

# Dominant Types of Mobile Phone Use

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*“Phone addiction is real, and so are its mental health risks”*

Forbes, December 2017

*“How phones are tearing us apart”*

Psychology Today, June 2015

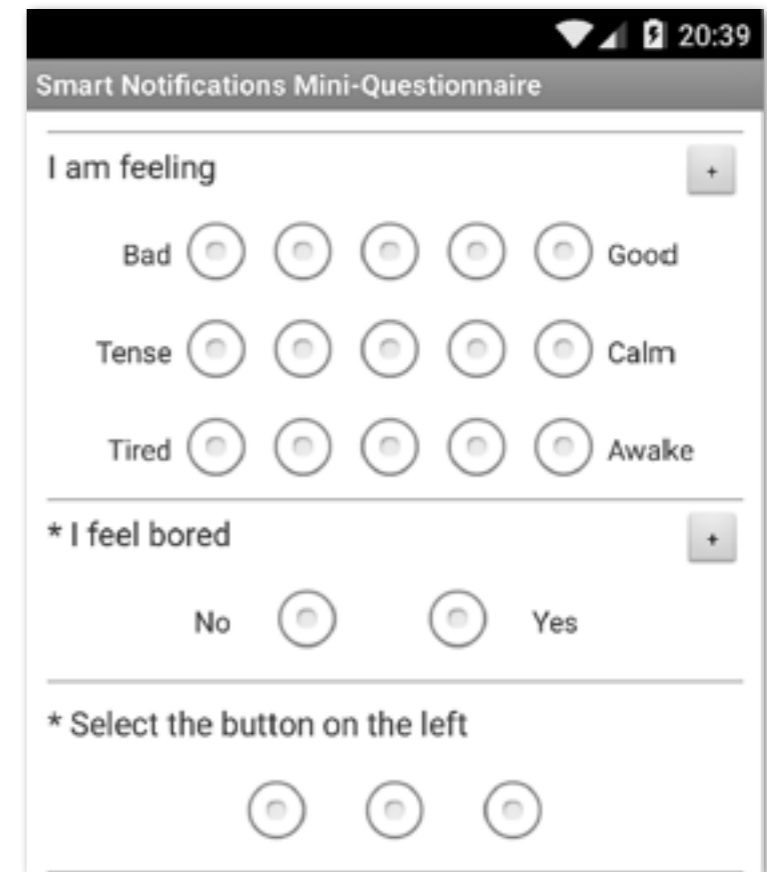
## Research Question:

Is phone addiction something that stands out from normal use in terms of phone use patterns?

If yes, how does it differ?

# Data Collection

- Study with 340 participants, collecting mobile sensor data for ~4 weeks.
- Experience sampling questionnaire (right), using 10-15 notifications per day.
- In addition, we collected:
  - Big Five Personality Test
  - Personal Health Questionnaire Depression Scale (PHQ-8)
  - Boredom Susceptibility Scale (SSS-BS)



The screenshot shows a mobile application interface titled "Smart Notifications Mini-Questionnaire". The interface is displayed on a smartphone screen with a status bar at the top showing signal strength, Wi-Fi, and the time 20:39. The main content area contains three sections of a questionnaire:

- I am feeling**: A horizontal row of five radio buttons for selecting a feeling. The labels "Bad" and "Good" are on the far left and right respectively. The other three buttons are unlabeled.
- Tense**: A horizontal row of five radio buttons. The labels "Tense" and "Calm" are on the far left and right respectively. The other three buttons are unlabeled.
- Tired**: A horizontal row of five radio buttons. The labels "Tired" and "Awake" are on the far left and right respectively. The other three buttons are unlabeled.

Below these sections, there is a section titled **\* I feel bored** with two radio buttons labeled "No" and "Yes".

At the bottom, there is a section titled **\* Select the button on the left** with three radio buttons.

Experience sampling questionnaire

# Features

- Screen sessions (Day, Night)
- Phone calls (Day, Night)
- App Launches (Day, Night) for:  
    Social, Messaging, Email and Game apps
- Network data activity (Rx)
- Photos taken
- Battery drain
- Ringer mode (Normal, Silent, Vibrate)

# Unsupervised Learning

- K-means (#clusters)
- Agglomerative (#clusters, linkage type, affinity)
- Spectral (#clusters, kernel type)
- DBScan (neighbourhood size, min samples)
- Mean-shift (bandwidth)
- Gaussian Mixtures (#components, covariance type, convergence threshold)

