

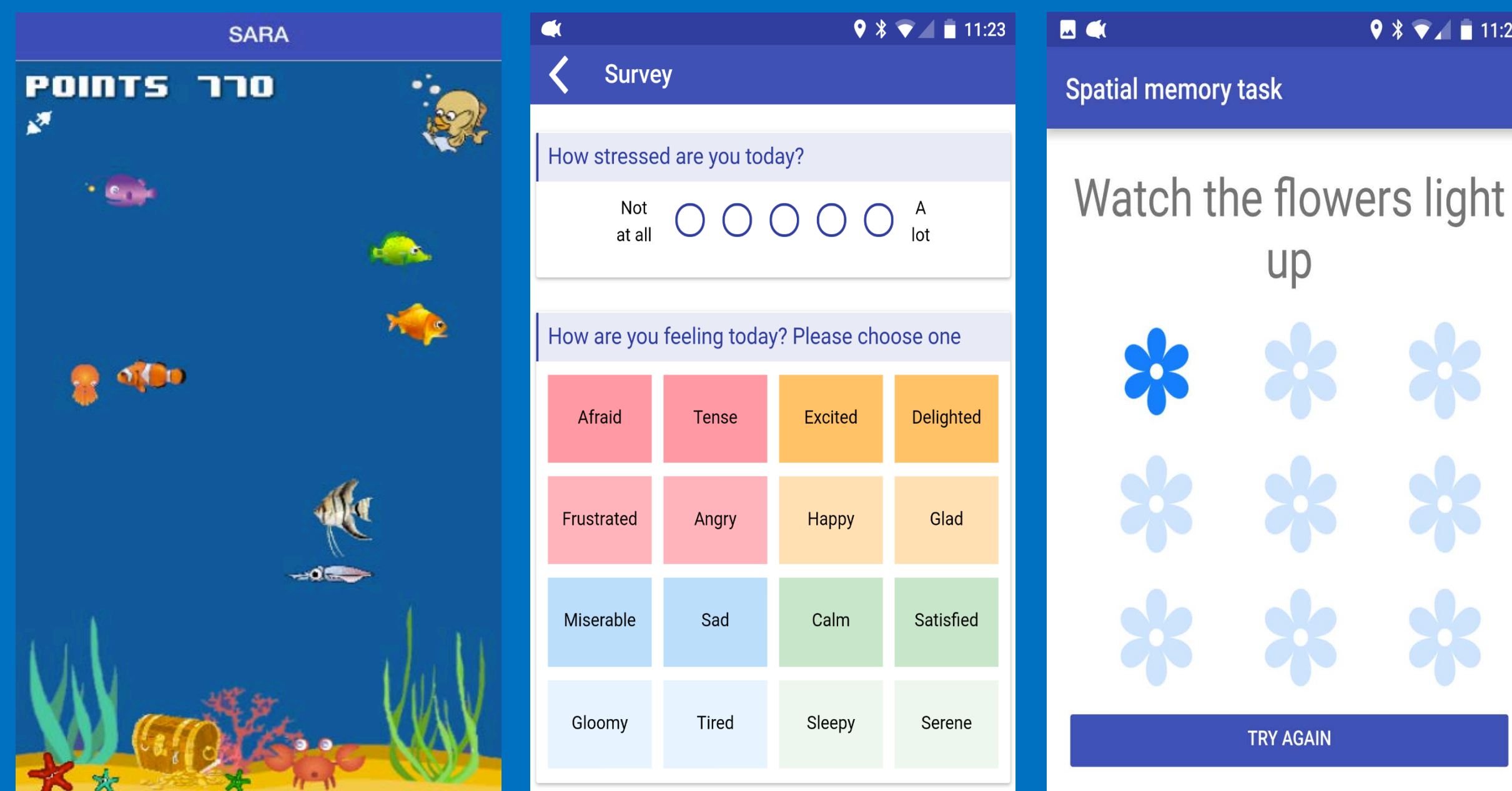
Feasibility and Acceptability of Using a Mobile Phone App to Assess Substance Use Among Adolescents and Emerging Adults

Meredith L. Philyaw-Kotov¹, Mashfiqui Rabbi², Susan A. Murphy², Pedrag Klasnja¹, Ambuj Tewari¹, Inbal Nahum-Shani¹, Erin E. Bonar¹, Rebecca M. Cunningham¹, Maureen A. Walton¹

¹University of Michigan; ²Harvard University

Background

- Substance use is an alarming public health issue, associated with morbidity, mortality, and significant societal costs.
- Mobile phone apps are a promising data collection and intervention delivery tool for research with substance-using youth, as most teens (73%) and young adults (92%) own a smartphone.
- Existing mobile apps in the substance use field lack data collection capabilities and require a therapist to push intervention content.
- To address these challenges, our study team developed a prototype Android mobile phone app called SARA (Substance Abuse Research Assistant).
- The SARA app includes novel features to enhance participant engagement, including: 1) a game-like environment in which new fish and levels can be unlocked by completing assessments, 2) memes/gifs, and 3) inspirational push notification messages containing celebrity quotes and song lyrics.



