspective. J Adolesc Health. 2020 Aug;67(2S):S7-S13

AYA Review References

*Sanci L. (2020). The Integration of Innovative Technologies to Support Improving Adolescent and Young Adult Health. *The Journal of adolescent health : official publication of the Society for Adolescent Medicine*, *67*(2S), S1–S2

Marsch, L. A., & Borodovsky, J. T. (2016). Technology-based Interventions for Preventing and Treating Substance Use Among Youth. *Child and adolescent psychiatric clinics of North America*, *25*(4), 755–768.

MacDonell KW, Prinz RJ. A Review of Technology-Based Youth and Family-Focused Interventions. Clin Child Fam Psychol Rev. 2017 Jun;20(2):185-200.

Pradhan AM, Park L, Shaya FT, Finkelstein J Consumer Health Information Technology in the Prevention of Substance Abuse: Scoping Review J Med Internet Res 2019;21(1):e11297

MacDougall, S., Jerrott, S., Clark, S., Campbell, L. A., Murphy, A., & Wozney, L. (2021). Text Message Interventions in Adolescent Mental Health and Addiction Services: Scoping Review. JMIR Mental Health, 8(1), e16508.

Broad Statements

- The largest literature on digital interventions for AYA is for nicotine and alcohol.
- The largest literature is for college age AYA.
- There is a heavy emphasis on prevention/early intervention in the computer/web literature while SMS, online social support, and mobile apps trend more severe.
- After the brief digital feedback literature, text messaging and general social support are the most studied mediums of mobile intervention.
- We need more research on digital interventions for more severe AYA SUD populations and for different substances.
- We need more research on caregiver and family based digital interventions.

Qualitative Research Findings with AYA

- Majority of AYA don't feel consequences of use until interferes with developmental milestones

- AYA get turned off by fear based messaging - works for younger adolescents

- Believable and credible
    - Independence and resilience (Truth, ATI)

- Reflect their values and views about their own health and well-being

- Connection and peer support

Entertainment Serious Games (All)
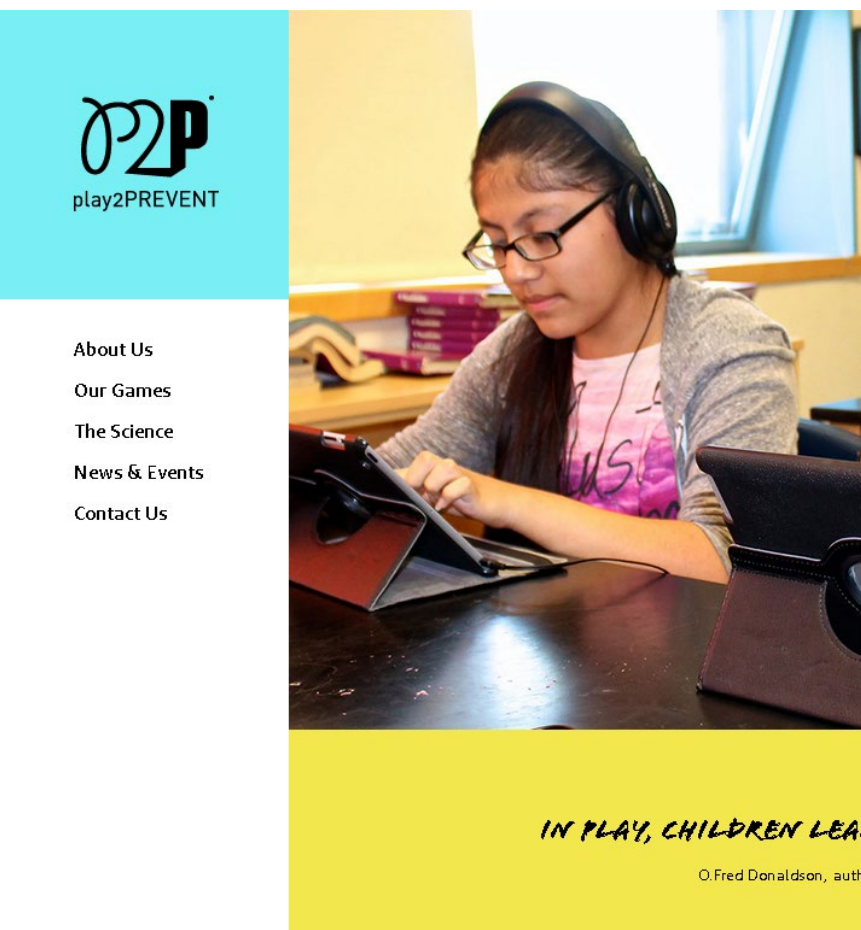
Play2Prevent

Serious games, defined as games with a primary purpose other than pure entertainment to educate, communicate, and improve health.*

Both active and passive mechanisms

Reviews suggested that serious games have small positive effects on health-related behaviors and their determinants but that the effect is largely fleeting.

Stealth Skill Building

Night of the Gummies
Flavor Monsters
DXM Labworks
Tunnel Tail

*Use metaphors that build on key prevention concepts to reduce peer pressure
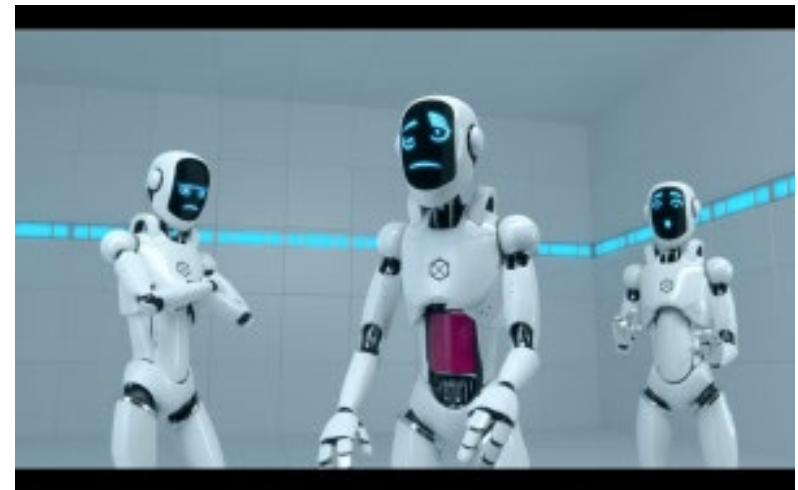
Digital Normative Feedback and Brief Personalized Feedback (Primary & Secondary)

Normative Feedback, Personalized Feedback, Costs/Consequences, Reduction Strategies

- Increase problem awareness
- Primarily with college students
- Results are mixed and depend on numerous factors
- Reviews of **social norms** feedback reveal little effect
- Overall, personalized may be better than normative and normative should be tailored to the experiences.
- Targeted (e.g. specific event) may be better
- In-lab appears better than remote
- Overall positive effects fleeting

Social Connection Interventions (Secondary & Tertiary)

- Multiple Mediums with emphasis on social media sites, SMS and app based group connection.
- Peers and interactive social elements
- Overall efficacy of interventions that use various social connection interventions promising, but varies among target and program.
- Peer Recovery Support and helplines.
- Real world, real world, real world!
- It is easy – anyone can do it.

