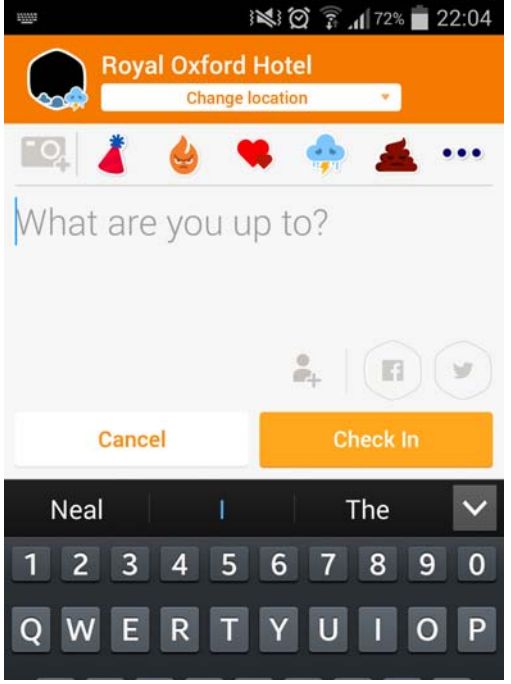
Smartphones, Psychiatry, & Big Data

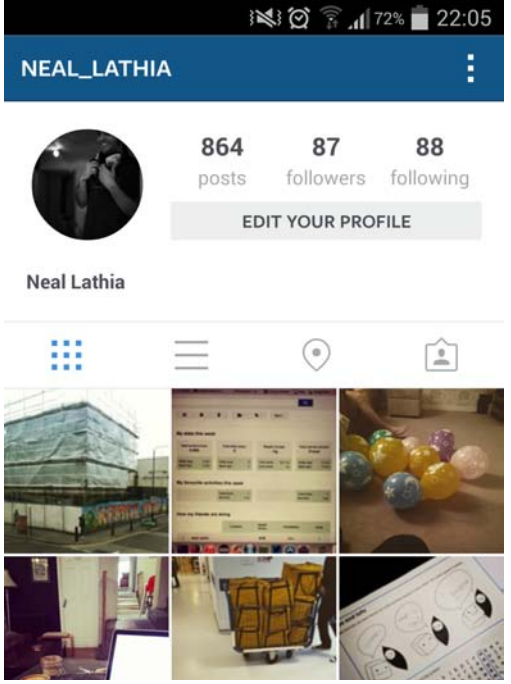
@neal_lathia, @ConorFarrington
University of Cambridge

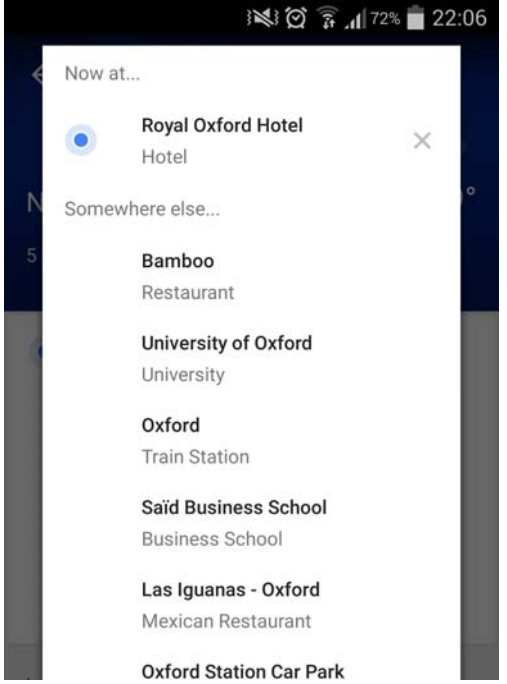
71% TECHNOLOGICAL

195 CULTURAL

87% HEALTH







DIARY METHODS: Capturing Life as it is Lived

Niall Bolger, Angelina Davis, and Eshkol Rafaeli
Psychology Department, New York University, New York, New York 10003;
e-mail: niall.bolger@nyu.edu, aed232@nyu.edu, erm5@nyu.edu

Key Words experience sampling method, longitudinal designs, electronic data collection, self-report measures, multilevel models

■ **Abstract** In diary studies, people provide frequent reports on the events and experiences of their daily lives. These reports capture the particulars of experience in a way that is not possible using traditional designs. We review the types of research questions that diary methods are best equipped to answer, the main designs that can be used, current technology for obtaining diary reports, and appropriate data analysis

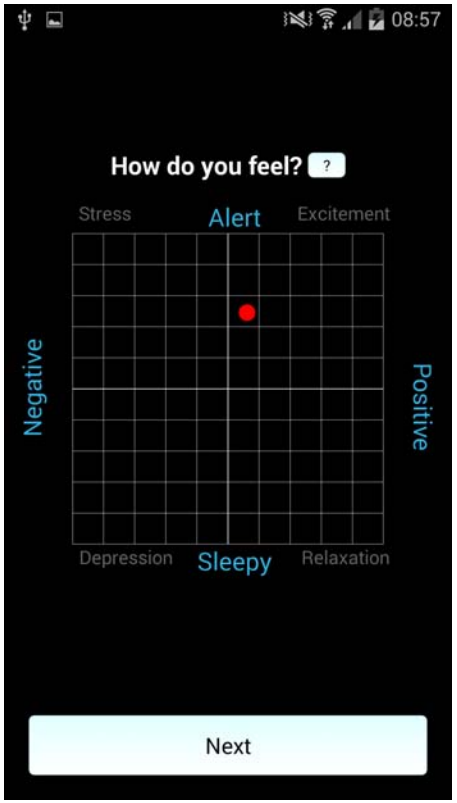
Accelerometer
GPS / Wi-Fi
Gyroscope
Bluetooth
Microphone
Humidity
Temperature
Phone / Text Logs
Device Logs
Social Media APIs
App Usage

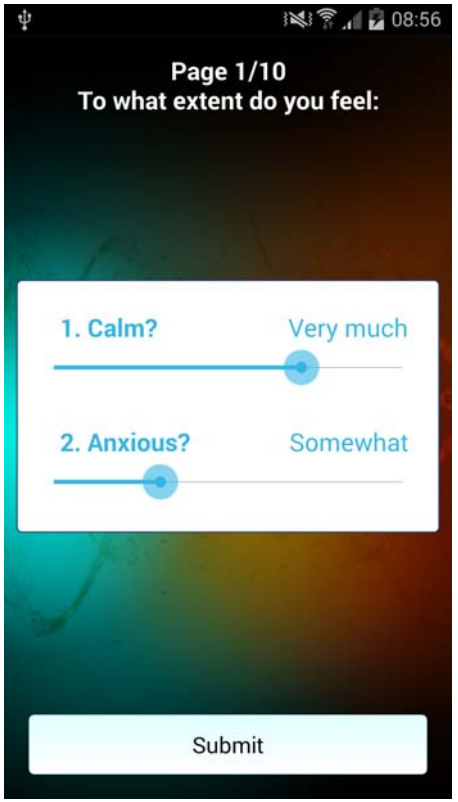
Accelerometer | Physical Activity
GPS / Wi-Fi | Mobility
Gyroscope | Orientation
Bluetooth | Co-Location
Microphone | Ambient Audio
Humidity | Environment
Temperature | Environment
Phone / Text Logs | Socialising
Device Logs | Network
Social Media APIs | Socialising
App Usage | Information Needs

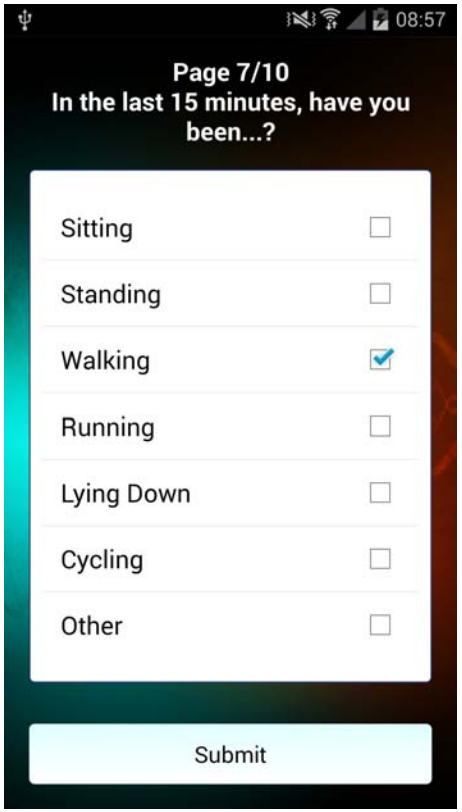
Case 1: Subjective Wellbeing & Behaviour

