



New Directions for Treating Substance Use Disorders

Kendra Wyant



Background
on SUDs

My research

Grad school





What is addiction?

Overview of DSM-5 SUD

1. Taking the substance in larger amounts or for longer than you're meant to
2. Wanting to cut down or stop using the substance but not managing to
3. Spending a lot of time getting, using, or recovering from use of the substance
4. Cravings and urges to use the substance
5. Not managing to do what you should at work, home, or school because of substance use
6. Continuing to use, even when it causes problems in relationships
7. Giving up important social, occupational, or recreational activities because of substance use
8. Using substances again and again, even when it puts you in danger
9. Continuing to use, even when you know you have a physical or psychological problem that could have been caused or made worse by the substance
10. Needing more of the substance to get the effect you want (tolerance)
11. Development of withdrawal symptoms, which can be relieved by taking more of the substance

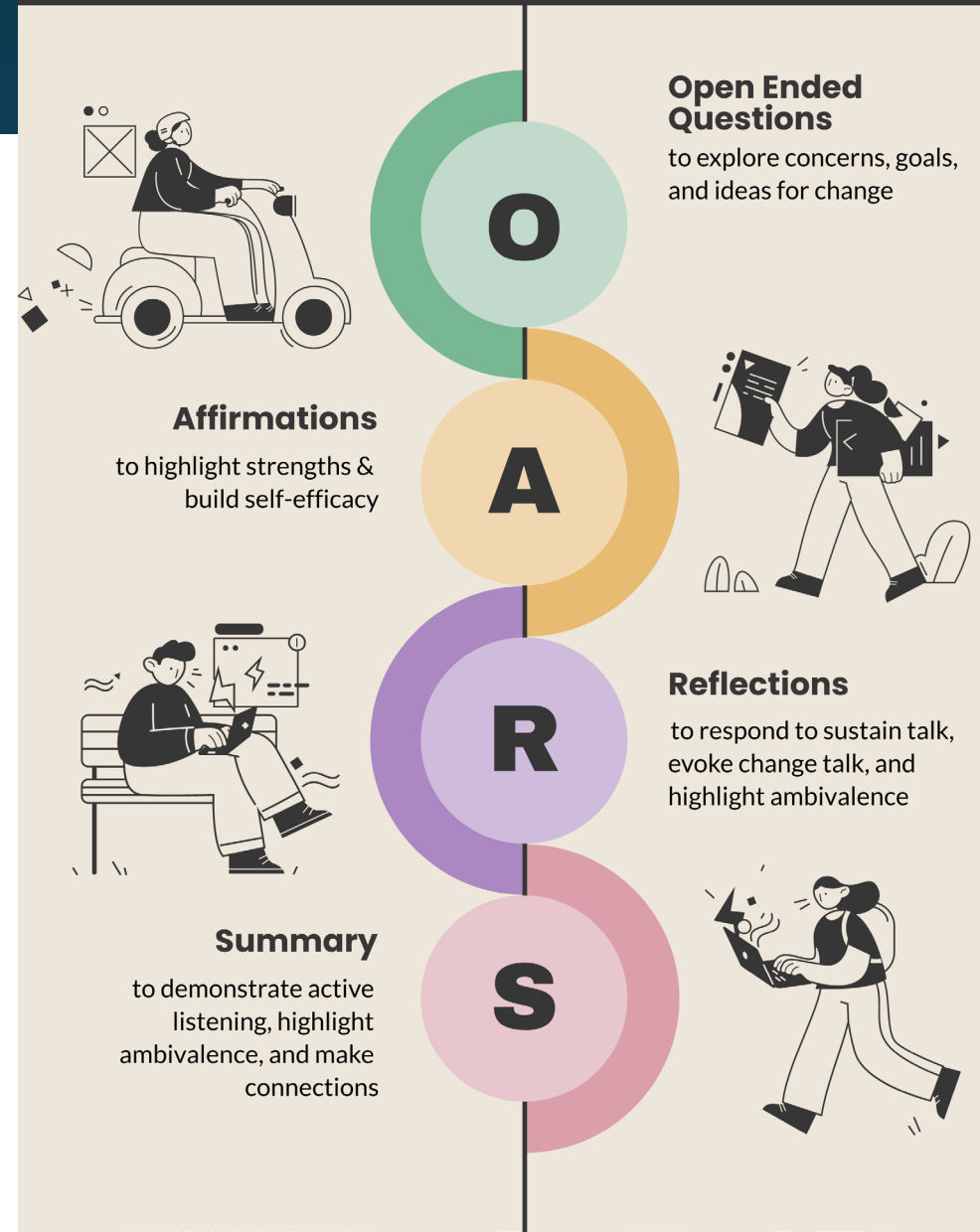
In 2022...