(Wong et al., 2020; Gilmour et al. 2020)
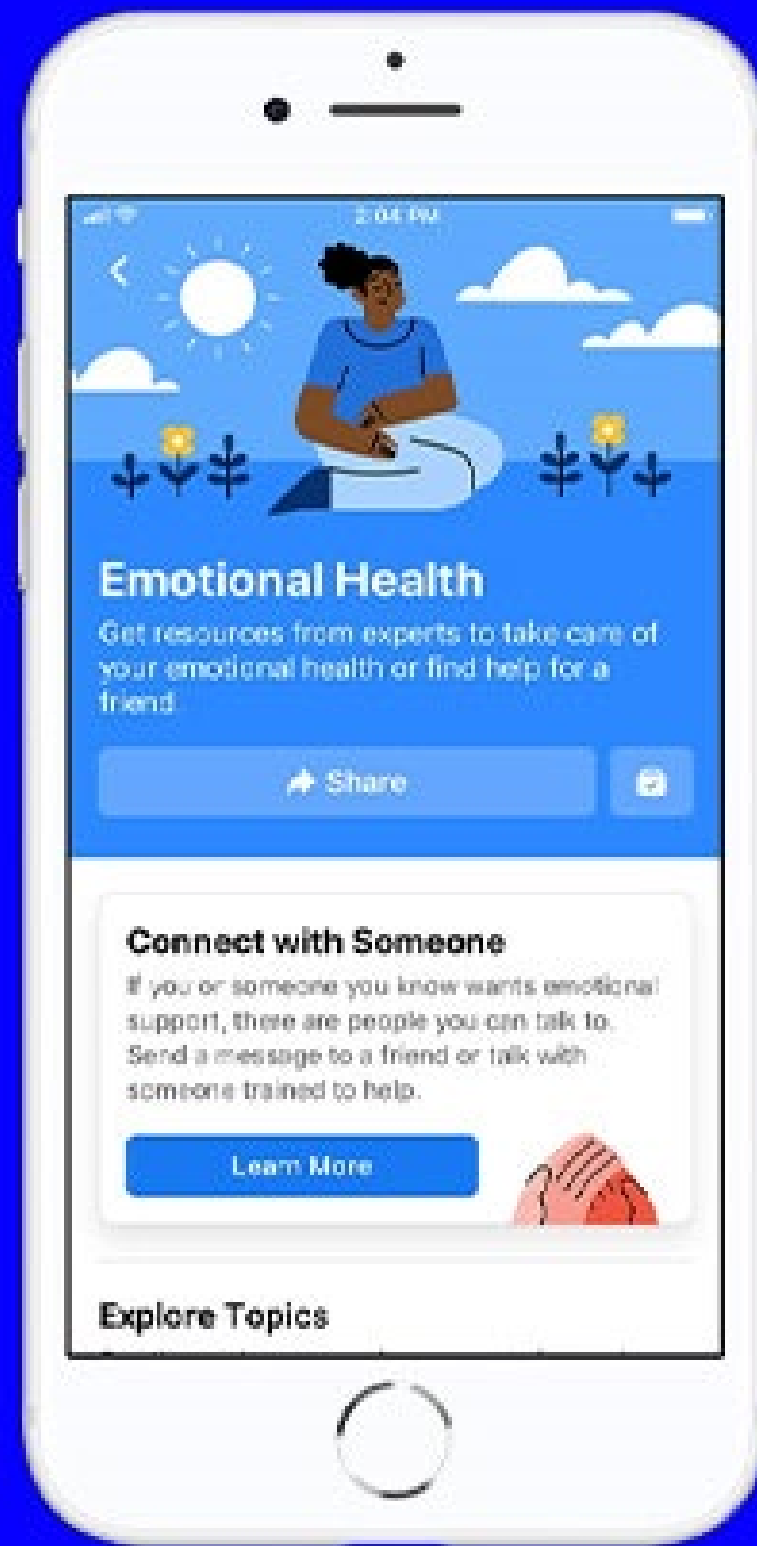
Skills Training & Role Play (Web & Apps)

- CBT
- Skills training
- Role Play
- Contingency Management
- *Mostly +21

(CBT4CBT, Carroll et al; Check-up and choices, Hester et al; TES/PEAR, Marsch et al.; Dynamicare, Gastfriend et al. and many more! but few <25.

reSET™: Patient-facing features

Cravings & Trigger Assessments

Patient

Mobile Dashboard

CBT Modules

Fluency Training

Contingency Management

reSET™ and reSET-O™ are not available for sale in the USA
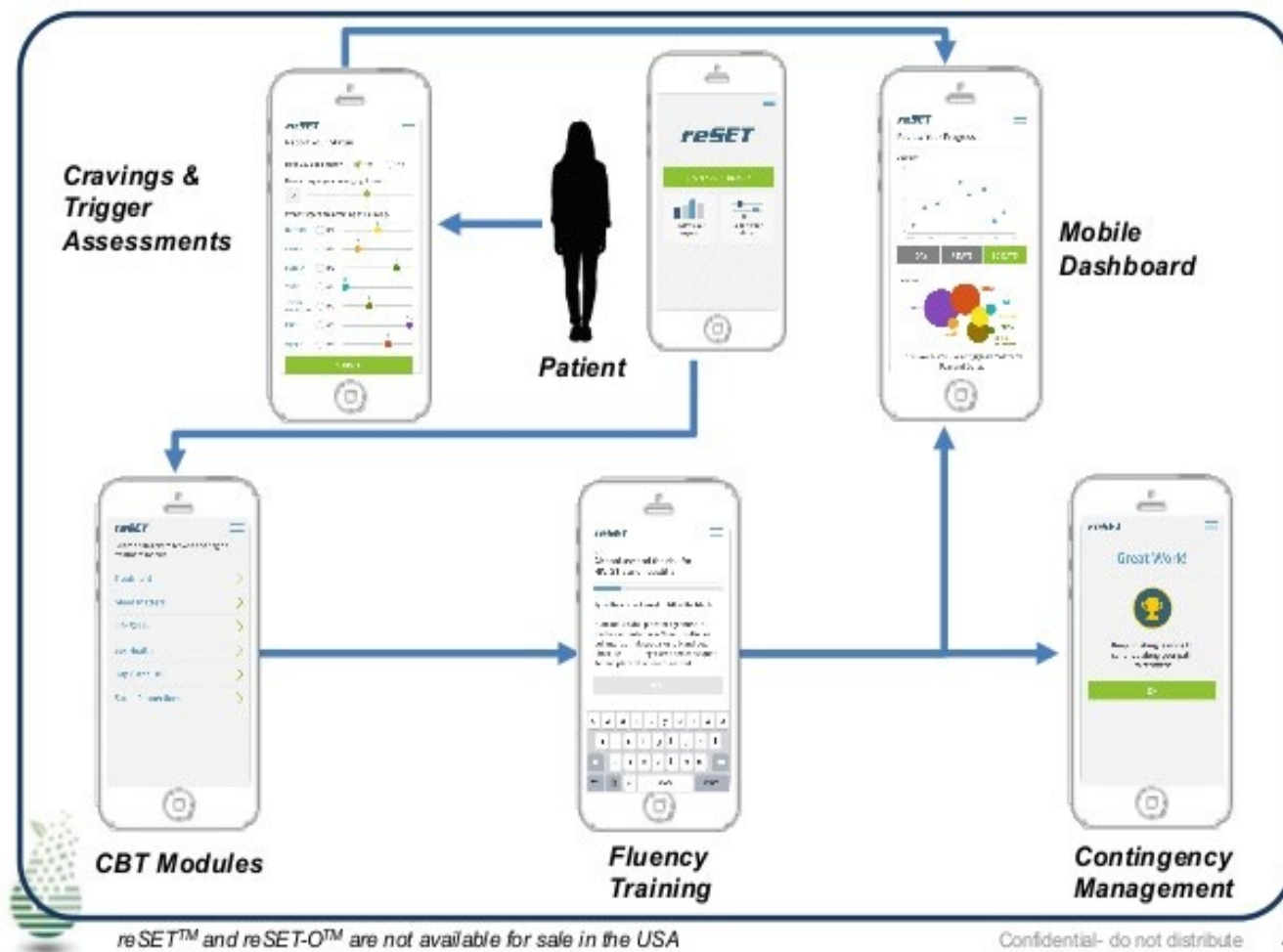
Sustained Engagement is a Problem