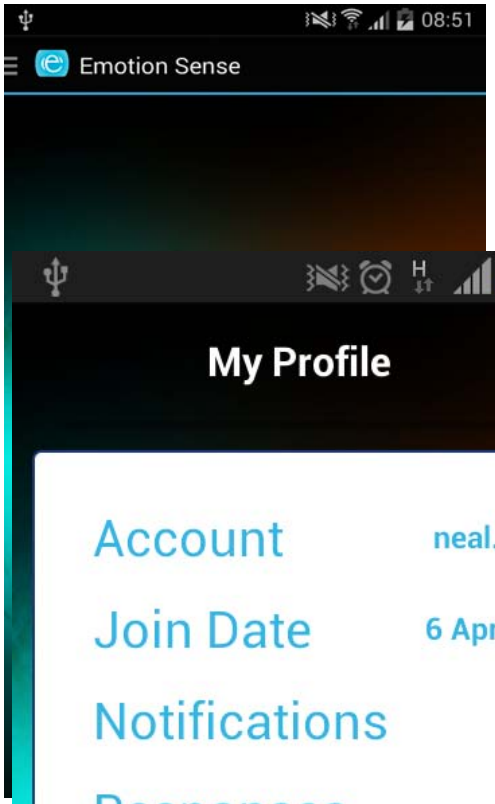
N. Lathia, G. Sandstrom, P. Rentfrow, C. Mascolo (in prep). *Happy People Live Active Lives.* 2015.

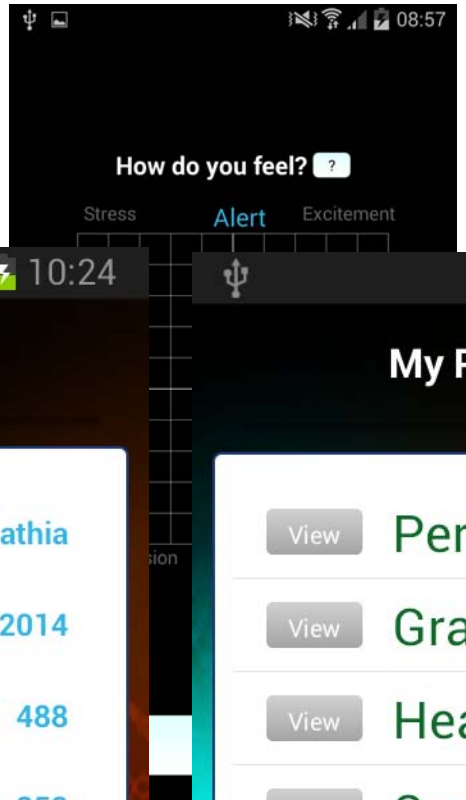
08:51
Emotion Sense
EMOTIONSENSE
Click on 'Profile' to complete a Demographics survey!
Profile
Emotions
How do you feel?

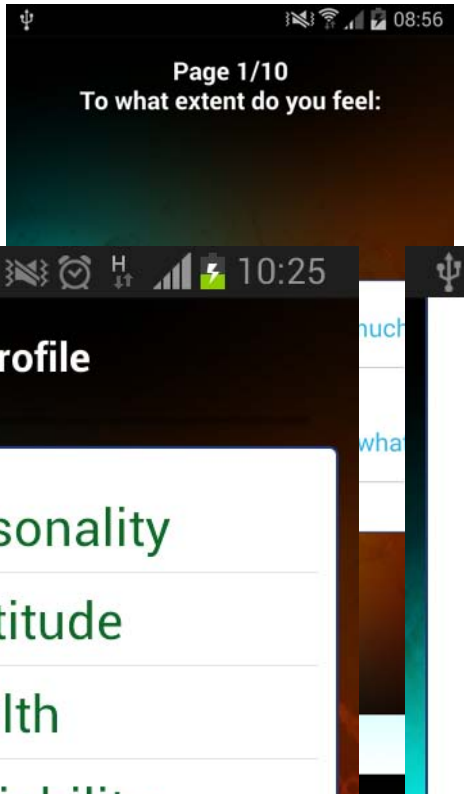

08:57
How do you feel?
Stress
Alert
Excitement
Negative
Positive
Depression
Sleepy
Relaxation
Next

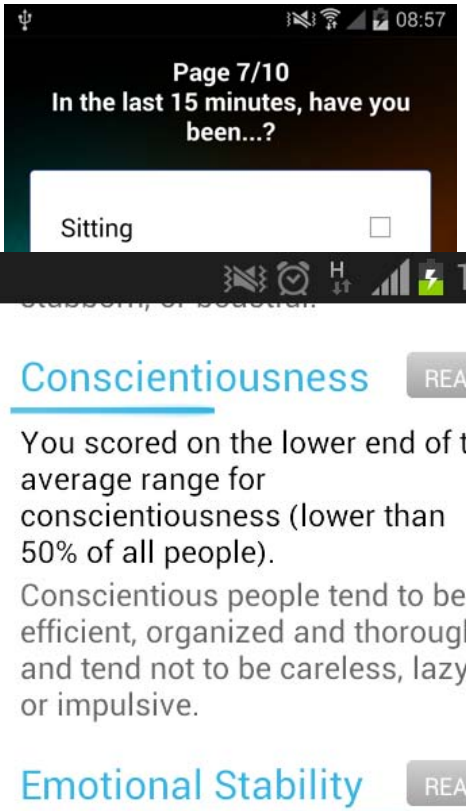

08:56
Page 1/10
To what extent do you feel:
1. Calm?
Very much
2. Anxious?
Somewhat
Submit

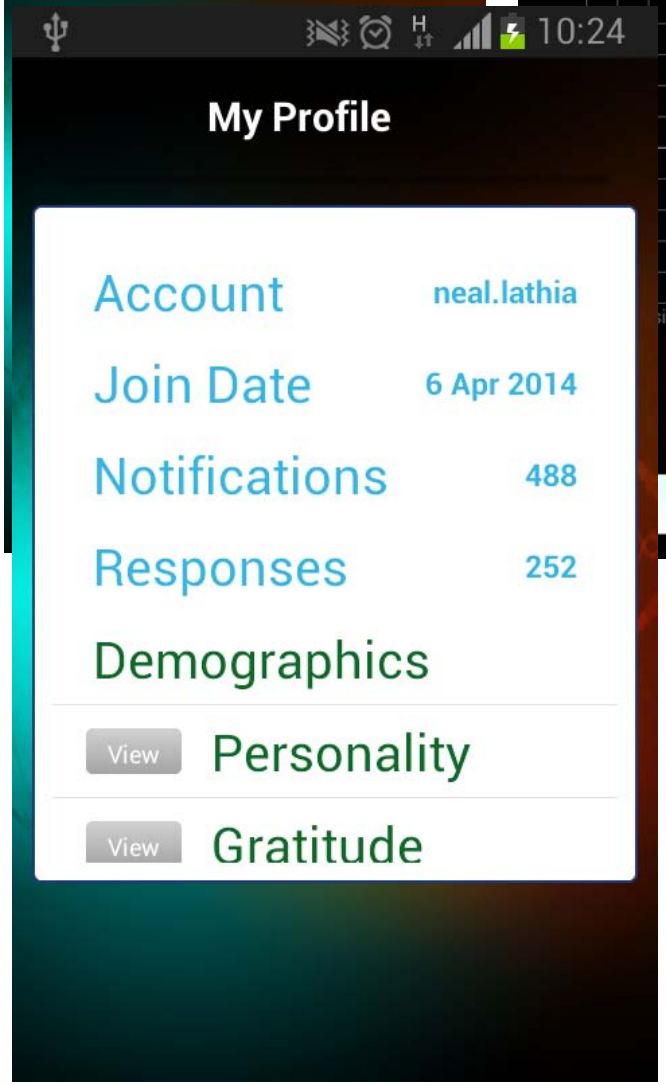

08:57
Page 7/10
In the last 15 minutes, have you been...?
Sitting
Standing
Walking
Running
Lying Down
Cycling
Other
Submit