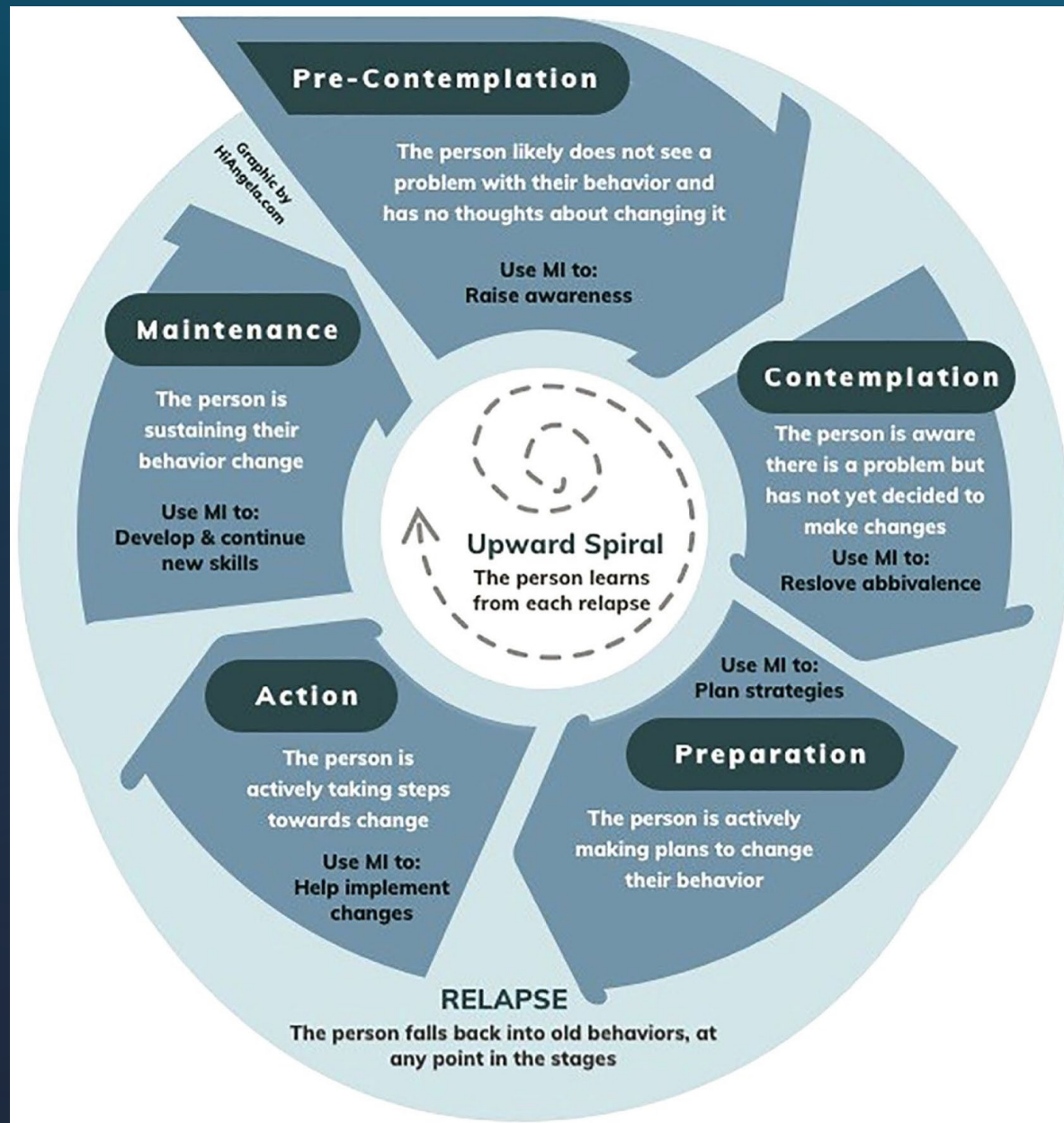
- 48.7 million people aged 12 or older (or 17.3%) had an SUD in the past year
- The percentage of people aged 12 or older with an SUD in the past year was highest among young adults aged 18 to 25 (27.8% or 9.7 million people)
- An estimated 52.9% of adults aged 18 or older with SMI used illicit drugs in the past year

Effective treatments exist

- Motivational Interviewing

OARS help folks move!





Effective treatments exist

- Motivational Interviewing
- Cognitive Behavioral Therapy
- Relapse Prevention
- Medication

But not everyone has access to these tx's



COST



LOCATION



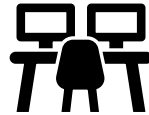
LONG WAIT LISTS



- SUDs are chronic relapsing diseases
- Lapses can occur at any time
- Lapses are often early signs of relapse
- As a lifelong disease, people require on-going support

Lapses

- Lapses are often preceded by external and internal factors



- Risk factors may be detectable in different time windows
- Current treatments may not detect early signs of lapse risk

DIGITAL HEALTH

DIGITAL MEDICINE

DIGITAL THERAPEUTICS

Digital therapeutics (DTx) that meet Industry Core Principles are generally classified into one of three categories based on the product's primary purpose.

	TREAT A DISEASE	MANAGE A DISEASE	IMPROVE A HEALTH FUNCTION**
Clinical endpoints	Must deliver a therapeutic intervention and use clinical endpoints to support product claims	Must deliver a therapeutic intervention and use clinical endpoints to support product claims	Must deliver a therapeutic intervention and use clinical endpoints to support product claims
Clinical evidence	Clinical trials and ongoing evidence generation required	Clinical trials and ongoing evidence generation required	Clinical trials and ongoing evidence generation required
Level of medical claims	Medium to high risk claims	Medium to high risk claims	Low to medium risk claims
Regulatory oversight	Third-party validation of efficacy and safety claims by regulatory or equivalent national body	Third-party validation of efficacy and safety claims by regulatory or equivalent national body	Degree of oversight depends on local regulatory frameworks
Patient access	Prescription	Non-prescription OR Prescription	Non-prescription OR Prescription





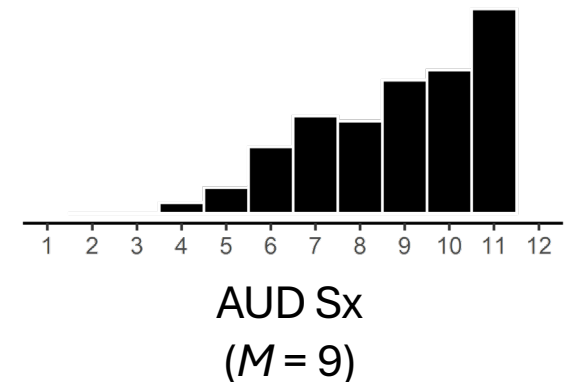
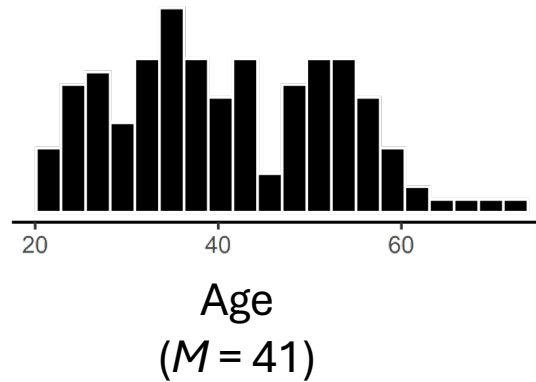
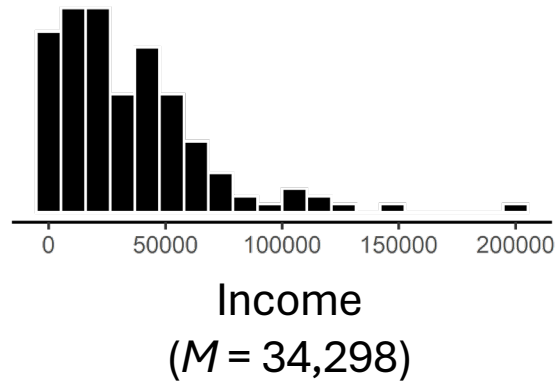
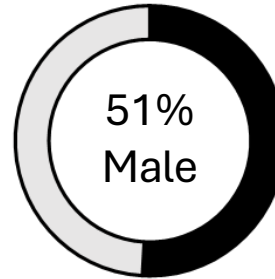
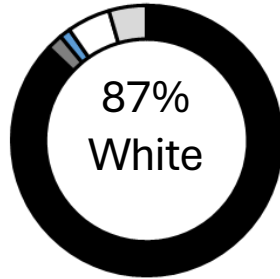




Thoughts?