App 30-day retention by primary incorporated technique.
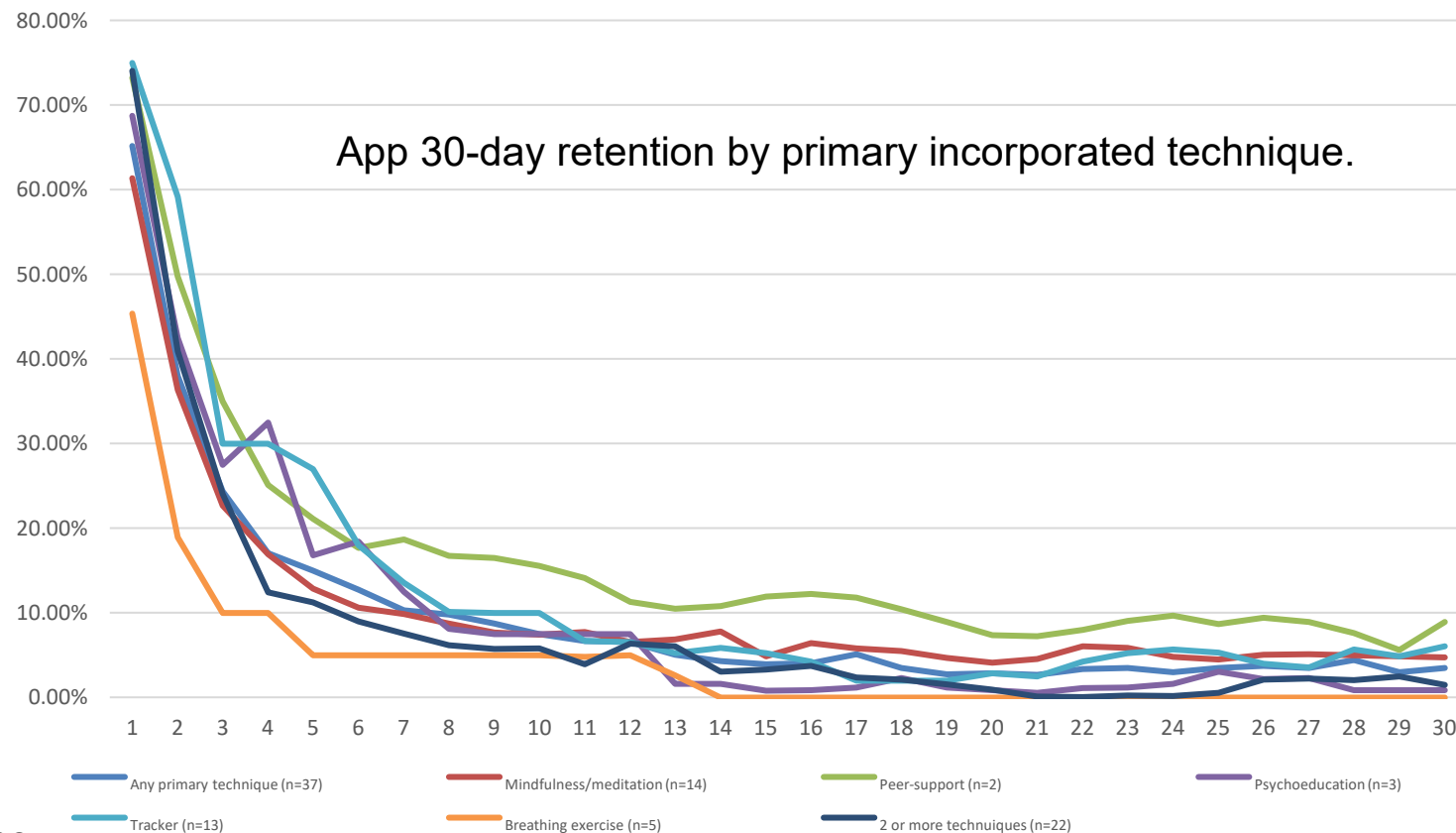
Closed systems require effort

	Any primary technique (n=37)	Mindfulness/meditation (n=14)	Peer-support (n=2)	Psychoeducation (n=3)
Tracker (n=13)	Breathing exercise (n=5)	2 or more technuiques (n=22)		

36

Baumel, A, **Muench, F**, Edan, S, Kane, JM. (2019). Objective user engagement with mental health apps: systematic search and panel-based usage analysis. Journal of Medical Internet research, 21(9), e14567

AYA Text Messaging

- Best outcomes for binge drinking
- Mixed outcomes other but overall positive
- Focus on commitment and goals
- Proactive = high engagement
- Just-in-time features highlighted

*Refer to Brian Suffoletto's work!

MacDougall, S., Jerrott, S., Clark, S., Campbell, L. A., Murphy, A., & Wozney, L. (2021). Text Message Interventions in Adolescent Mental Health and Addiction Services: Scoping Review. JMIR Mental Health, 8(1), e16508.
Suffoletto, B., Huber, J., Kirisci, L., Clark, D., & Chung, T. (2020). The effect of SMS behavior change techniques on event-level desire to get drunk in young adults. Psychology of addictive behaviors, 34(2), 320.

TRAC II Study

- April to June, 2016
- 1 urban ED
- Screened n=143 YAs 18-25 years
  - AUDIT-C score >3 for women or >4 for men
- Enrolled n=50 in 2-week SMS Run-In
  - SMS Assessments only
- Responded to at least 50% SMS queries & opted-in (n=38)
  - 4-weeks (n=9)
  - 8-weeks (n=10)
  - 12-weeks (n=10)
  - >12-weeks (n=9)

Thursday

Goal=10 if mean max drinks>10
Goal=X-1 if mean max drinks>4/5 & ≤10
Goal=4/5 if mean max drinks ≤5

Weekend Drinking Plan — no → Abstinence Plan Support Message 1

48% | yes

Adaptive Drinking Limit Goal* — no → Goal Resistance Message

95% | yes

Goal Support Message

Friday & Saturday*
Only if Drinking Limit Goal Commitment Made

Drinking Plan Today — no → Abstinence Plan Support Message 2

yes

42% | Goal Self-Efficacy Score | 58%
Score 1 to 3 | Score 4 to 5

Low Self Efficacy Boost Message | High Self Efficacy Reinforcing Message

Sunday

Weekend Max Drinks (X)

20%
0 → Abstinence Message

X> goal | X≤ goal | ≥4/5 | <4/5

Goal Not Met Message | Goal Met Message | Hazardous Drinking Message | Non-hazardous Drinking Message

5% | 35% | 6% | 34%

*If Weekend Drinking Limit Goal Made | *If Weekend Drinking Limit Goal Not Made or No Weekend Drinking Plan

Conversational Agents / AI

- Artificial intelligence (AI) conversational agents have the ability to offer contextual and **always-available** support.
    - Include text based conversational agents (chatbots) and virtual avatars (animation/VR).

- Studies have shown feasibility and overall positive for mental health improvements in mental health in adolescents and adults.

- Addiction studies primarily smoking with good feasibility but limited overall literature base.

*Adolescents like conversational agents – they add distance and can be a great initial strategy for engagement to triage care and 24-7 care.

Vaidyam AN, Wisniewski H, Halamka JD, Kashavan MS, Torous JB. Chatbots and Conversational Agents in Mental Health: A Review of the Psychiatric Landscape. Can J Psychiatry. 2019 Jul;64(7):456-464. doi: 10.1177/0706743719828977.

One note...