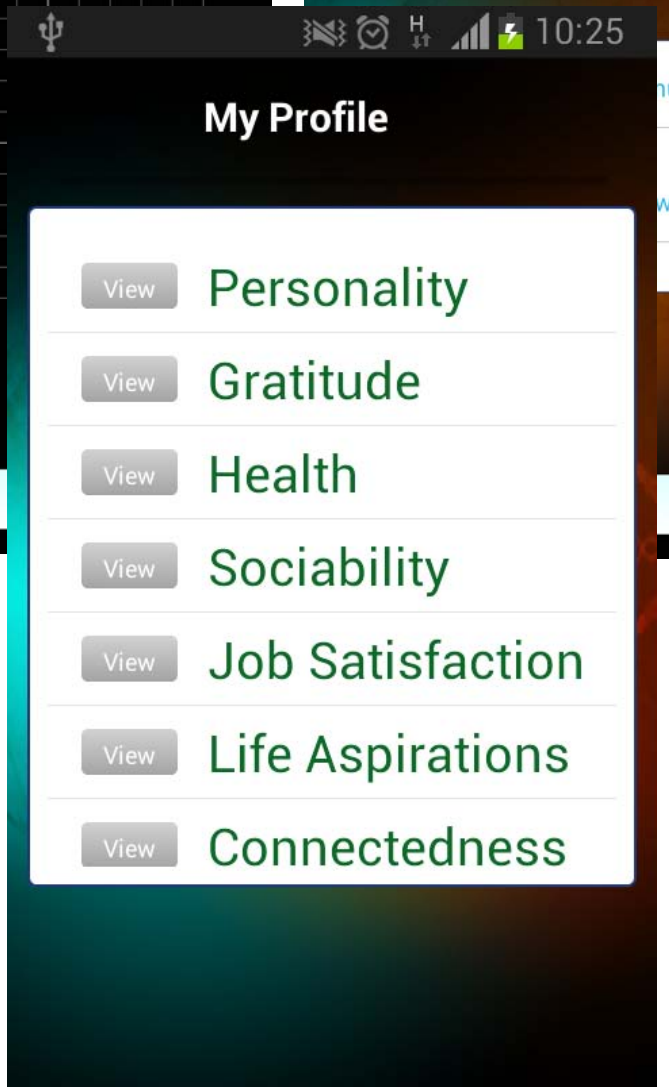

08:51
Emotion Sense

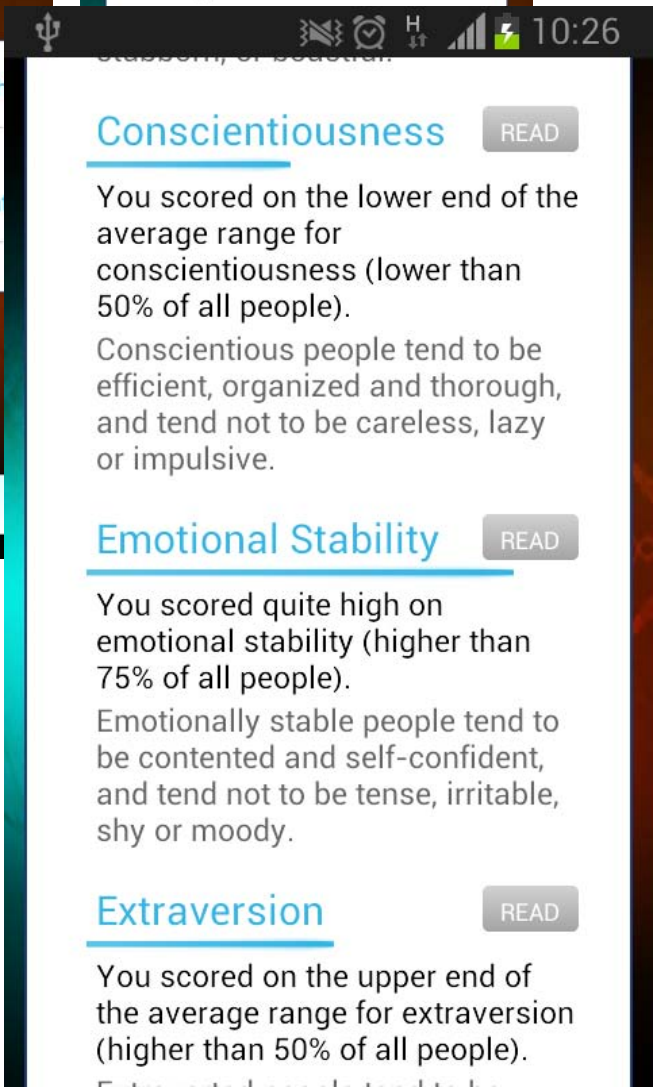

08:57
How do you feel?
Stress
Alert
Excitement

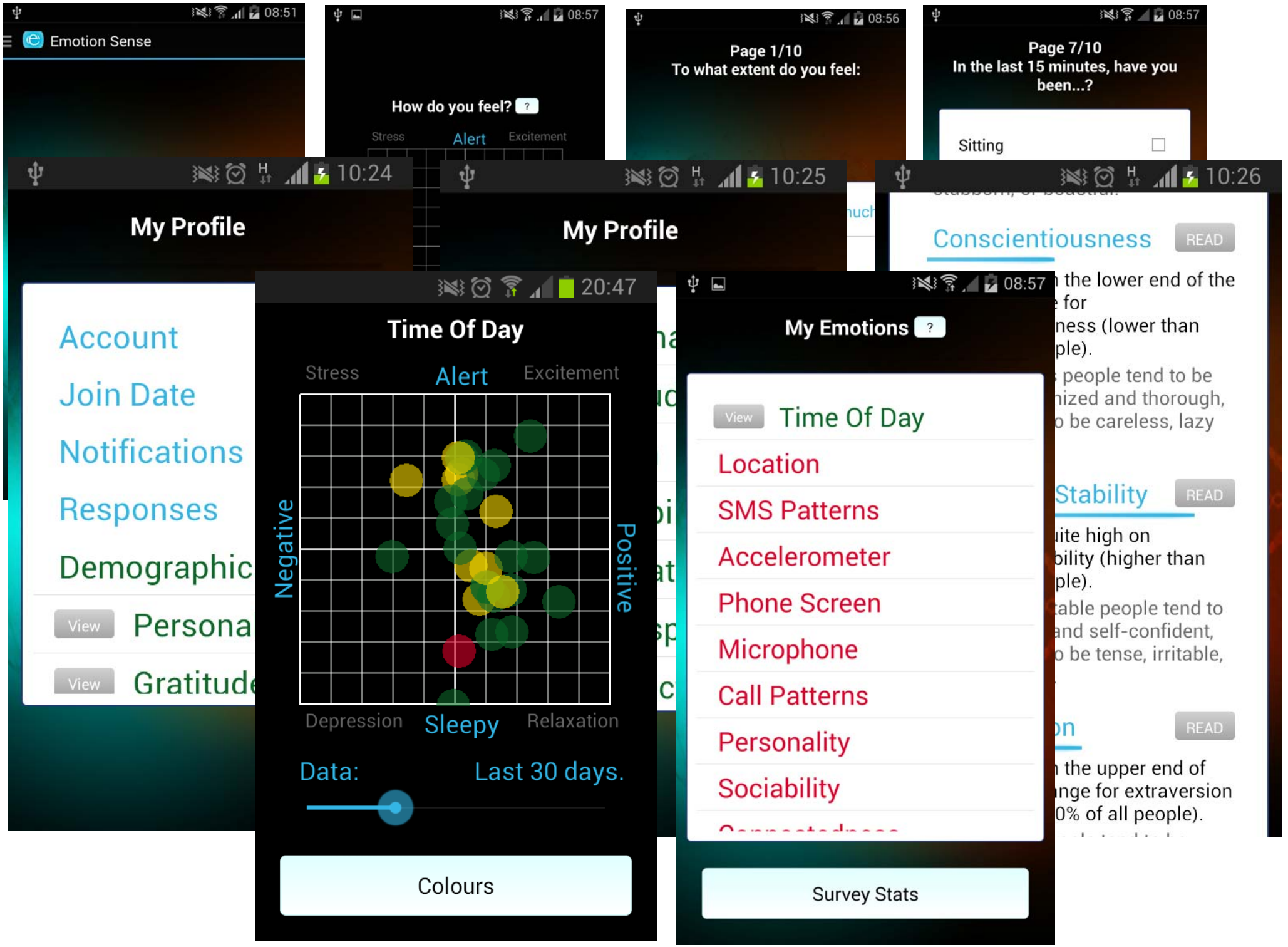

08:56
Page 1/10
To what extent do you feel:

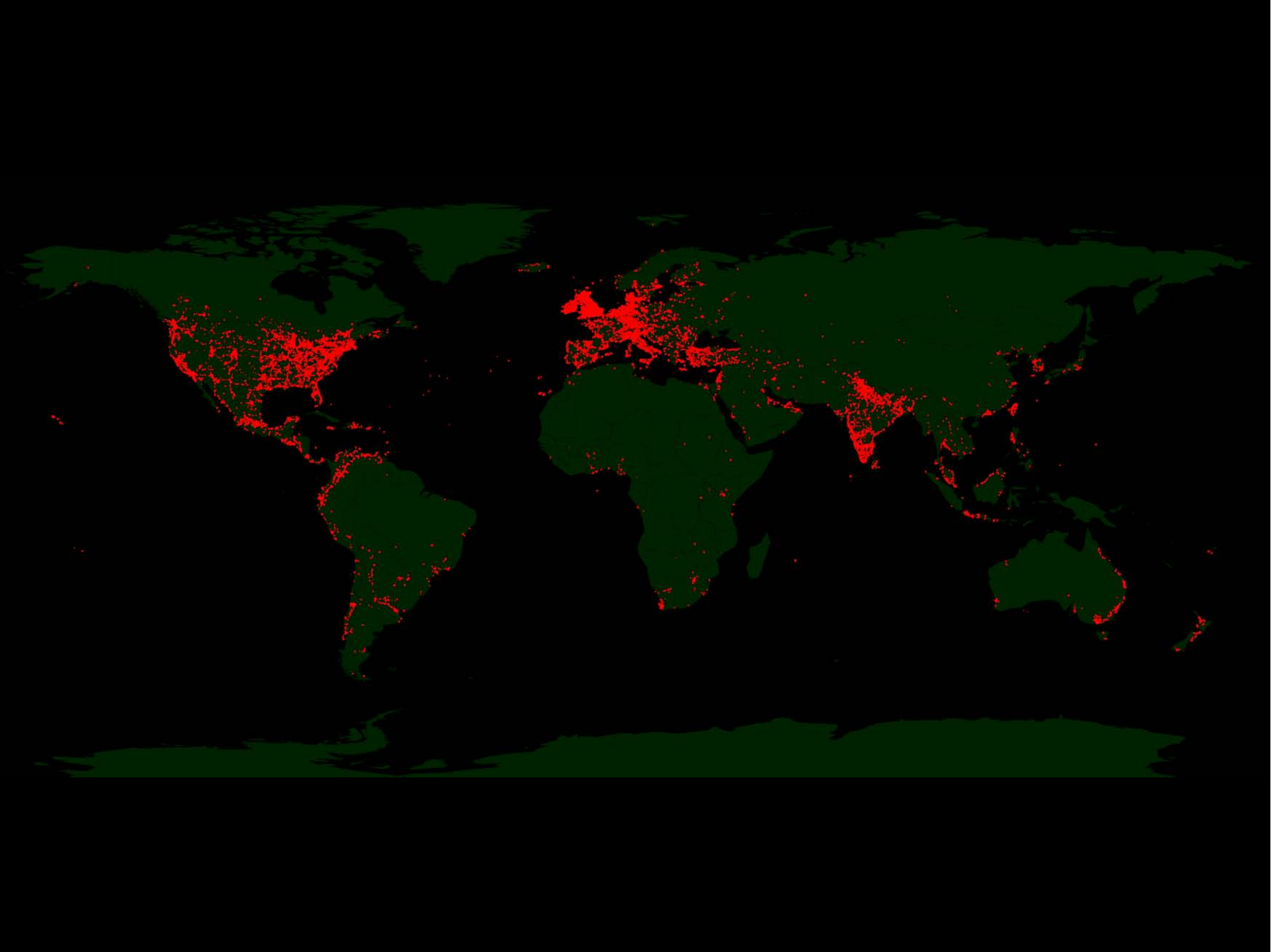

08:57
Page 7/10
In the last 15 minutes, have you been...?
Sitting

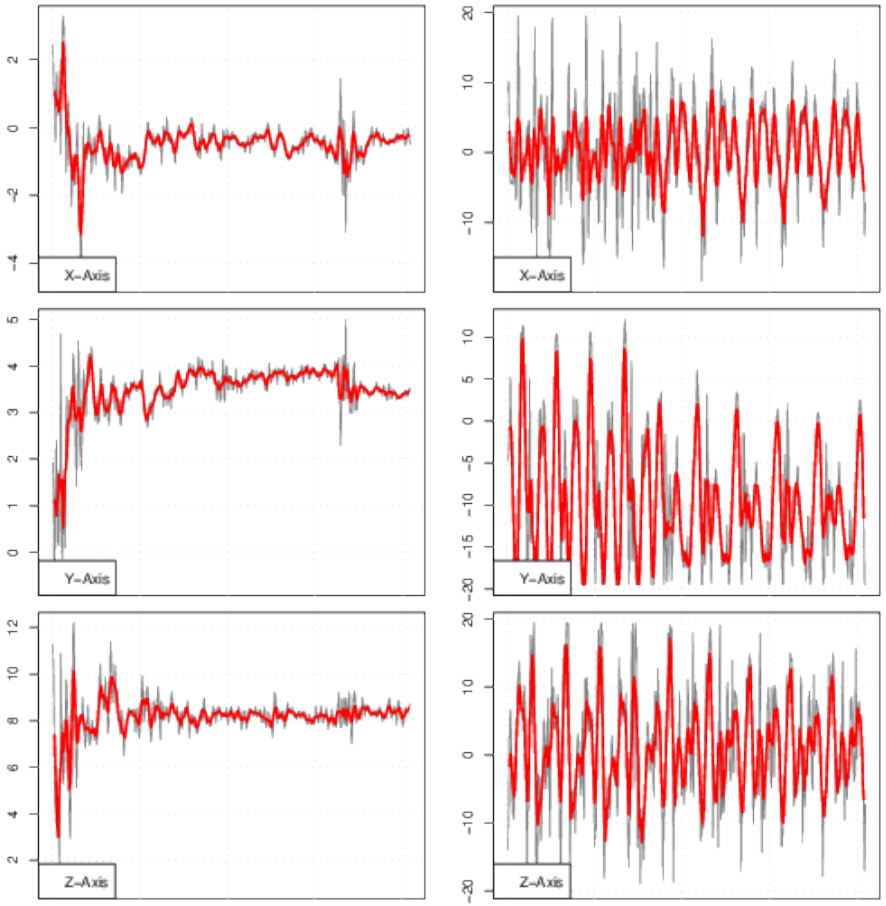

10:24
My Profile
Account
neal.lathia
Join Date
6 Apr 2014
Notifications
488
Responses
252
Demographics
View
Personality
View
Gratitude