Participants

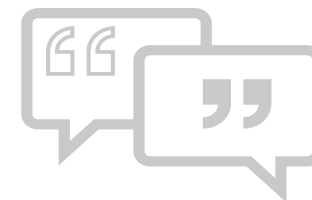


Research Q1: Is personal sensing
acceptable to people with
substance use disorders?

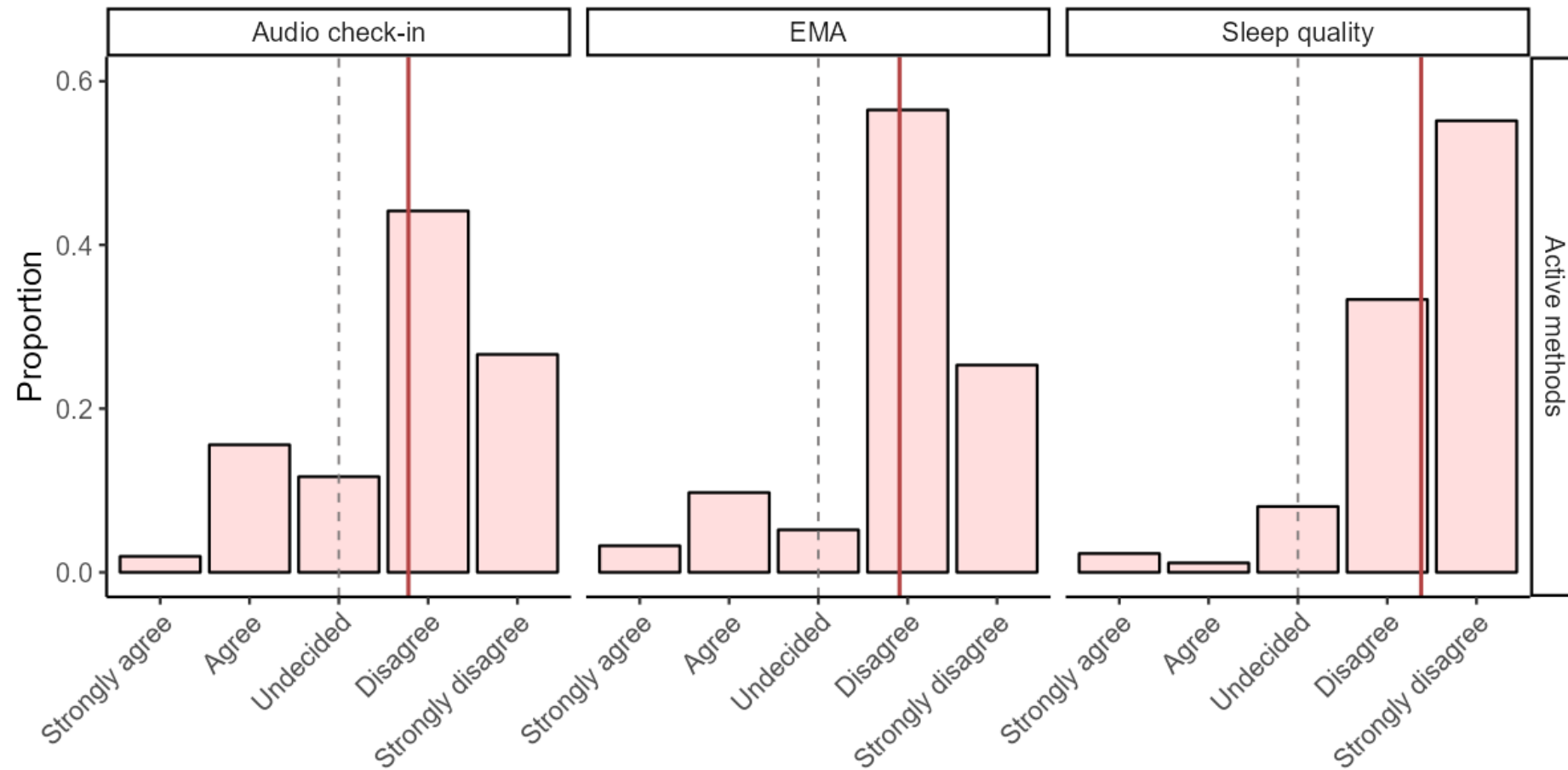


Active

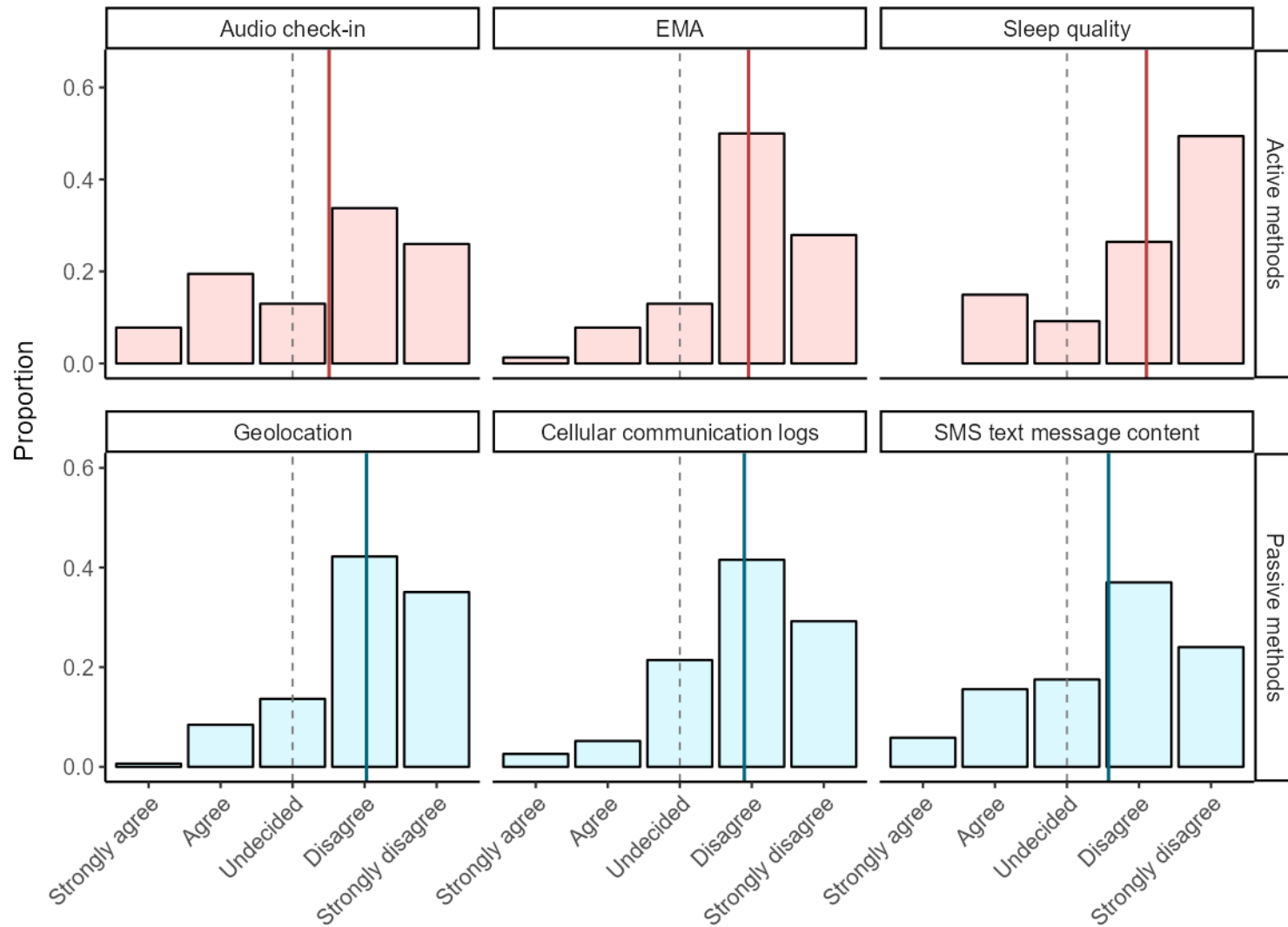
Passive



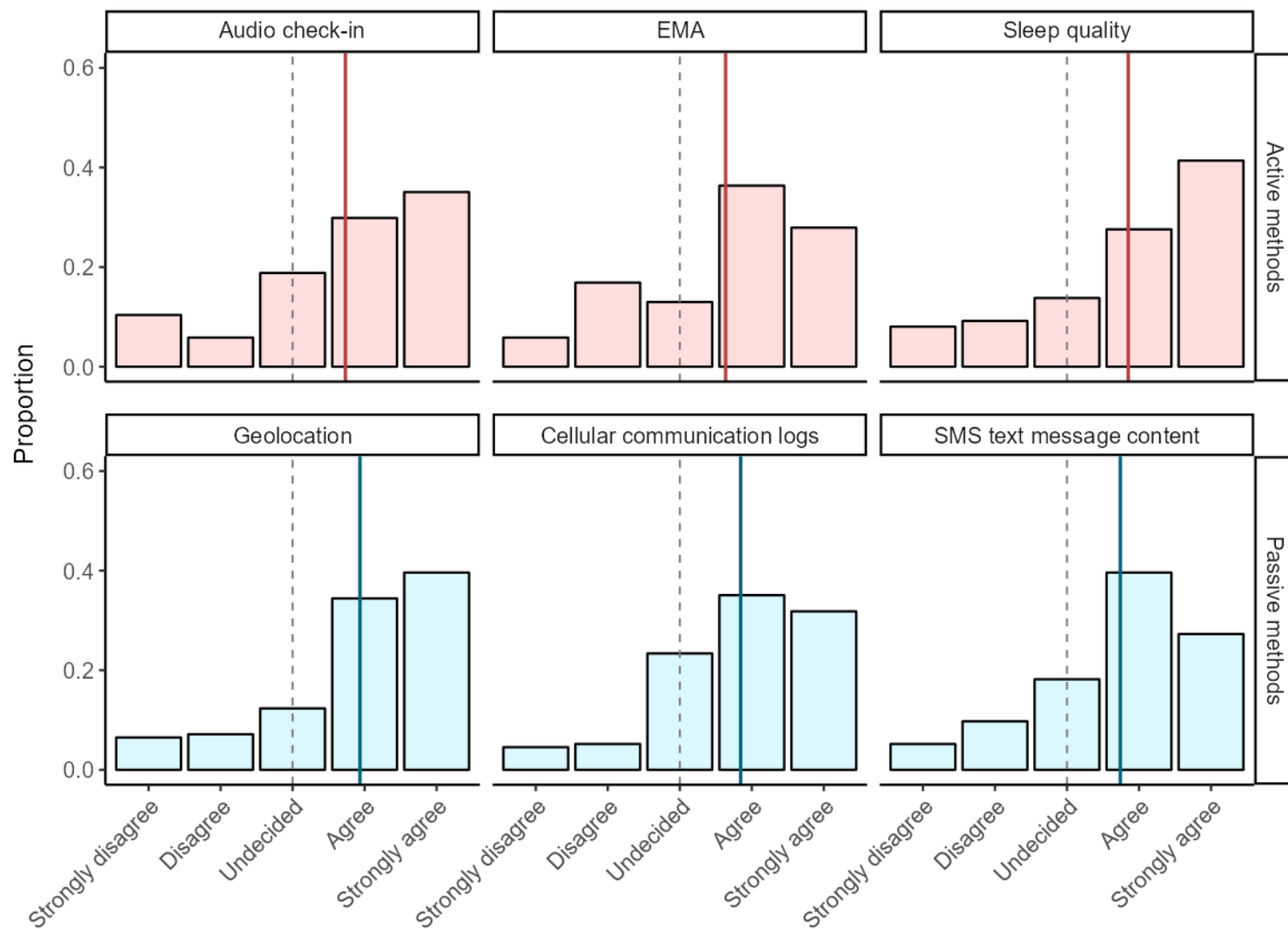
Interference



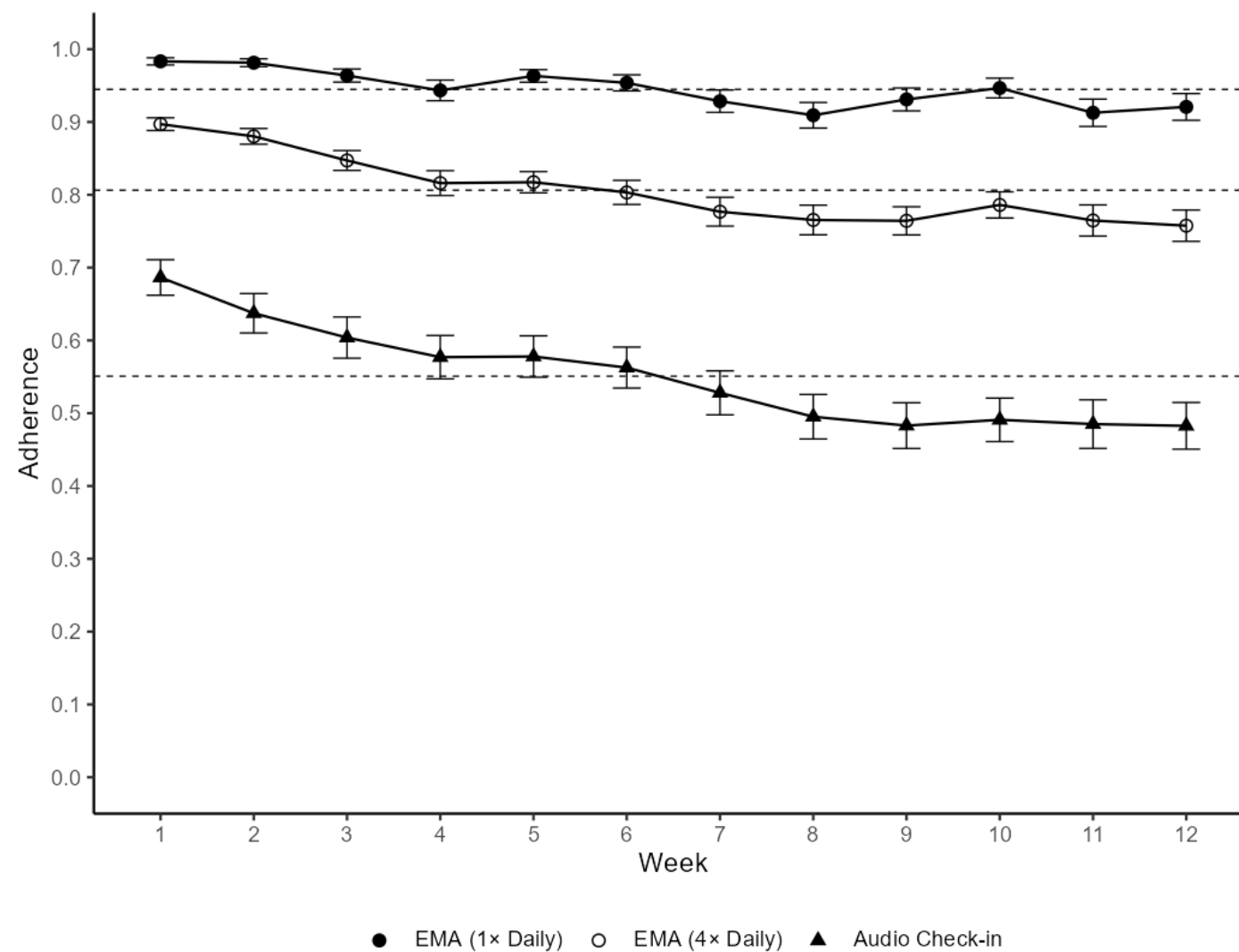
Dislike



Willingness to Use for 1 Year



Adherence



“I loved this part! It was like journaling kind of where I would discover things that were hidden in my subconscious. I have a recording app on my phone and I will continue doing the voice check in as a form of checking in with myself.”

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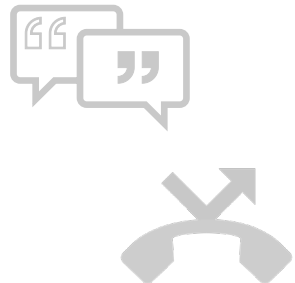
“If I was more of a diary type of person I'd probably be more into this kind of thing. I mostly just didn't know what to say.”

“I felt like I needed to seek out a private spot to do the audio message. I would have much preferred to type the message.”