Study Protocol

- From 6/2017 – 8/2017, patients (ages 14 -24) were recruited for a pilot study from the Emergency Department (ED) at the University of Michigan.
- ED patients were approached, provided consent, took a 5-minute online screening survey, and received a token gift valued at \$1.
- Participants were eligible for the study if they:
 - Had an Android smartphone for app download; and
 - Reported past-month binge drinking (5 drinks men/4 drinks women) or recreational cannabis use.
- Interested participants provided written informed consent/assent, were shown how to download and use the SARA app, and were given the opportunity to complete:
 - A 20-minute online baseline survey for \$20 cash
 - Brief daily assessments using the app during a 30-day field testing period, in which participants could earn up to \$13
 - A 45-60 minute follow-up phone interview after the field testing period for a \$30 electronic gift card.

Measures & Analysis

Daily adherence was measured by whether or not the participant completed at least one of the following assessments on a given day: 1) a brief survey about daily stress, mood, loneliness, fun, novelty, hopefulness and alcohol/marijuana use, and 2) two active tasks measuring neurocognitive performance. Adherence was tallied across the field testing period to capture the total number of days that each participant was adherent.

Acceptability was assessed using Likert-type items adapted from previous m-health research (e.g., Stoyanov et al 2015) which inquired about the app's ease of use, age-appropriateness of its content, and participants' comfort level using the app to answer sensitive questions.

Analysis. Study data were analyzed using SPSS Version 24. Descriptive statistics (i.e., frequencies) were conducted to examine response distributions among the study sample.

Sample Characteristics

- A total of 247 patients were screened for eligibility.
- Of the 30 patients (12%) who met study eligibility criteria, 21 (70%) agreed to participate.

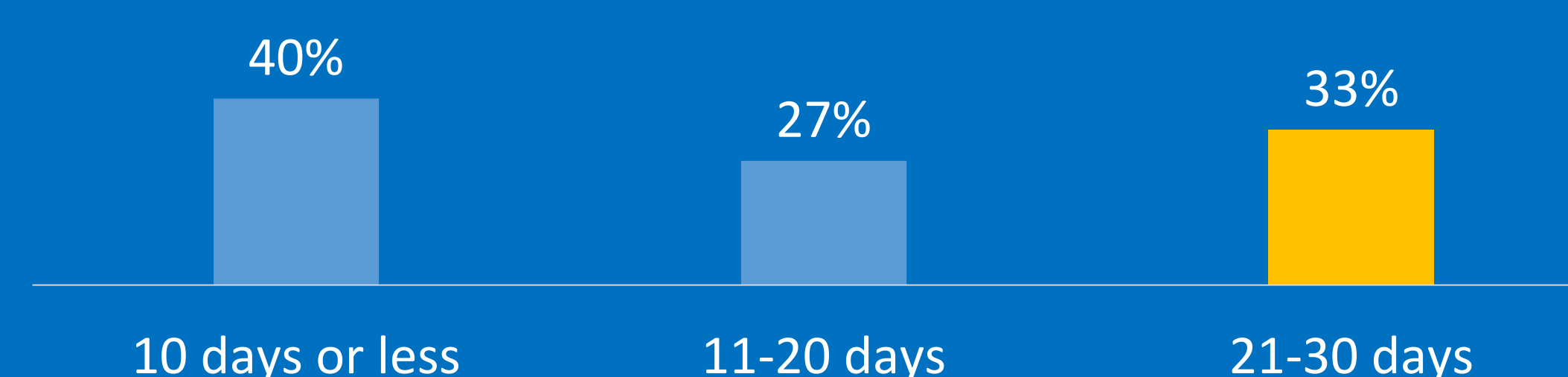
Table 1. Demographic Characteristics of Study Sample (n=21)

Indicator	n(%)
Age (in years)	
18-20	7 (33.3%)
21-25	14 (66.7%)
Male Sex	13 (61.9%)
Hispanic Ethnicity	1 (4.8%)
Caucasian Race	17 (81.0%)
Some College or Higher Education	11 (52.4%)
Past-Month Substance Use	
Binge Drinking (1+ times)	10 (47.6%)
Recreational Marijuana Use (1+ times)	12 (57.1%)

Field Testing Adherence

- Of the 18 enrolled participants (86%) who installed the SARA app on their phone, 15 (83%) had the app installed on their phone for 16 or more days during the field testing period.