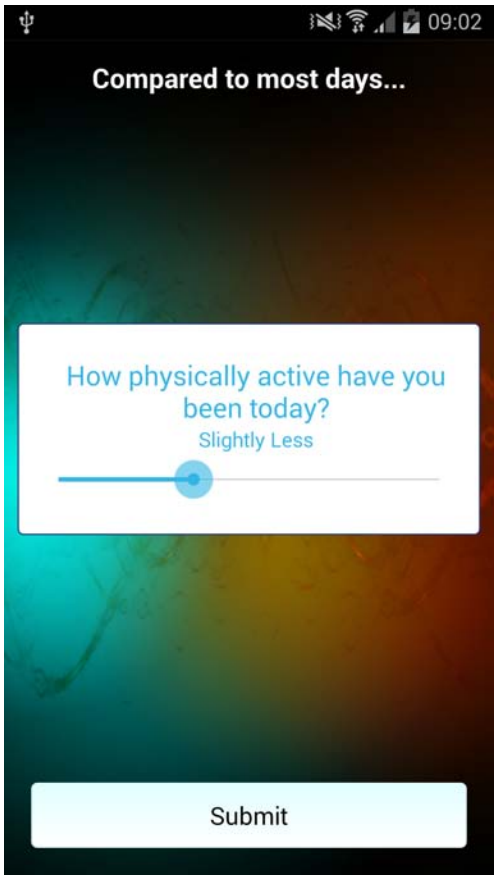

10:25
My Profile
View
Personality
View
Gratitude
View
Health
View
Sociability
View
Job Satisfaction
View
Life Aspirations
View
Connectedness

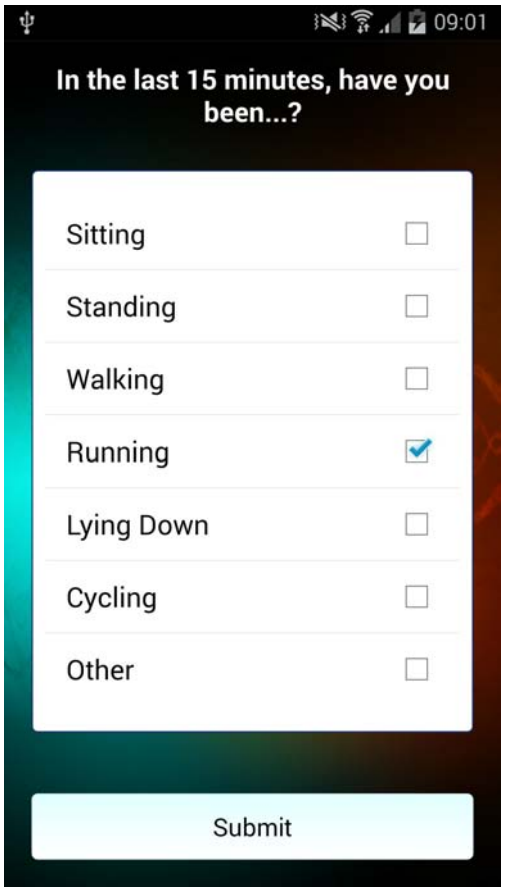

10:26
Conscientiousness
READ
You scored on the lower end of the average range for conscientiousness (lower than 50% of all people).
Conscientious people tend to be efficient, organized and thorough, and tend not to be careless, lazy or impulsive.
Emotional Stability
READ
You scored quite high on emotional stability (higher than 75% of all people).
Emotionally stable people tend to be contented and self-confident, and tend not to be tense, irritable, shy or moody.
Extraversion
READ
You scored on the upper end of the average range for extraversion (higher than 50% of all people).

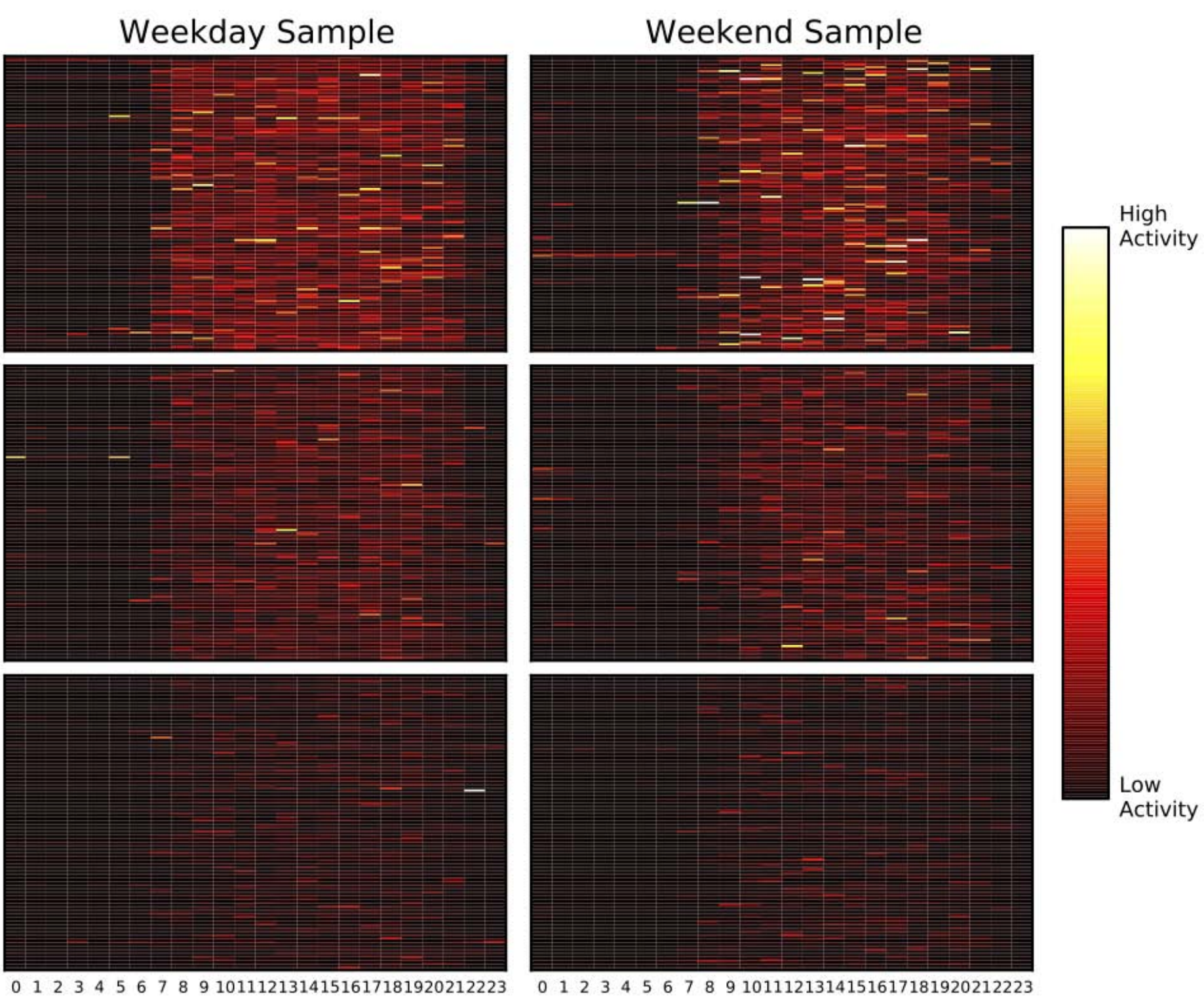

08:51
Emotion Sense
08:57
How do you feel?
Stress
Alert
Excitement
08:56
Page 1/10
To what extent do you feel:
08:57
Page 7/10
In the last 15 minutes, have you been...?
Sitting
10:24
My Profile
Account
Join Date
Notifications
Responses
Demographic
View
Persona
View
Gratitude
10:25
My Profile
10:26
Conscientiousness
READ
the lower end of the
for
ness (lower than
ple).
people tend to be
nized and thorough,
o be careless, lazy
Stability
READ
ite high on
bility (higher than
ple).
table people tend to
and self-confident,
o be tense, irritable,
on
READ
the upper end of
nge for extraversion
0% of all people).
20:47
Time Of Day
Stress
Alert
Excitement
Negative
Positive
Depression
Sleepy
Relaxation
Data:
Last 30 days.
Colours
08:57
My Emotions
View
Time Of Day
Location
SMS Patterns
Accelerometer
Phone Screen
Microphone
Call Patterns
Personality
Sociability
Survey Stats