“It takes time out of your day where you have to completely switch locations just so you can do it in private. I don't like that people could hear me and the topic wherever and whenever so I stopped using it.”

“Never noticed so it was zero inconvenience whatsoever!”

“I went about my days as I normally would and never thought about it.”



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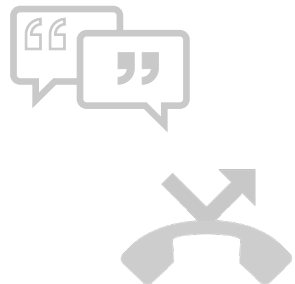


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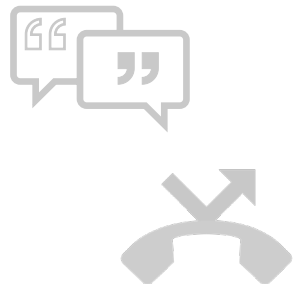
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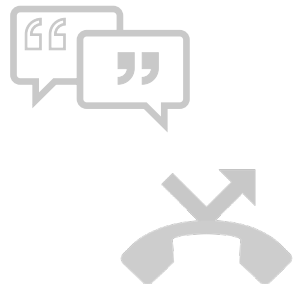
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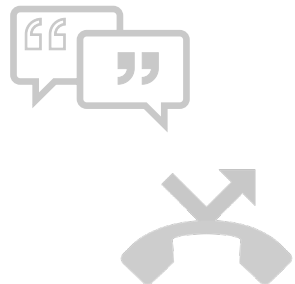
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“It seems this was more to aid with the study research than to help with my recovery. If I could see a way it would be prioritized to help me, I would be more willing to have them tracked longer. “



Conclusion

“This study demonstrated the acceptability of several personal sensing methods. These methods were acceptable (1) over a longer period than has previously been assessed, (2) across active and passive methods, (3) despite the sensitivity of the data, (4) among individuals with AUD who may have greater privacy concerns, and (5) without explicit clinical benefits to the participants. These findings suggest that personal sensing methods are poised as accessible, feasible avenues to collect data about individuals to be used for clinical applications. More work is needed to determine the predictive utility of the data that can be collected via personal sensing, but our study shows that this work will be worthwhile to pursue.”

-
- + . Research Q2: Can we predict
 - lapses using a mostly ***passive*** sensing method?