# Measuring Cluster Validity

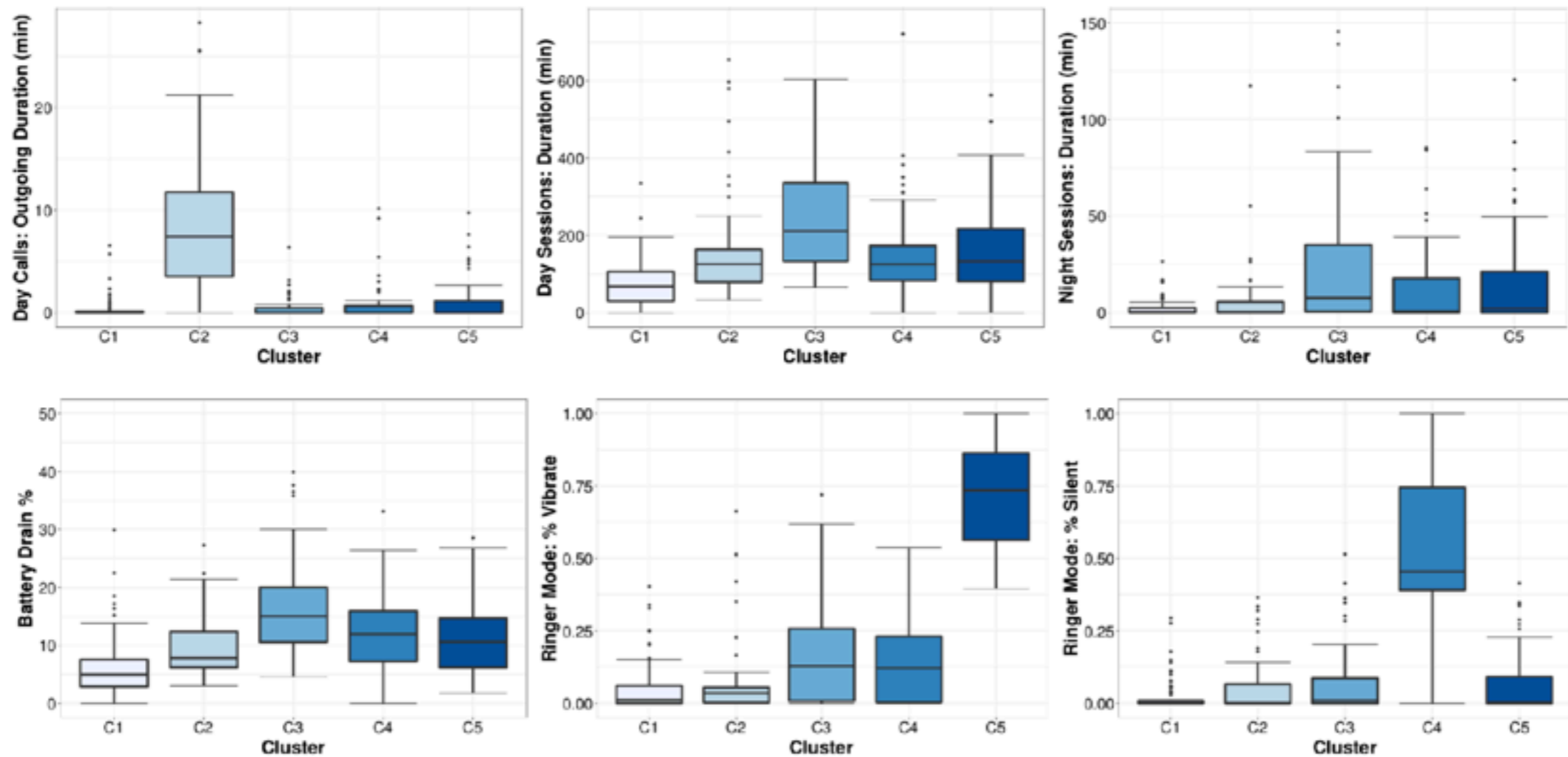
<b>Algorithm</b>	<b>Rule</b>	<b>Algorithm</b>	<b>Rule</b>
Banfeld Raftery	<i>min</i>	Point Biserial	<i>max</i>
C index	<i>min</i>	Davies-Bouldin	<i>min</i>
Dunn	<i>max</i>	Ray-Turi	<i>min</i>
Gamma	<i>max</i>	SD-Scat	<i>min</i>
log(BGSS/WGSS)	<i>min diff</i>	Silhouette	<i>max</i>
McClain-Rao	<i>min</i>	Xie-Beni	<i>min</i>
PBM	<i>max</i>		

13 internal validity criteria used in a Rank Aggregation approach

**Winning clustering configuration:**

> Spectral, with '*rnf*' kernel and k=5.