I did not talk about video-
chat because it is just
general therapy now

For Profit Digital Behavioral Health Companies Targeting or Allowing for Interaction with Teens and Families

WHITE STAR CAPITAL

MENTAL HEALTH TECH LANDSCAPE

CCBT

HEADSPACE · joyable · 10% HAPPIER
unmind · pzizz · Big Health
Sync Project
PEAR THERAPEUTICS · Calm · SIMPLE HABIT
pacifica · QuitGenius · AKILI
INSCAPE · happify · moodpath · CureApp

33% OF COMPANIES ANALYZED / $5.8M AVG FUNDING AMOUNT

TELEPSYCHIATRY

BlueCall · competencer · Selfapy
talkspace · LYRA · Ginger.io
Able To
Kip · regroup THERAPY
ieso
Workit Health
Breakthrough · 1 DOC WAY · wecounsel

16% OF COMPANIES ANALYZED / $6.7M AVG FUNDING AMOUNT

PROVIDER TOOLS

Quartet · inflexxion · CMHC Systems
valant · core SOLUTIONS · silvercloud · mindstrong
agile health · MindCare SOLUTIONS · ValeraHealth

15% OF COMPANIES ANALYZED / $5.7M AVG FUNDING AMOUNT

CONSUMER TOOLS

WEConnect · webpsychology · inquisithealth
huddle · connected health · THRIVE GLOBAL
find circles. · Remente · TalkLife

13% OF COMPANIES ANALYZED / $1.8M AVG FUNDING AMOUNT

HARDWARE

ybrain · RENDEVER · CARROT
NEUROFLOW · muse the brain sensing headband
psious · somatix Data with a purpose
find-me · feel · FLOW
sana · Limbix · Kognito

12% OF COMPANIES ANALYZED / $1.1M AVG FUNDING AMOUNT

APPLIED AI

meQuilibrium · shine · neurotrack
Woebot · spring · koko · cognoa
BIOBEATS · AVALON Ai · bark · Psyomics Transforming Mental Health

11% OF COMPANIES ANALYZED / $3.8M AVG FUNDING AMOUNT

DIGITAL ADDICTION SOLUTION LANDSCAPE

ROCK HEAL+H

ALCOHOL

HIP SOBRIETY

DRUGS

TOBACCO

PEAR THERAPEUTICS

weconnect

SG Sober Grid

epidemic solutions

InteraSolutions

MOBER

Hey,Charlie

DynamiCare HEALTH

Marigold HEALTH

Triggr Health

Workit Health

Sober.ly

ascent CONNECT. HOPE. LIVE.

CHESS HEALTH Real Evidence. Real Recovery.

CHRONO THERAPEUTICS

PIVOT

agile health
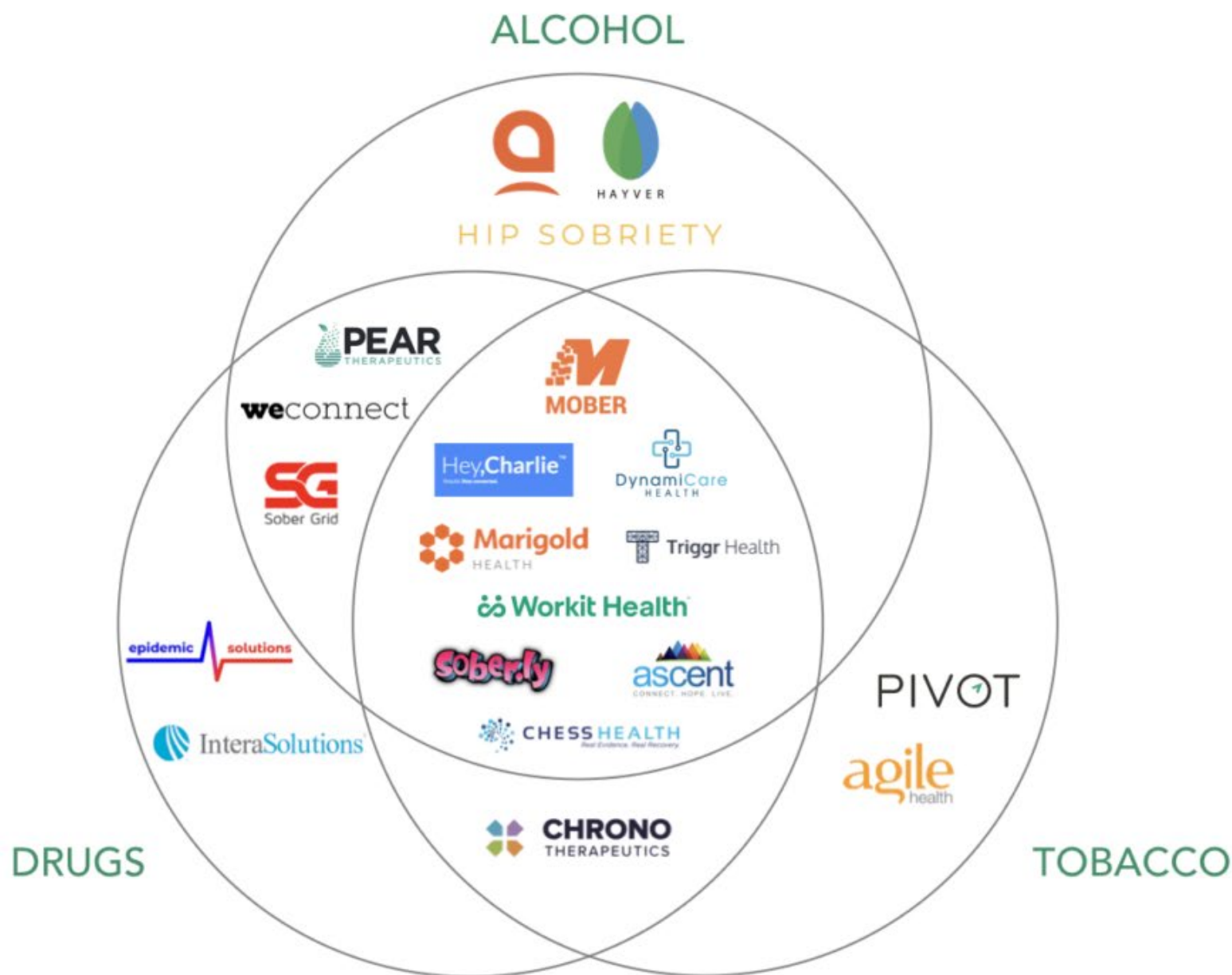
Note: Includes companies intended to treat people with a diagnosed SUD as well companies assisting people who want to minimize their use of substances but do not have a diagnosis; Excludes medication adherence, mental health, and pain management companies whose primary focus is not addiction

Self-Guided Apps
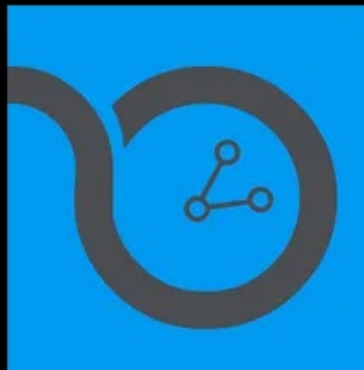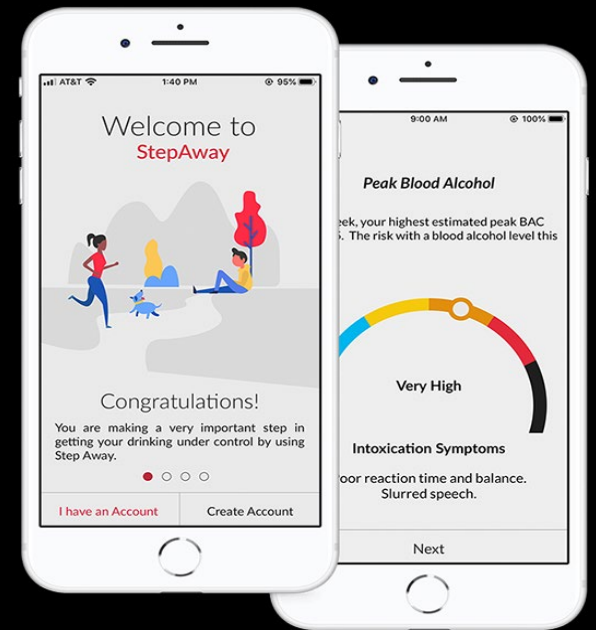
Traditional Treatment Centers are Embracing Digital (Hazeldon, Caron, Wellbridge, etc)

Non-Profits, States and Mutual Support Groups Are Embracing and Leveraging Technology

Family and Caregiver Treatments

AYA

Barriers to Family Engagement

A review of the barriers to family and concerned significant other focused care highlights **the opportunity for digital therapies**:

- Trouble with travel, **coordinating schedules**, insufficient time, lack of resources, location barriers etc.