Voice and Text Message Logs

- Passive



Voice and Text Message Logs

- Passive
- Capture risk factors in varying time windows



Voice and Text Message Logs

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- Capture risk factors in varying time windows
- Can be contextualized with little added burden
- Context could increase predictive power



Voice and Text Message Logs

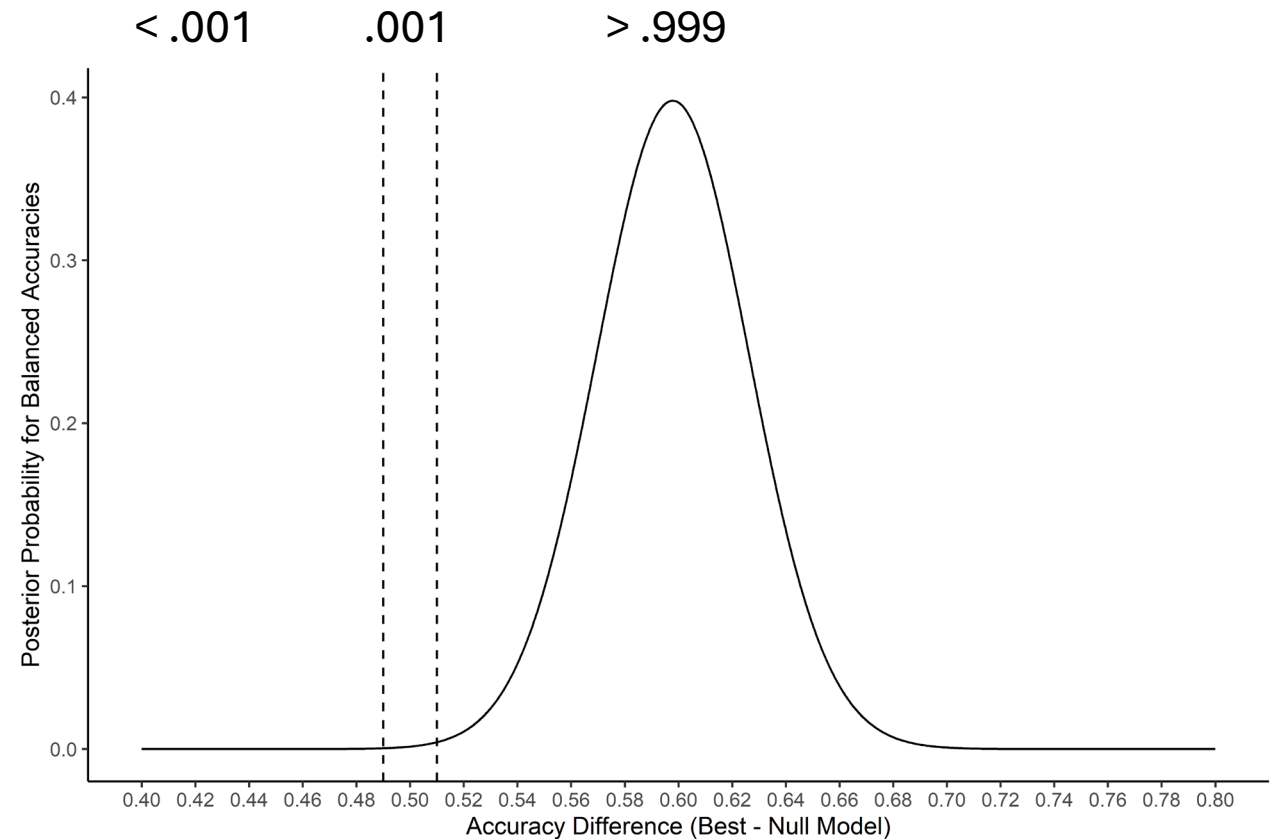
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Best Model Performance

passive random forest

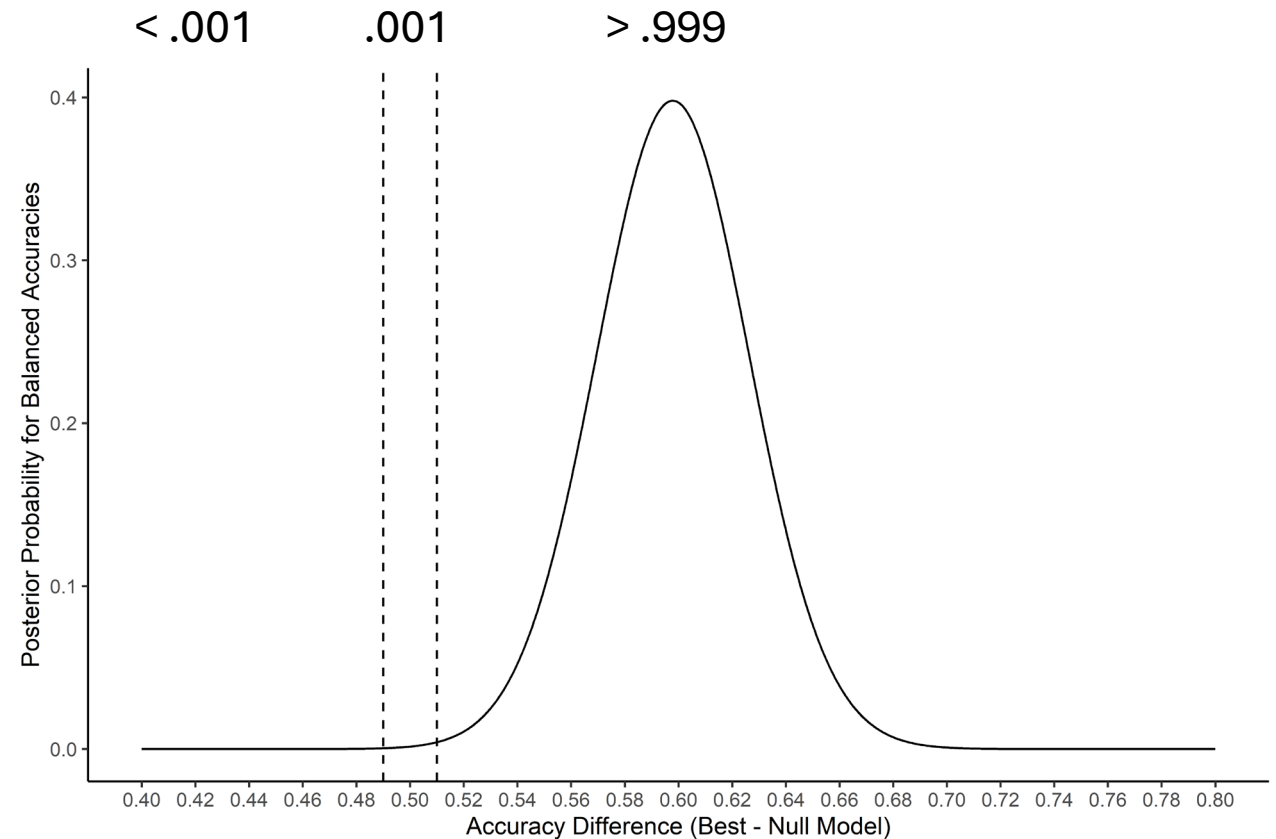
Metric	Estimate
balanced accuracy	.60
accuracy	.72
sensitivity	.46
specificity	.73
positive predictive value	.09
negative predictive value	.96
area under the ROC curve	.64