X-Axis
Y-Axis
Z-Axis
X-Axis
Y-Axis
Z-Axis

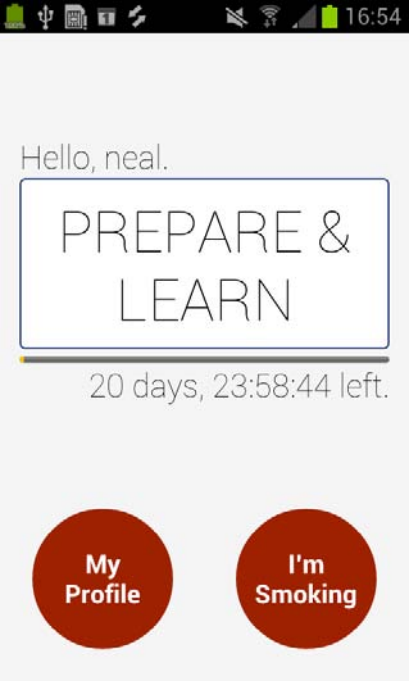

09:02
Compared to most days...
How physically active have you been today?
Slightly Less
Submit

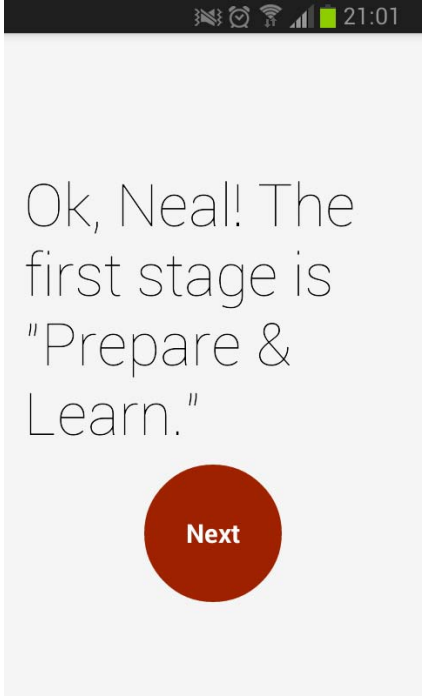

09:01
In the last 15 minutes, have you been...?
Sitting
Standing
Walking
Running
Lying Down
Cycling
Other
Submit

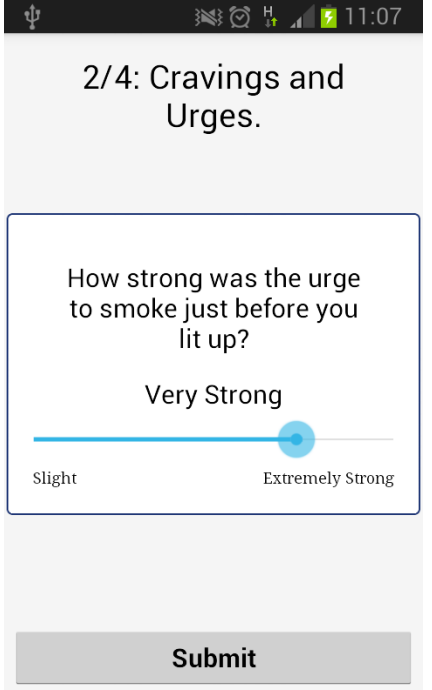

Weekday Sample
Weekend Sample
High Activity
Low Activity
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

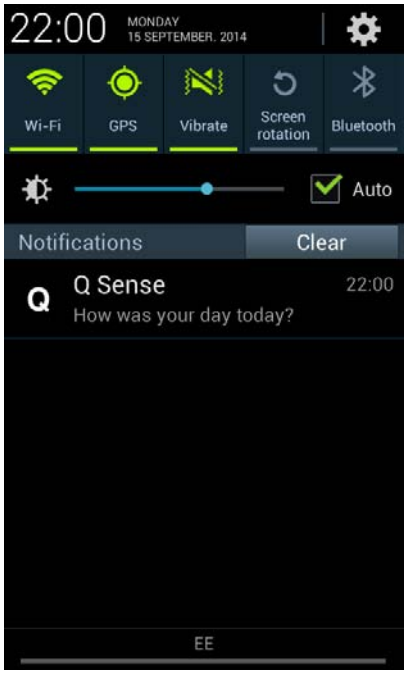
Case 2: Smoking Cessation

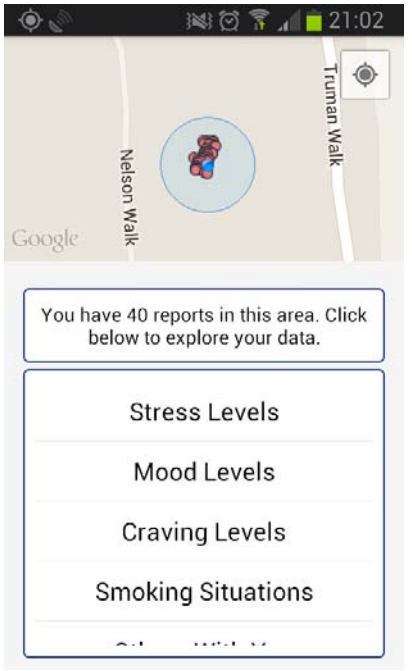
Naughton et al. (in prep). *The feasibility of a context aware smoking cessation app (Q Sense): A mixed methods study*. 2015.


16:54
Hello, neal.
PREPARE & LEARN
20 days, 23:58:44 left.
My Profile
I'm Smoking

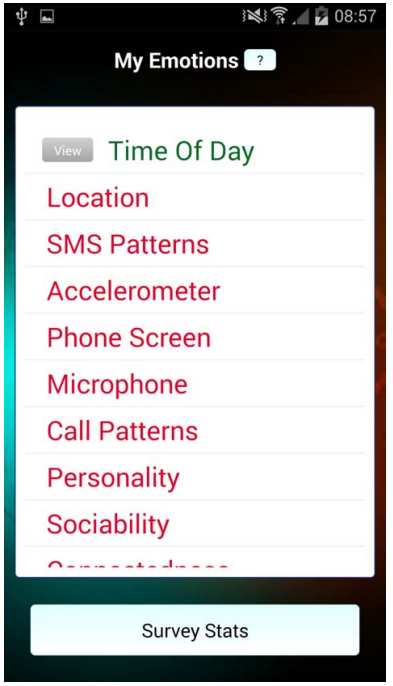

21:01
Ok, Neal! The first stage is "Prepare & Learn."
Next

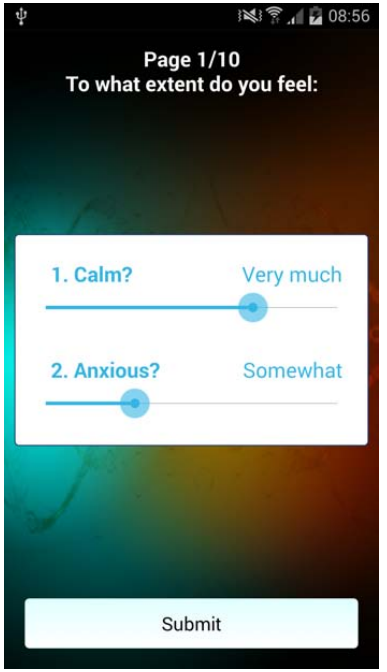

11:07
2/4: Cravings and Urges.
How strong was the urge to smoke just before you lit up?
Very Strong
Slight
Extremely Strong
Submit

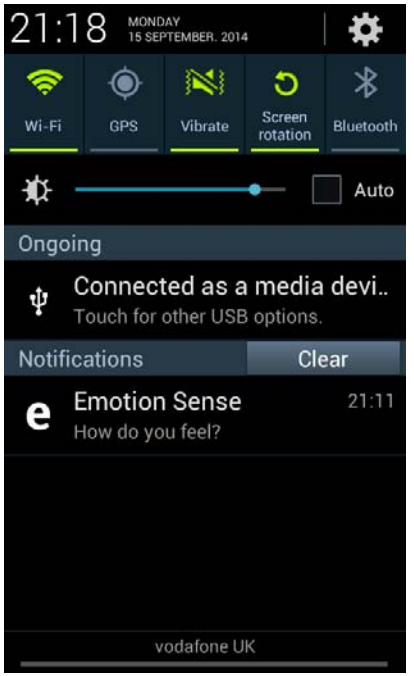

22:00
MONDAY
15 SEPTEMBER. 2014
Wi-Fi
GPS
Vibrate
Screen rotation
Bluetooth
Auto
Notifications
Clear
Q Sense
22:00
How was your day today?
EE