- Stigma, family blaming, **unengaged family members**, prior experiences, etc.

- **Organizational expertise**, scheduling, billing that does not reward family engagement, etc.

- Alanon philosophy, **ignoring relevance of concerned other**.

- Ignoring treating the family as the unit of intervention.

Parent and Family Training

- Limited empirical literature for addiction prevention and SUD digital interventions for parents and families.

- Large literature on online digital parent training for childhood disruptive disorders.
  - Overall effective for both self-care and child symptoms

- Telehealth / video chat literature more prevalent for parent and family mental health care.

- Provider and peer phone based interventions effective

- Emerging literature on text messaging to increase parental self-efficacy and care in mental health.

- Large window of opportunity!

Family / Caregiver Digital Intervention References

- Jansen R, Reid M. Communication Technology Use by Caregivers of Adolescents With Mental Health Issues: Systematic Review. JMIR Mhealth Uhealth. 2020 Aug 19;8(8):e13179.
- Thongseiratch, T., Leijten, P. & Melendez-Torres, G.J. Online parent programs for children's behavioral problems: a meta-analytic review. *Eur Child Adolesc Psychiatry* **29,** 1555–1568 (2020).
- Harris, M., Andrews, K., Gonzalez, A. *et al.* Technology-Assisted Parenting Interventions for Families Experiencing Social Disadvantage: a Meta-Analysis. *Prev Sci* **21,** 714–727 (2020).
- Chu JTW, Wadham A, Jiang Y, et al. Effect of MyTeen SMS-Based Mobile Intervention for Parents of Adolescents: A Randomized Clinical Trial. *JAMA Netw Open.* 2019;2(9):e1911120.
- Wrape, E. R., & McGinn, M. M. (2019). Clinical and ethical considerations for delivering couple and family therapy via telehealth. *Journal of Marital and Family Therapy*, *45*, 296-308.
- Carpenter, K. M., Foote, J., Hedrick, T., Collins, K., & Clarkin, S. (2020). Building on shared experiences: The evaluation of a phone-based parent-to-parent support program for helping parents with their child's substance misuse. *Addictive Behaviors, 100*.
- Hogue, A., Becker, S. J., Fishman, M., Henderson, C. E., & Levy, S. (2021). Youth OUD treatment during and after COVID: Increasing family involvement across the services continuum. *Journal of Substance Abuse Treatment*. DOI: 10.1016/j.jsat.2020.108159

Consumer Programs (Prevention & Intervention)

PREP – Prevention Resources and Education for Parents/Caregivers

Parent CRAFT

SMART Recovery Family & Friends
Help For You and Your Loved Ones

Are you looking for resources to help you support someon
addiction? Is someone else's addiction negatively affectin
seeking an alternative to tough love? We provide effective
both you and your loved one. Our methods are based on t
and CRAFT Therapy (Community Reinforcement & Family

Lesson 8: How do I allow natural consequences for my child?

LESSON 8

How do I allow natural consequences for my child?

Partnership Consumer Programs

Helpline

Bilingual specialists provide support, guidance and resources

Personalized plan for your family

Drugfree.org

Science-based information and resources to help you and your family

Guides, e-books, videos and more

Help & Hope by Text

Personalized and supportive messages sent straight to your mobile device

E-Learning

Self-paced course addressing teen substance use

10 lessons strengthen parenting skills and offer tools and strategies

Peer Parent Coaching

Work one-on-one with a peer parent coach who has "been there" and can relate to your family's experience with substance use

Online Support Community

Live online gatherings hosted by Peer Parent Coaches

Opportunity to find support and connection

*Note: Does not include our provider training technical assistance programming for families

The Support Journey

Multi-channel Engagement

Preferred Mode of Communication (Phone, video-chat, SMS, Chat, Facebook, Whats App)
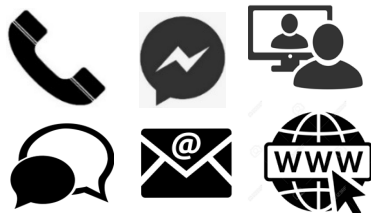
Assess

Passive & Active Assessment

Curate (Feedback)