Approximately **one-third** of participants (n=15) were at least 70% adherent during the field testing period.

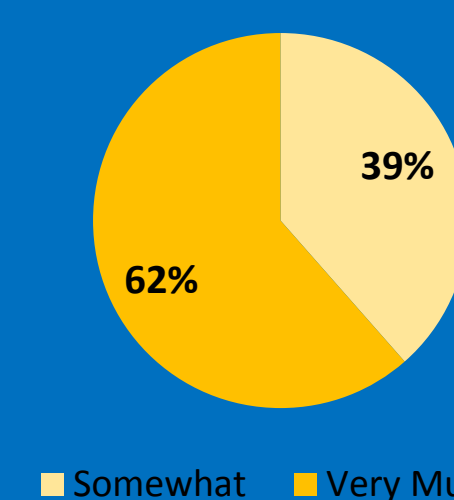


Acceptability of the SARA App

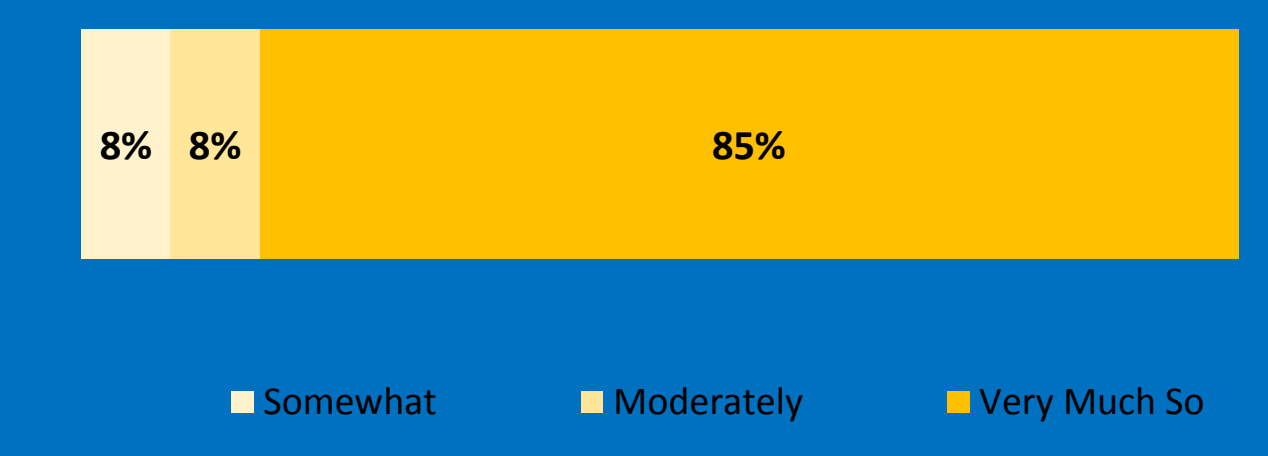
- To date, 13 participants (72%) have completed a follow-up interview.
- Almost all (92.3%) participants gave the app a rating of **at least 4 stars** for use in a research study.



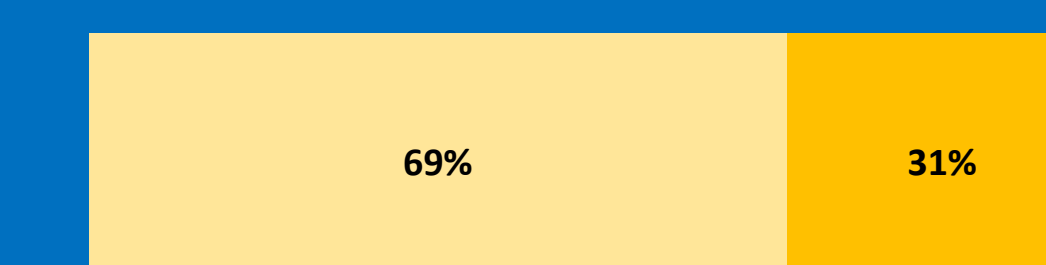
Over half of participants indicated that the app content is **very appropriate** for people their age.