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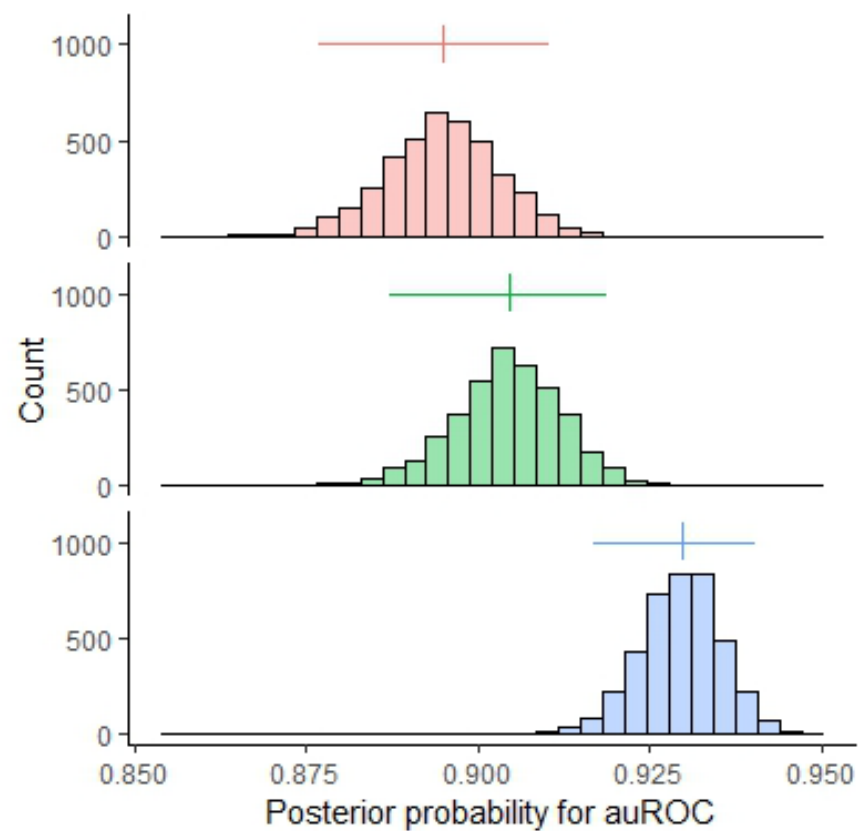
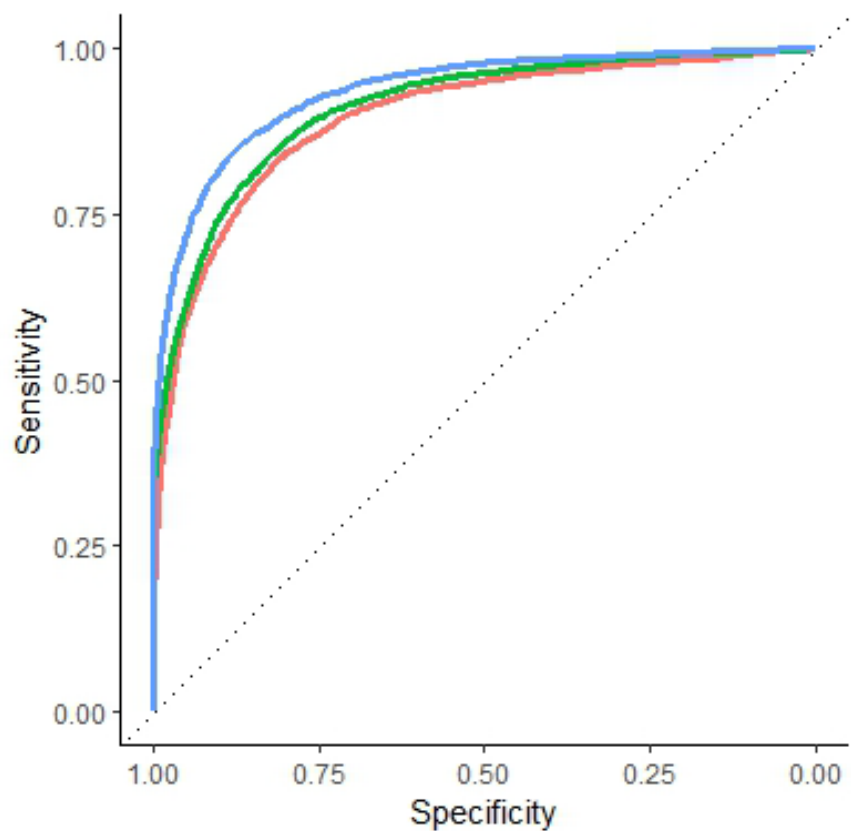
The models can detect some signal for lapse risk in cellular communication logs. While this is promising, at the moment, these models are not clinically useful.

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- + . Research Q3: Can we predict
 - lapses before they occur with ***active*** sensing methods?

4 X Daily EMA

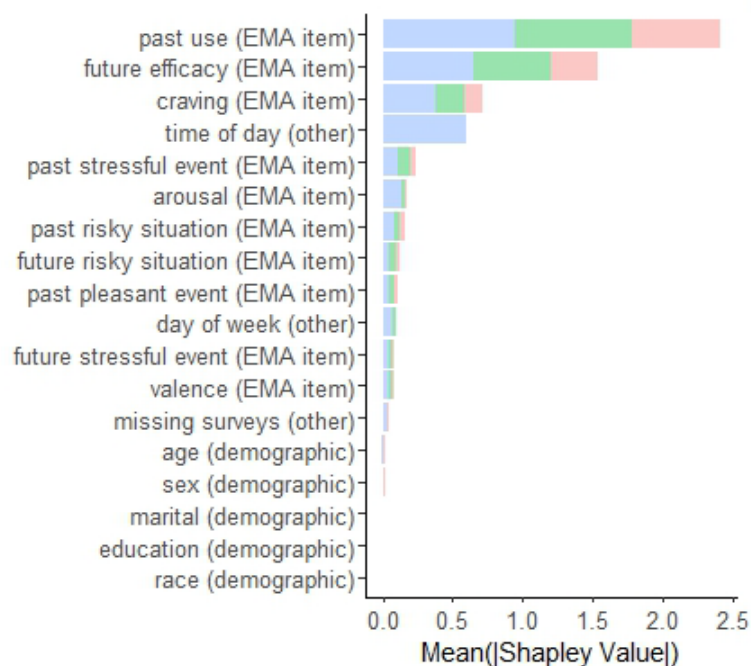
- Past use
- Future efficacy
- Craving
- Arousal
- Valence
- Past stressful event
- Past pleasant event
- Past risky event
- Future risky situation
- Future stressful event



