HARNESSING THE POWER OF MOBILE TECHNOLOGY TO MONITOR ALCOHOL USE AND BEHAVIORS IN DAILY LIFE

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Mobile health application

Integrating wearable sensors
>90% of 18-25 year olds have smartphones¹
>96% amenable in our sample

Brief app responses in lieu of phone calls
Flexibility in scheduling and response

¹Pew Research Center, 2016
mNCANDA
MOBILE HEALTH APP

- 5 assessments over 4 weeks
- >90% follow-up rate over all prompts
- 82% completed ALL ASSESSMENTS

nCANDA
ncanda.org
WEEKLY SU ASSESSMENT
In the last 7 days:

2. How many drinks did you usually have? (on days you drank)
   --Select-- ▼

3. What is the most number of drinks you had in one day?
   --Select-- ▼

4. How many days did you have more than 5 drinks?
   --Select-- ▼

5. What days did you use marijuana?
   □ Sunday
   □ Monday
   □ Tuesday
   □ Wednesday

MyLife Daily Craving
Answer for YESTERDAY

Peak craving for ALCOHOL yesterday
1 □ □ □ □ □ 5

Peak craving for MARIJUANA yesterday
1 □ □ □ □ □ 5

Peak craving for OTHER yesterday
1 □ □ □ □ □ 5

4. How many alcoholic drinks did you have?
   --Select-- ▼

5. Did you use marijuana?
   □ Yes
mNCANDA
MOBILE HEALTH APP

- Reliability & Accuracy
  - $\alpha=.85-.95$ with in-person assessment over 4 weeks
  - More proximal and precise assessment of drinking events
    - 30-day alcohol frequency = 0.31 events higher (95% CI=0.05-0.57) via mNCANDA

- Efficiency
  - 2-5 minutes for most responses
WHY CONSIDER SLEEP?

1. Examine the developmental trajectory of functional sleep measures and how they are impacted by alcohol exposure.
2. Examine sleep behavior as a predictor of hazardous alcohol drinking in adolescents.

Sleep Project:
SRI International
University of Pittsburgh
RECORDING SLEEP WITH POLYSOMNOGRAPHY

- Electroencephalograph
- Electromyograph
- Electro-oculograph
NON-RAPID EYE MOVEMENT (NREM) SLEEP
OUT OF THE LAB AND INTO THE HOME
High sensitivity in detecting sleep
Lower specificity in detecting wake
Fitbit approximates sleep-wake detection of PSG

de Zambotti et al. Physiol Behav., 2016
VALIDITY OF *FitBit Charge HR* IN MEASURING SLEEP AND HR

- Approximates ECG measures of HR during sleep

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de Zambotti et al. Physiol Behav., 2016
Expand FitBit use to all sites
Integrate wearable measures with mNCANDA assessments
Ecological Momentary Assessment
- Prior to in-person MRI and neuropsych
- Before & after substance use events

FitBit data provides corroborating data
EMA Assessments

- Time-sensitive responses
- Behavioral triggers
- Tailored probes and scheduling

MyLife Daily Mood Rating
Rate your CURRENT mood:

1. How DOWN/DEPRESSED are you feeling?
   --Select-- ▼

2. How ANGRY/MAD are you feeling
   --Select-- ▼

3. How STRESSED are you feeling?
   --Select-- ▼

4. How HAPPY are you feeling?
   --Select-- ▼

5. How TIRED are you feeling?
   --Select-- ▼
Integrate with wearable biosensors

Noninvasive Alcohol Monitoring Using a Wearable Tattoo-Based Iontophoretic-Biosensing System

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"UN-AWARE-ABLE" BIOSENSORS

BAC = .07
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