Personalize to each person's unique needs with immediate and ongoing feedback

Synchronous & Asynchronous Automated & Human Support

Adapt

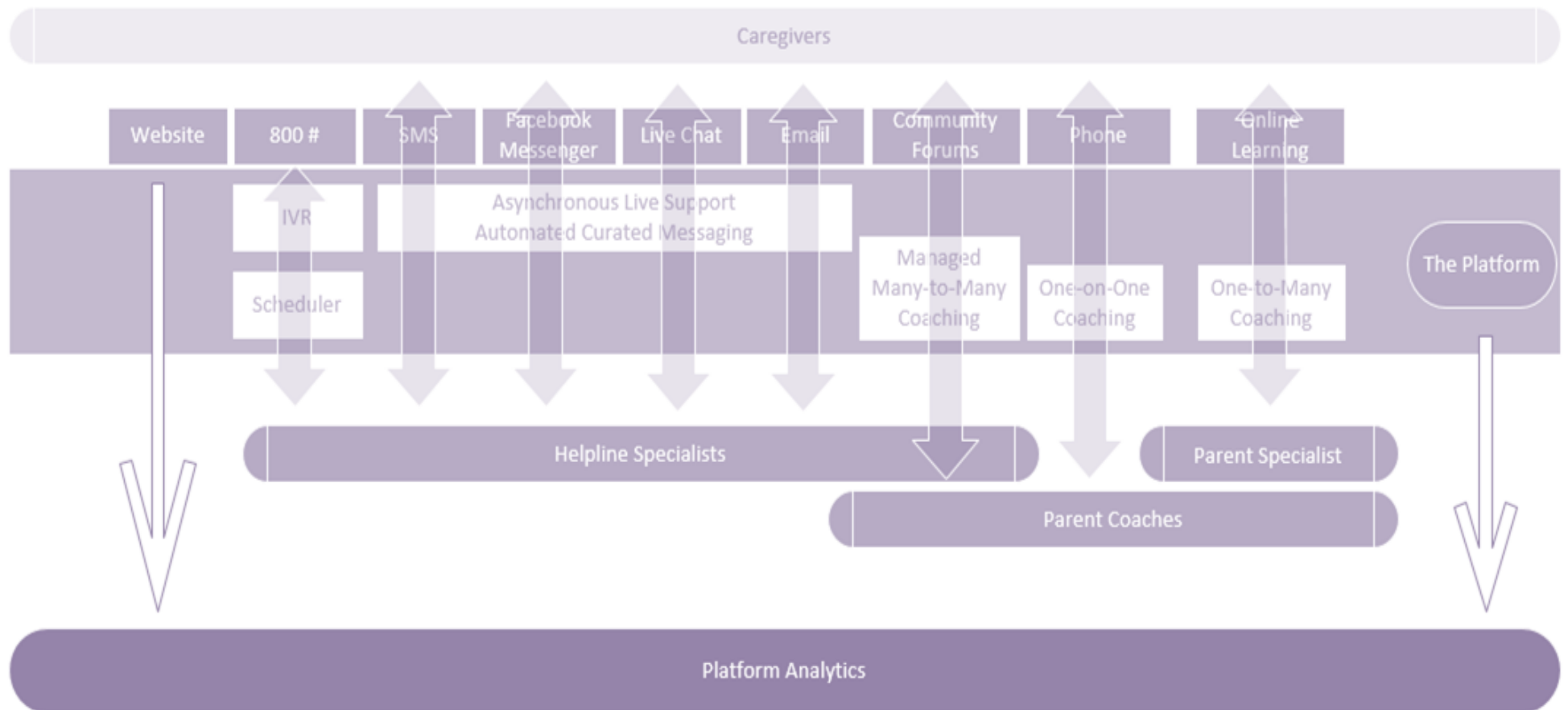Adapt through ongoing assessment that changes the program with the changing needs
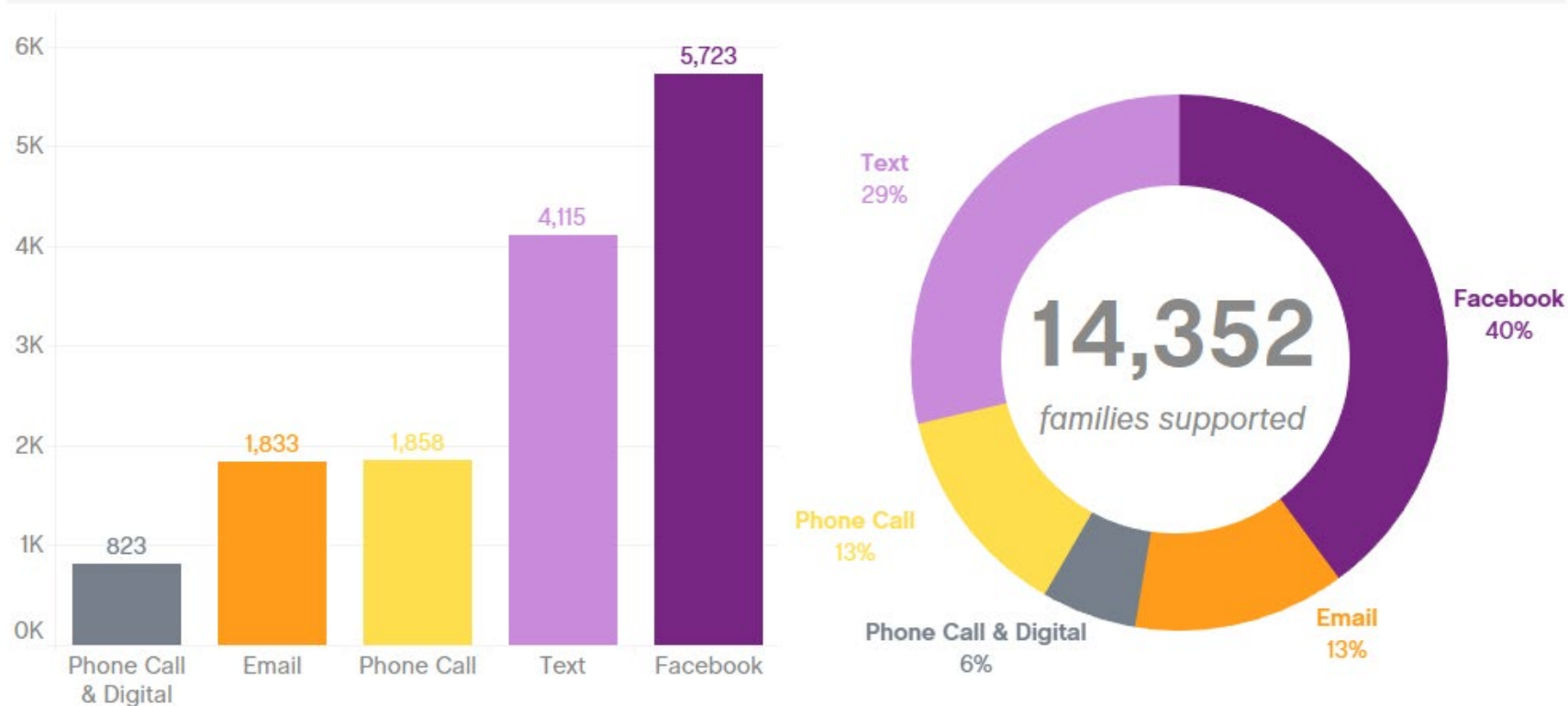
Localize

Embedded referrals to in-person services
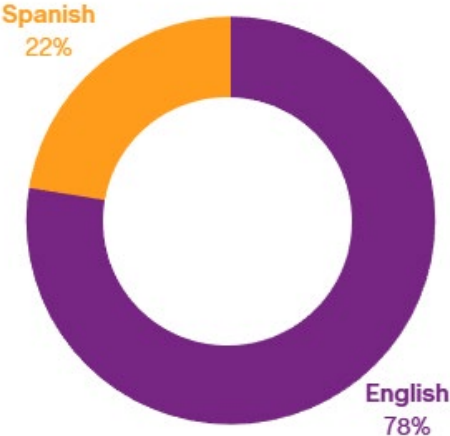
Omni-Channel Communication
Partnership Helpline Example

Helpline: Families Supported by Mode of Service (2020)

Bar chart values:
- Phone Call & Digital: 823
- Email: 1,833
- Phone Call: 1,858
- Text: 4,115
- Facebook: 5,723

Donut chart: **14,352** families supported
- Facebook 40%
- Email 13%
- Phone Call & Digital 6%
- Phone Call 13%
- Text 29%

Families supported data include all families who reached out to the helpline in 2020. They are split up by mode of service: Facebook, Text, Phone Call, Email, and Phone Call & Digital. These categories are the methods through which families can access the helpline. Families who enter the helpline through a digital mode of service (i.e., Facebook, Email, or Text) *and* schedule at least one phone call with the helpline are included in the Phone Call & Digital category. This category is only effective beginning in May 2020.

2020 Helpline Stats (Sample Only)
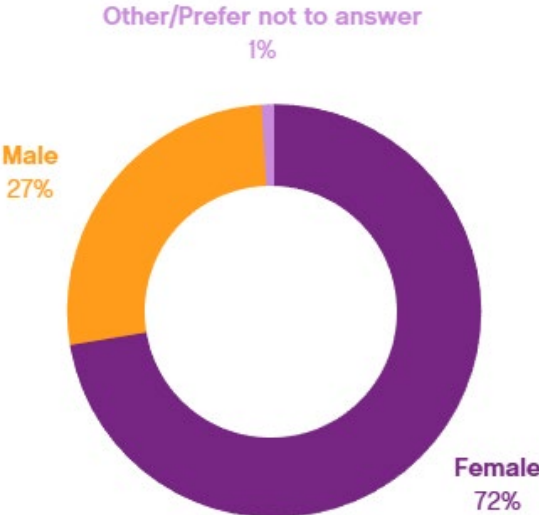
Client Language

Spanish
22%

English
78%

Sample Size
9,511

Client Gender - Calls Only

Other/Prefer not to answer
1%

Male
27%

Female
72%

Sample Size
2,018

Loved One Gender

Other Gender
1%

Female
30%

Male
69%
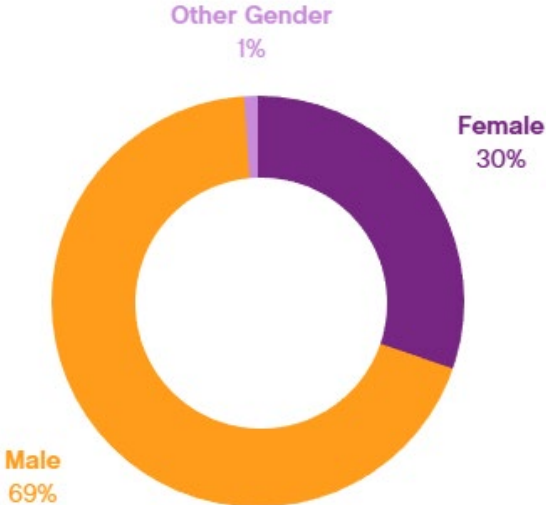
Sample Size
3,387

2020 Helpline Stats (Sample Only)

Loved One Age

- 12 or younger 1%
- 13-17 27%
- 18-30 50%
- 31-40 15%
- 41 or older 7%
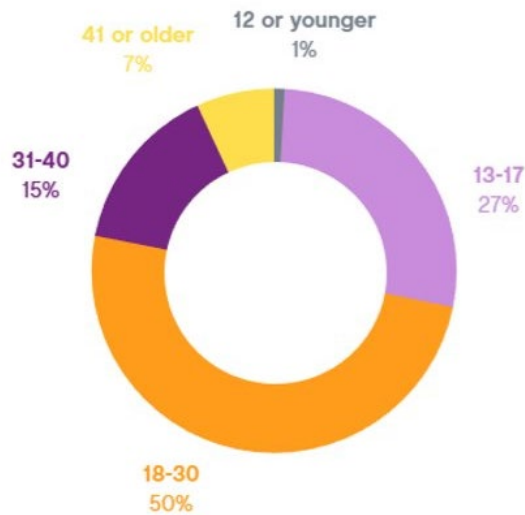
Sample Size 3,385