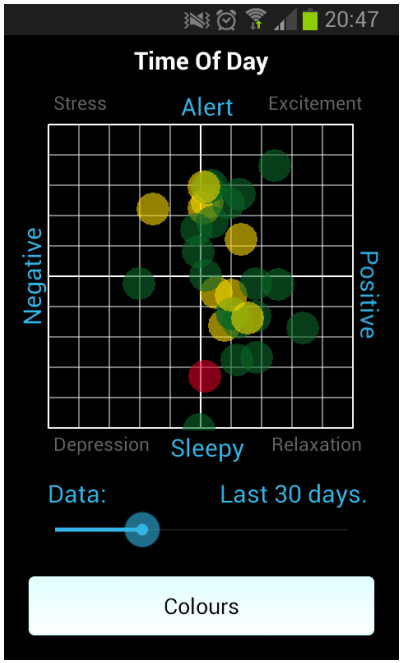

21:02
Truman Walk
Nelson Walk
Google
You have 40 reports in this area. Click below to explore your data.
Stress Levels
Mood Levels
Craving Levels
Smoking Situations

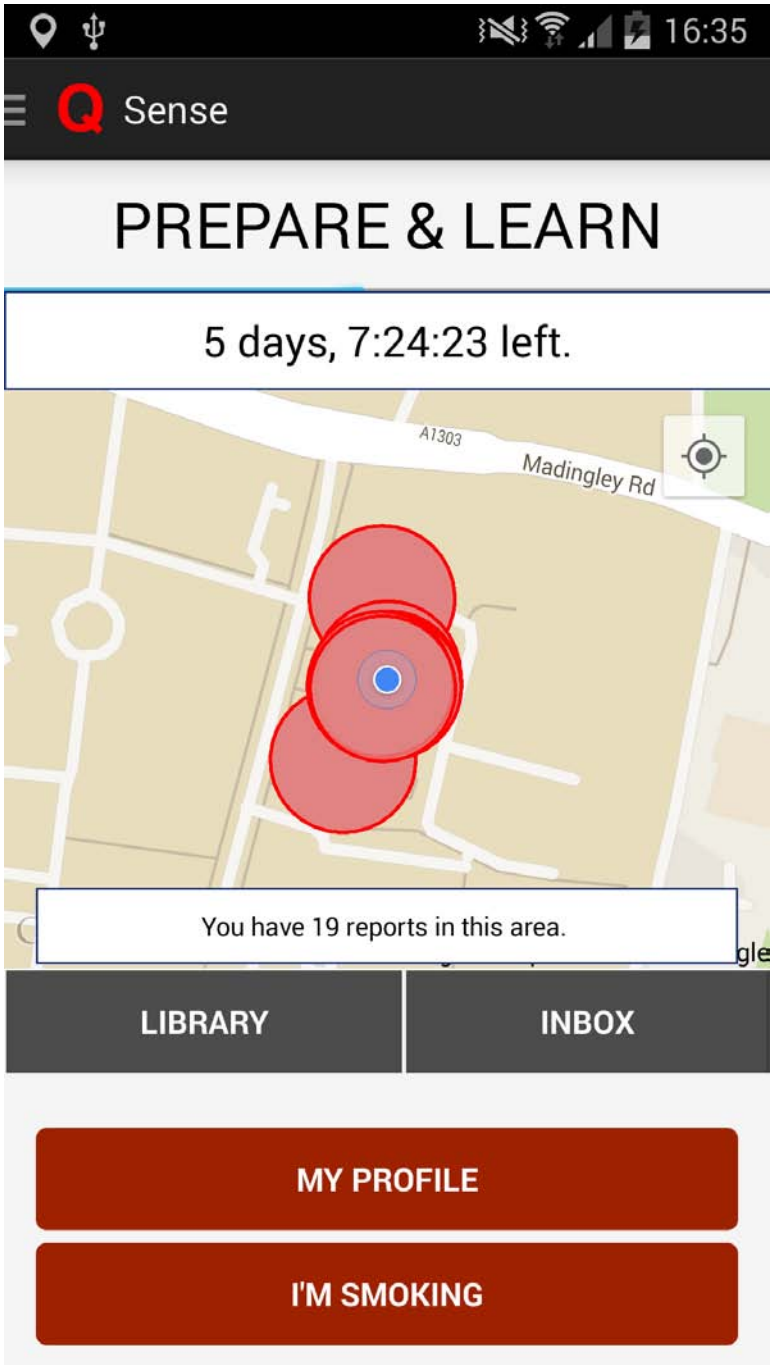
08:51
Emotion Sense
EMOTIONSENSE
Click on 'Profile' to complete a Demographics survey!
Profile
Emotions
How do you feel?


08:57
My Emotions
View
Time Of Day
Location
SMS Patterns
Accelerometer
Phone Screen
Microphone
Call Patterns
Personality
Sociability
Survey Stats

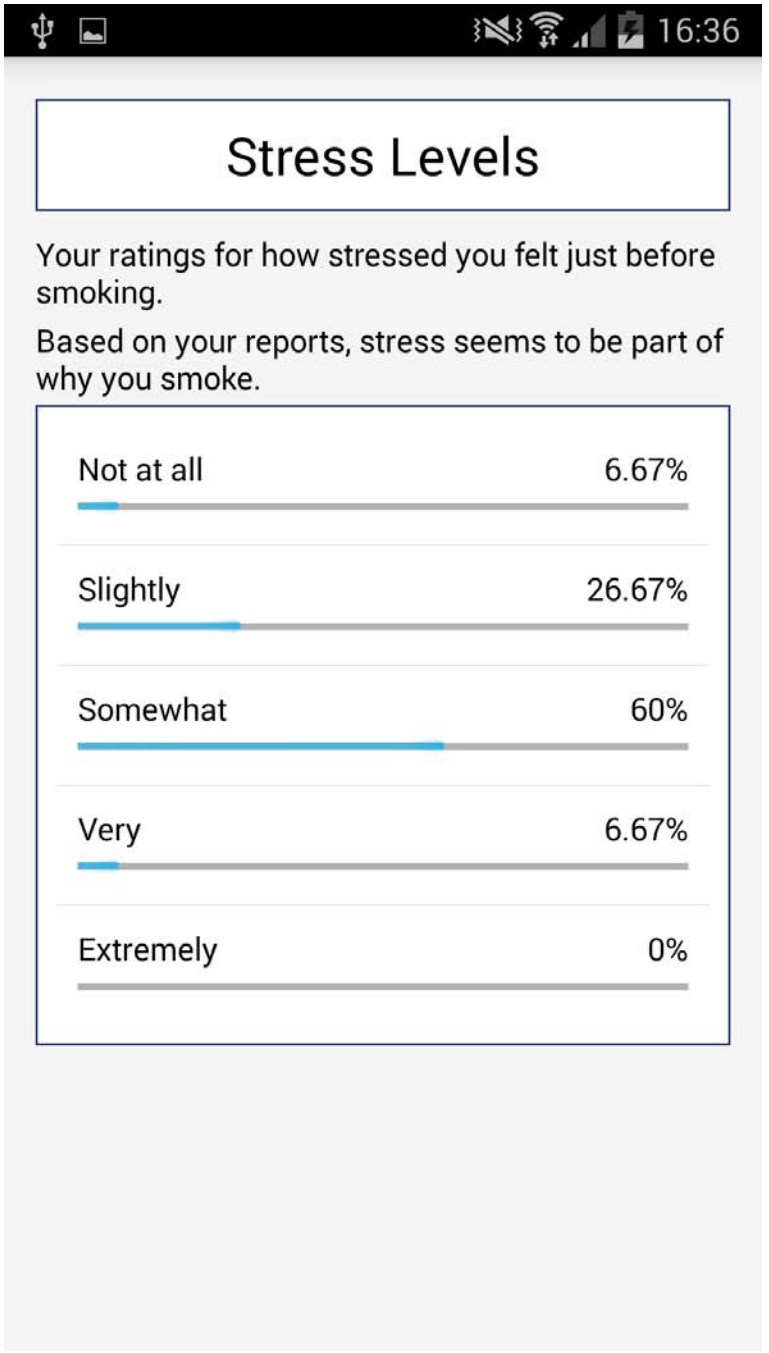

08:56
Page 1/10
To what extent do you feel:
1. Calm?
Very much
2. Anxious?
Somewhat
Submit