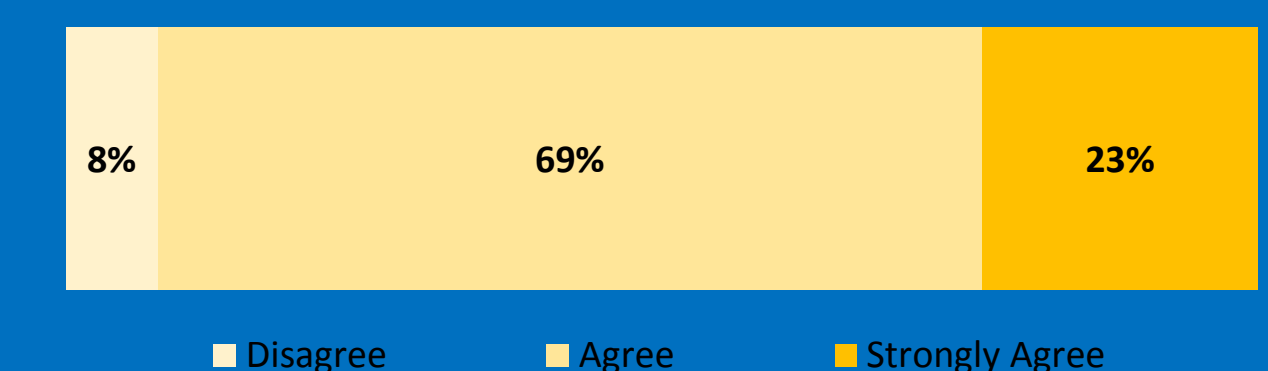
Majority of participants indicated that the app is **very easy to use**.



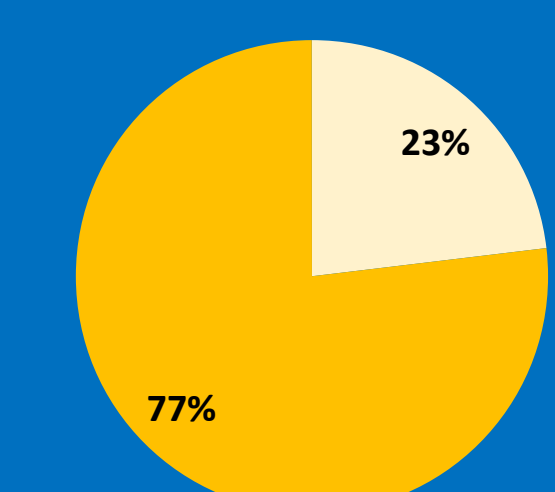
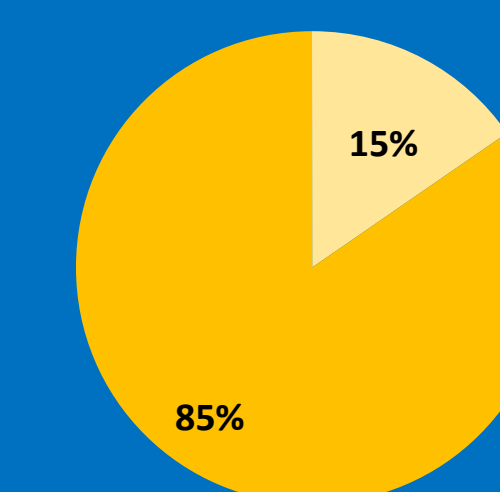
All participants **agreed or strongly agreed** that they felt comfortable answering personal questions via the app.



Almost all participants **agreed or strongly agreed** that they felt comfortable with the app collecting personal information about them (e.g., location).



Majority of participants reported they would prefer to answer survey questions using the **SARA app**, rather than **over the phone or by text**.



Conclusions and Next Steps

- Preliminary findings suggest that the SARA app is an acceptable and preferred means of data collection in research studies with 18-24 year olds.
- Data collection is currently underway to field test an enhanced prototype of the app, which is now available for download on Android or iPhone smartphones.

Acknowledgements

Center support and funding from the University of Michigan Injury Center (CDC R49 CE002099) and the Michigan Institute for Data Science

Lexa Giragosian, Anthony Mansour, Laura Dent, Linping Duan, and the patients and staff at the University of Michigan Health System Adult & Pediatric Emergency Departments