Client's Relationship to Loved One

- Parent/Step-parent/Guardian 69%
- Partner 7%
- Sibling 5%
- Friend 2%
- Grandparent 2%
- Other family member 4%
- Other relationship 10%
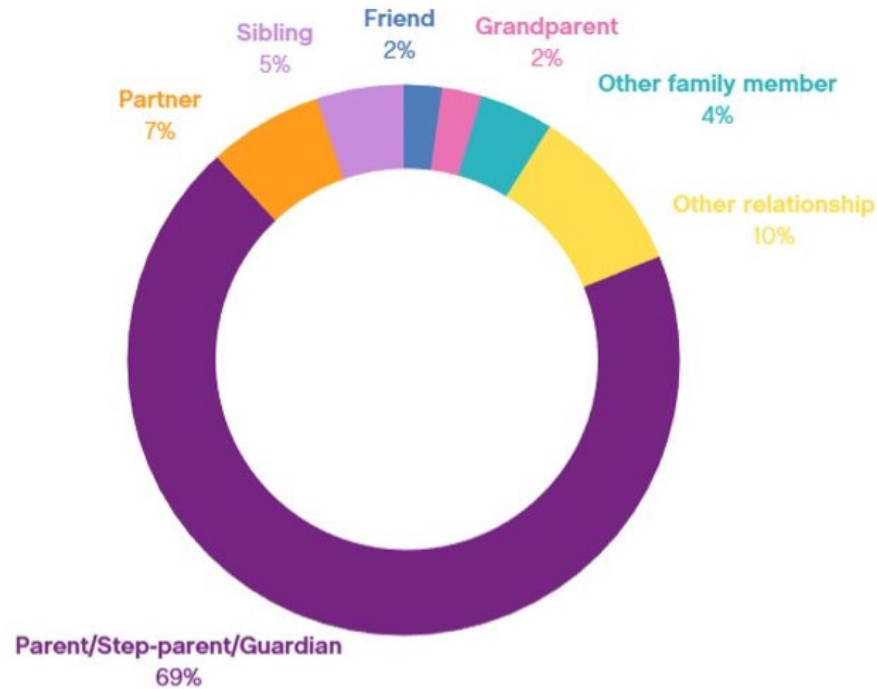
Sample Size 1,294

Loved One's Need State

- Struggling 75%
- Early Use 19%
- Recovery 3%
- Prevention 2%
- Treatment 1%
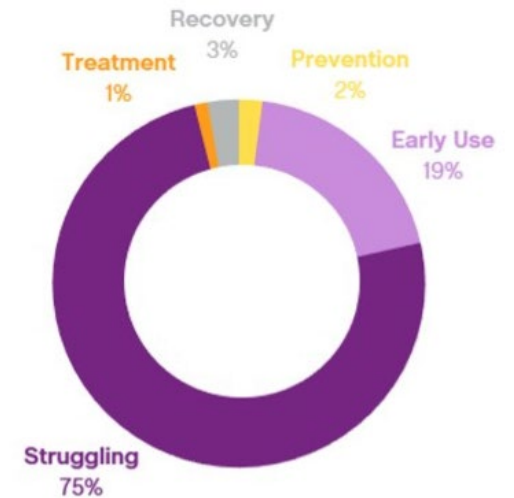
Sample Size 1,670

2020 Helpline Stats (Sample Only)

Primary Substance of Concern

Prescription stimulants 1%
Prescription painkillers 8%
Alcohol 11%
Other 5%
Benzodiazepines 3%
Not sure 5%
Cocaine or crack 6%
Nicotine 3%
Multiple substances 3%
Heroin 12%
Methamphetamine 10%
Inhalants 0%
Marijuana 34%
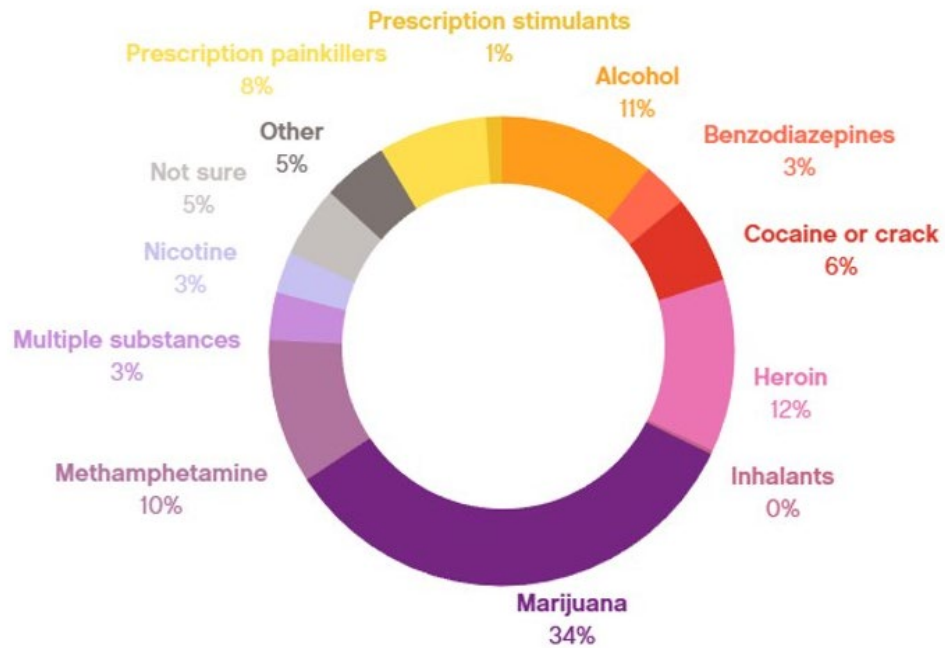
Sample Size 3,550