21:18
MONDAY
15 SEPTEMBER. 2014
Wi-Fi
GPS
Vibrate
Screen rotation
Bluetooth
Auto
Ongoing
Connected as a media devi..
Touch for other USB options.
Notifications
Clear
Emotion Sense
21:11
How do you feel?
vodafone UK

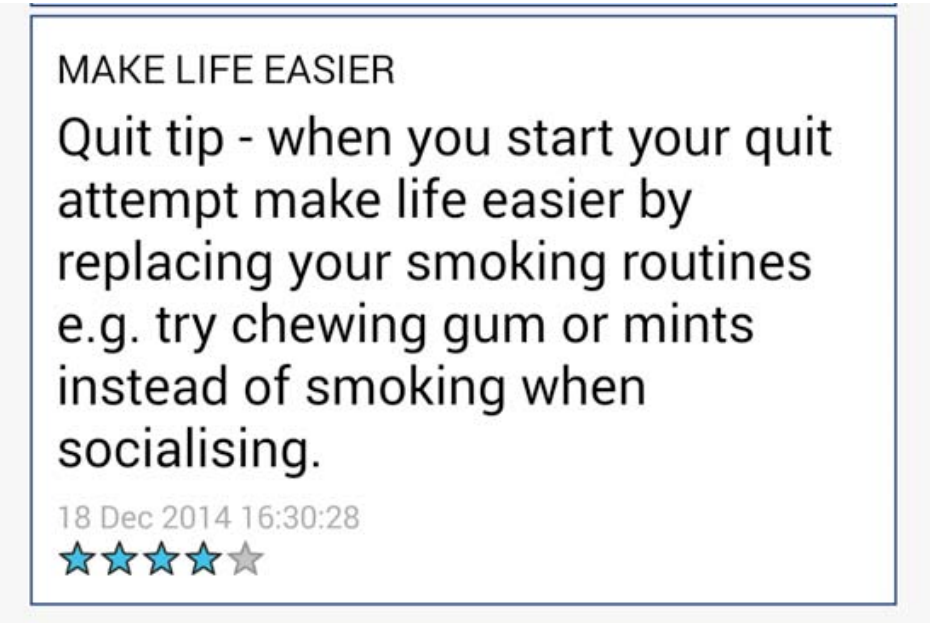

20:47
Time Of Day
Stress
Alert
Excitement
Negative
Positive
Depression
Sleepy
Relaxation
Data:
Last 30 days.
Colours


16:35
Sense
PREPARE & LEARN
5 days, 7:24:23 left.
A1303
Madingley Rd
You have 19 reports in this area.
LIBRARY
INBOX
MY PROFILE
I'M SMOKING

16:36
Stress Levels
Your ratings for how stressed you felt just before smoking.
Based on your reports, stress seems to be part of why you smoke.
Not at all 6.67%
Slightly 26.67%
Somewhat 60%
Very 6.67%
Extremely 0%



Stress, Depression, Urges, Situation, Social (Other Smokers).



Discussion

Washington University in St. Louis

SCHIZOPHRENIA

UNIVERSITY OF MARYLAND

ANXIETY

UNIVERSITY OF CAMBRIDGE

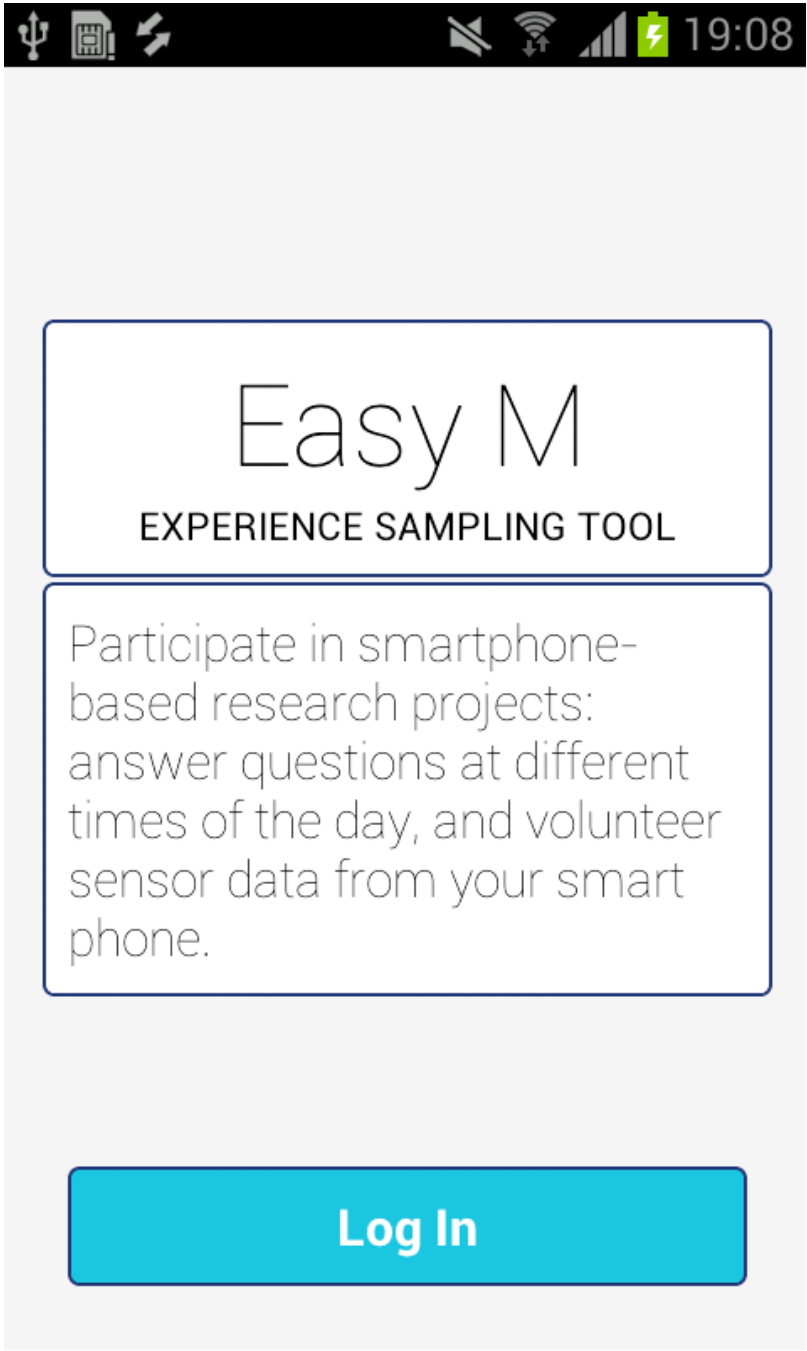
MOOD ADJUSTMENT

UNIVERSITY OF SILESIA IN KATOWICE

ANTI-SOCIAL PERSONALITY

University of Kent

ON/OFFLINE MOOD EXPRESSION



Individuals (across cultures) use technologies differently. Individuals (within cultures) have varying access to technology.

How can the technology be designed to consider these differences?

Individuals (across cultures) have varying attitudes to mental health. Individuals (within cultures) may need different kinds of care.

Will a smartphone support tool empower, or alienate?

New interventions could save time and money. New data changes how healthcare can manage and provide care.

Will this data empower or burden health services?

Smartphones, Psychiatry, & Big Data

@neal_lathia, @ConorFarrington
University of Cambridge

Supported by:

UNIVERSITY OF CAMBRIDGE Judge Business School

i-Teams Commercialising Creativity

EPSRC Engineering and Physical Sciences Research Council

MRC Medical Research Council