# Highly Discriminatory Features



Examples of score distributions of highly discriminatory features across predicted clusters



# A Proposed Taxonomy of Mobile Phone Users

**C1:** Limited Use (Baseline)

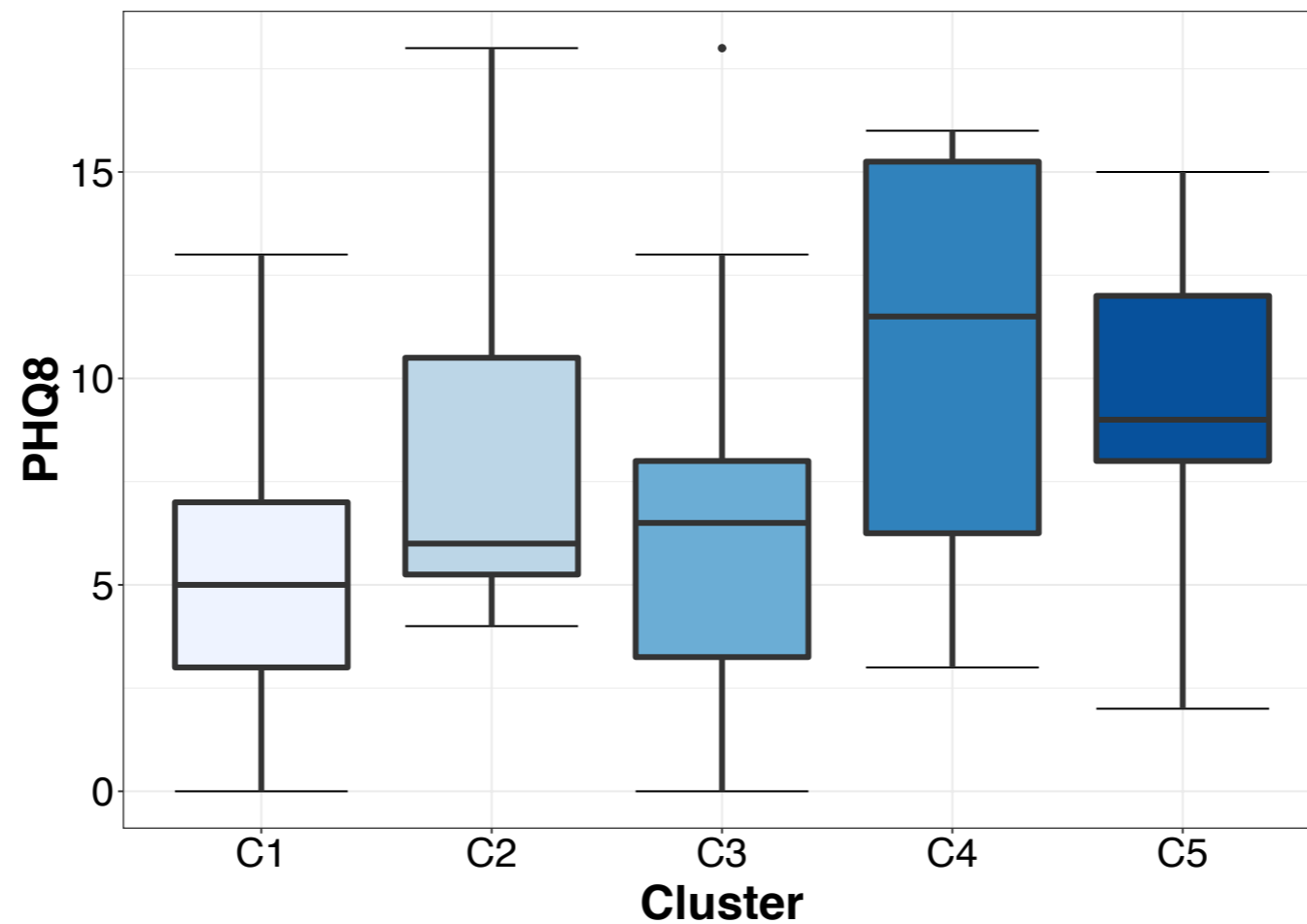
**C2:** Business Use

**C3:** Power Use

**C4:** Personality-Induced Problematic Phone Use

**C5:** Externally-Induced Problematic Phone Use

# Personality Traits: PHQ-8



PHQ-8 scores per cluster

# Conclusions

- Heavy phone use does not predict negative well-being.
- Typical habits such as *nightly phone use sessions* and *not having the ringer mode in 'normal'* are associated with problematic phone use and increase score in depression (PHQ-8) scale.
- Need for further research to study and understand the underlying mental problems without falling into the old moral “new technology is bad” panic.



Source: techdirt.com



*“New tech ‘addictions’ are mostly just old moral panic”*

Engadget UK, February 2018

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For more details, please read:

*"Typical Phone Use Habits: Intense Use Does Not Predict Negative Well-Being"*

Kleomenis Katevas, Ioannis Arapakis and Martin Pielot

ACM MobileHCI '18, Barcelona, Spain, September 2018.

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