Client Race/Ethnicity

- White / European Descent 60%
- Hispanic / Latinx Descent 28%
- Black / African Descent 11%
- Asian Descent 4%
- Middle Eastern Descent 1%
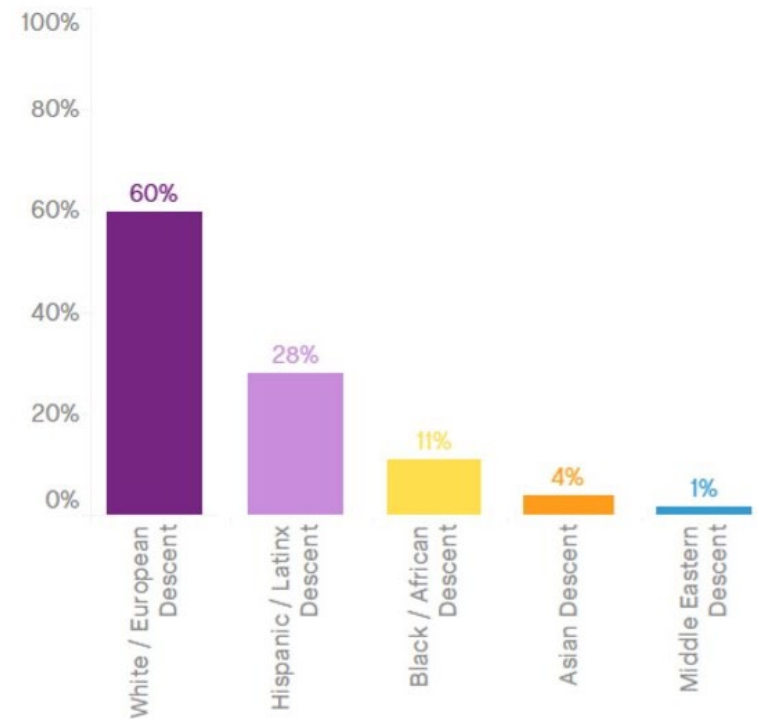
Sample Size 1,282

Help & Hope Mobile Intervention
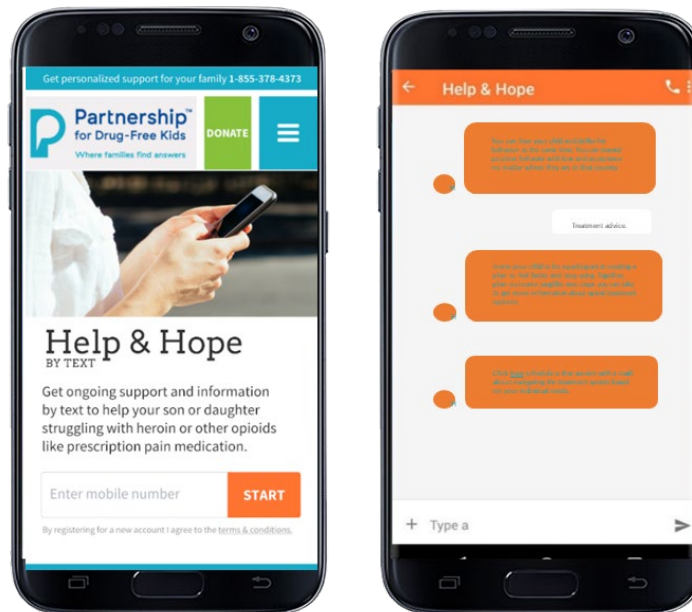
- Personalized feedback and mobile messaging from prevention to recovery (some in beta)

Text **"JOIN" to 55753** to start receiving messages

The helpline received over

100,000

digital messages in 2020.

The helpline replied to clients' inital contact in under

1 hour

on average in 2020.

27%

of clients receiving automated messages texted "chat" to connect with a specialist.

39%

of families reported re-engaging with the Partnership after contacting the helpline in 2020.
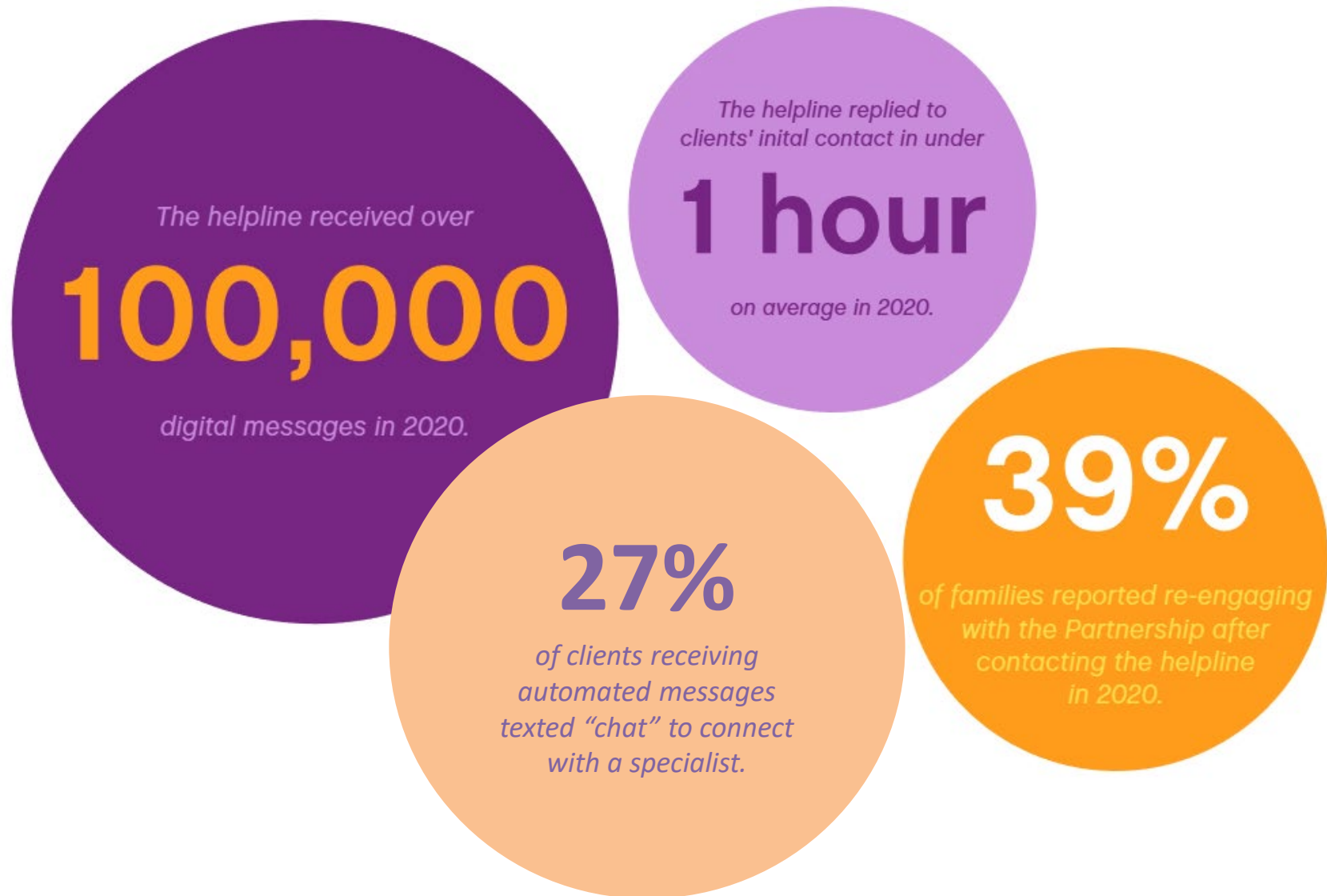
Suggestions for Integration into Practice

- **Review** the literature

- Then, **question** the literature

- Then, try it yourself and **don't cheat**

- Then, try it with the **target population**

- Then try it with your population when **nobody cares** about it happening (e.g. no monitoring or incentives).

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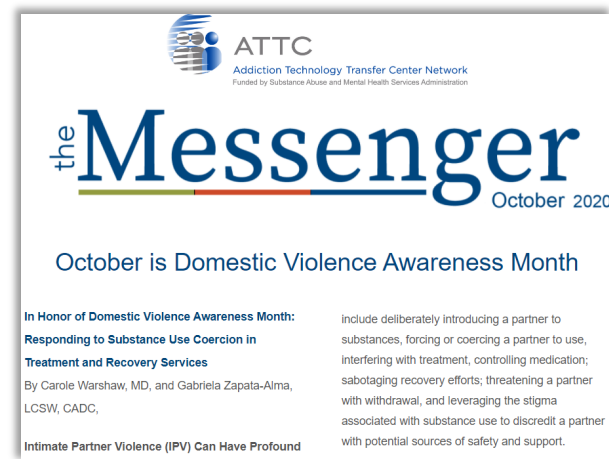
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