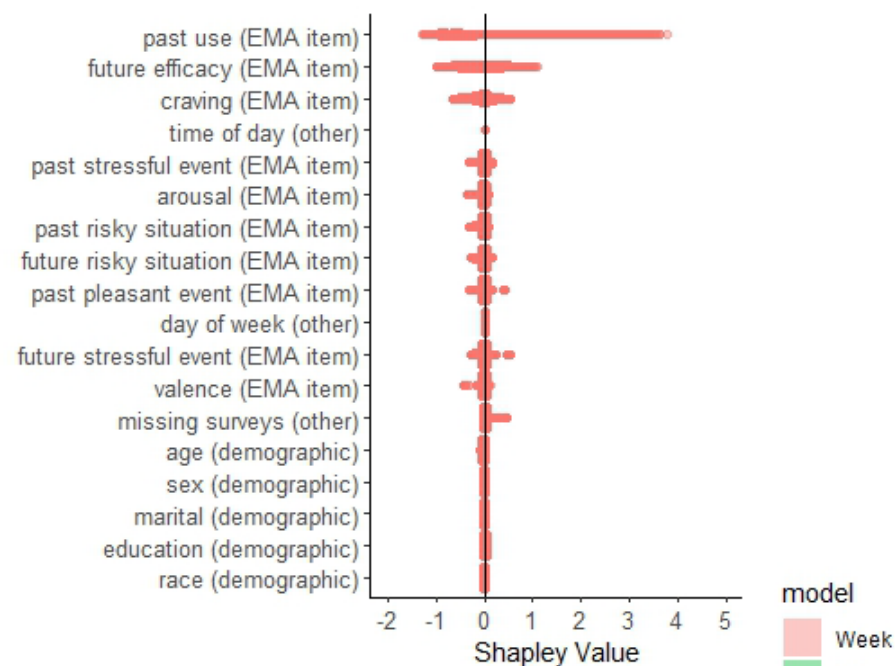


model ■ Week ■ Day ■ Hour

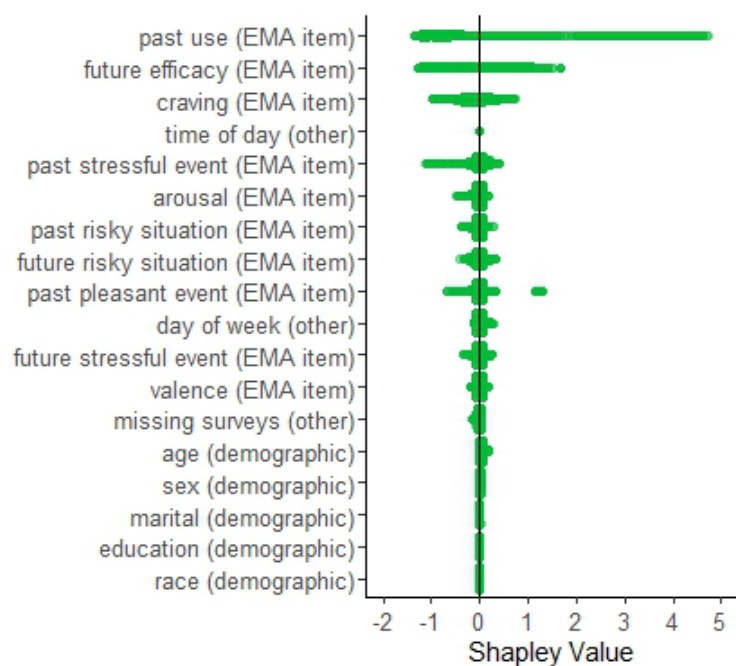
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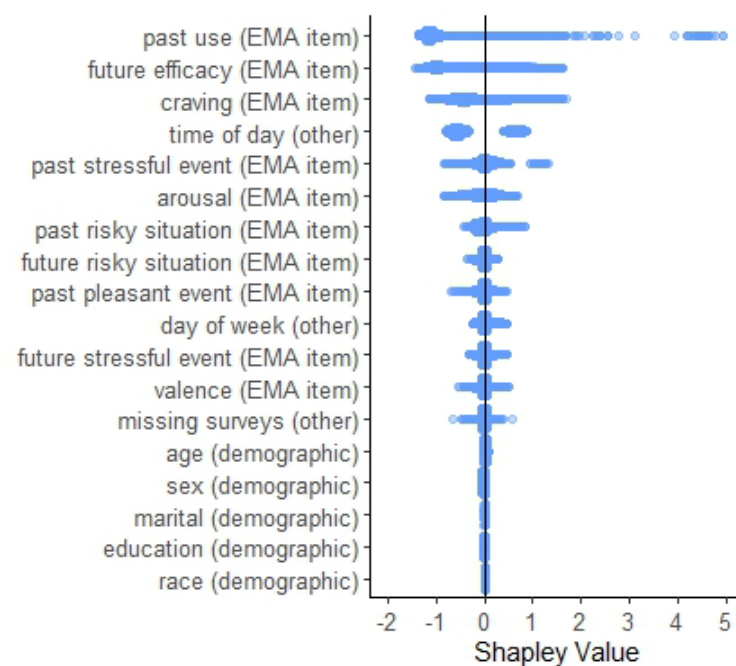
B



C



D




Conclusion

“All three full models performed exceptionally well, yielding auROCs of 0.89, 0.90, and 0.93 for week, day, and hour level models, respectively. auROCs above .9 are generally described as having “excellent” performance; the model will correctly assign a higher probability to a positive case (e.g., lapse) than a negative case 90% of the time. This confirms that EMA can predict future alcohol lapses in the next week, next day, and next hour with high sensitivity and specificity for new individuals. Using features that map onto important relapse prevention risk constructs may illuminate momentary contributors to predicted lapses.”



Future Directions

- Predicting lapses further into the future
 - Different population (OUD and increased diversity)
 - Combining passive and active data streams
 - Evaluating fairness of model performance across different groups
- 

Questions?



Grad School References

- <https://mitch.web.unc.edu/wp-content/uploads/sites/4922/2017/02/MitchGradSchoolAdvice.pdf>
- <https://accreditation.apa.org/accredited-programs>
- <https://pcsas.org/pcsas-accredited-programs/>
- <https://psych.wisc.edu/graduate-program/clinical-psychology-program/>



I am happy to answer any questions at kpaquette2@wisc.email