

By: Gabby Piccirilli

ARTICLE

critique

Peng, T. Q., & Zhu, J. J. H. (2020). **Mobile phone use as sequential processes: From discrete behaviors to sessions of behaviors and trajectories of sessions.** *Journal of Computer-Mediated Communication*, 25(2), 129–146.
<https://doi.org/10.1093/jcmc/zmz029>

SUMMARY

Peng and Zhu break down mobile phone use into 3 levels:

1. **Discrete Behaviors:** individual actions (ex: checking a text message or scrolling through a single post)
 2. **Sessions of Behaviors:** groups of actions that happen one after another in a single sitting (ex: opening multiple apps, replying to messages & browsing in one sitting)
 3. **Trajectories of Sessions:** patterns of sessions over time/timeline of mobile phone usage (ex: starting in the A.M. with a session of checking emails)
- They aimed to find patterns within mobile sessions and see how each person's return to phone use changed over time and differed from others.

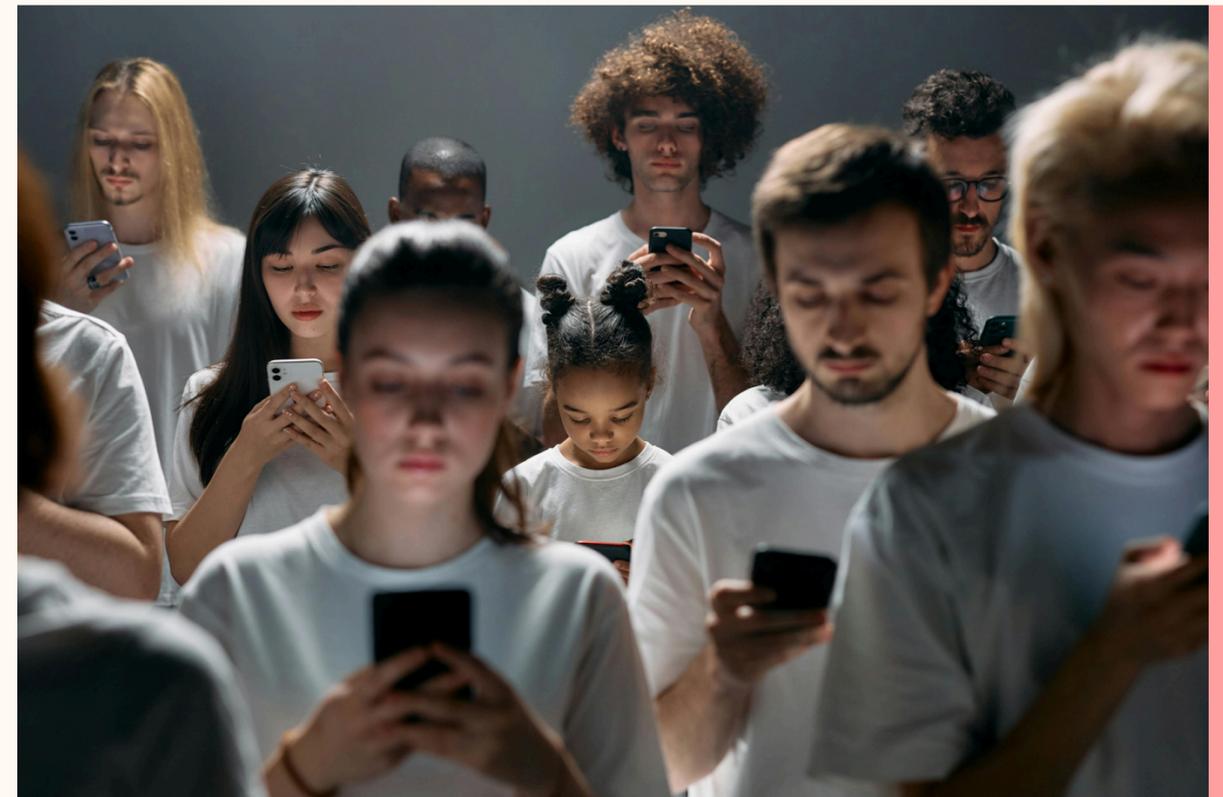
- They operationalized their research questions by collecting data from a representative panel in Hong Kong using an on-phone meter that passively tracked mobile app usage.
- Through their results, they were able to...
 - characterize sessions
 - map sequences & pair certain app usages together
 - track re-engagement patterns & differences among demographics
- Overall, they concluded that mobile phone use is becoming more uniform, with users managing time and engagement mainly during public hours to break routine.

MAIN POINT:

To examine mobile phone use as a *dynamic, continuous process* by analyzing sequences of user behaviors & timelines that include both active phone use and offline periods, providing insights into the behavioral patterns of mobile phone usage.

RELEVANCE & IMPORTANCE

- “Always-on, always-on you”
 - Mobile phones have become extensions of their users and a major part of everyday life.
- Deepening integration of mobile phones into daily life and growing complexity of how they are used calls for a fresh perspective.



PURPOSE

- Study aims to...
 - fill research gap by developing mobile phone use as 2 sequential processes: *mobile sessions & trajectories*
 - examine how individuals, as active users, organize actions into mobile sessions, revealing patterns within sessions and between on- and offline time.



FRAMEWORKS

DISCRETENESS

- Assumes that individuals make isolated choices about a **single type of media** rather than a mix of different media
- However, ordinary users personalize their media use across multiple types, leading to a new approach, a multiplicity framework.

MULTIPLICITY

- Aims to understand why and how **multiple media** are selected and combined for use
 - Mobile phones as multifunctional devices
 - Provides a more valid approach to understanding mobile phone use in real-life settings.

RESEARCH QUESTIONS:

RQ1.

Uncovering sequential characteristics underlying mobile sessions



What patterns and order of actions are happening within each mobile phone session?

RQ2.

Uncover sequential patterns in mobile sessions initiated and generated by ordinary users of mobile phones.



What are the patterns in the order of actions that ordinary mobile phone users take during their phone sessions?

RQ3.

Examine the intraindividual change and interindividual differences on the mobile re-engagement embedded in mobile trajectories.



How does each person's pattern of returning to their phone change over time and how do these patterns differ between people?

OPERATIONALIZATION

- Data was collected from a representative panel of **2,500 users in Hong Kong** from July 2016-November 2016
 - Participants recruited by a marketing research firm for local media organizations
 - Demographic information obtained via self-report online survey
- An **on-phone meter** was installed on the Android and iOS mobile phones of the enrolled users.
 - Meter passively tracked the use of mobile apps.
 - Only tracked the use of **active apps** on screen & filtered others running in the background
 - Recorded the **start and end time** of the use of each active app
 - Did not record if the use of an app is triggered by notifications or not.
- Users in the panel generated approximately **11.5 million** records of discrete app use and **1.8 million** multi-app mobile sessions.
- 20 generic categories for mobile apps
 - i.e.: Communication, Education, Entertainment, Music, News, etc.
- Gender
 - Dichotomous variable
- 5 age groups
 - 18–20, 21–30, 31–40, 41–50, and 51–64
- 6 categories, three levels of education
 - Ordinal variable; Low, medium, and high
- 6 categories of occupation
 - Discrete variable; managers, professionals, clerks, workers, students, and unemployed.

OPERATIONALIZATION CONT.

- **Mobile Sessions**

- Looked at gap between app uses ("inter-app interval") & set threshold for each person.
 - If the gap is smaller than a person's usual time between apps, the apps are part of the same session.
 - Otherwise, a new session was started.

- **Multi-App Sessions**

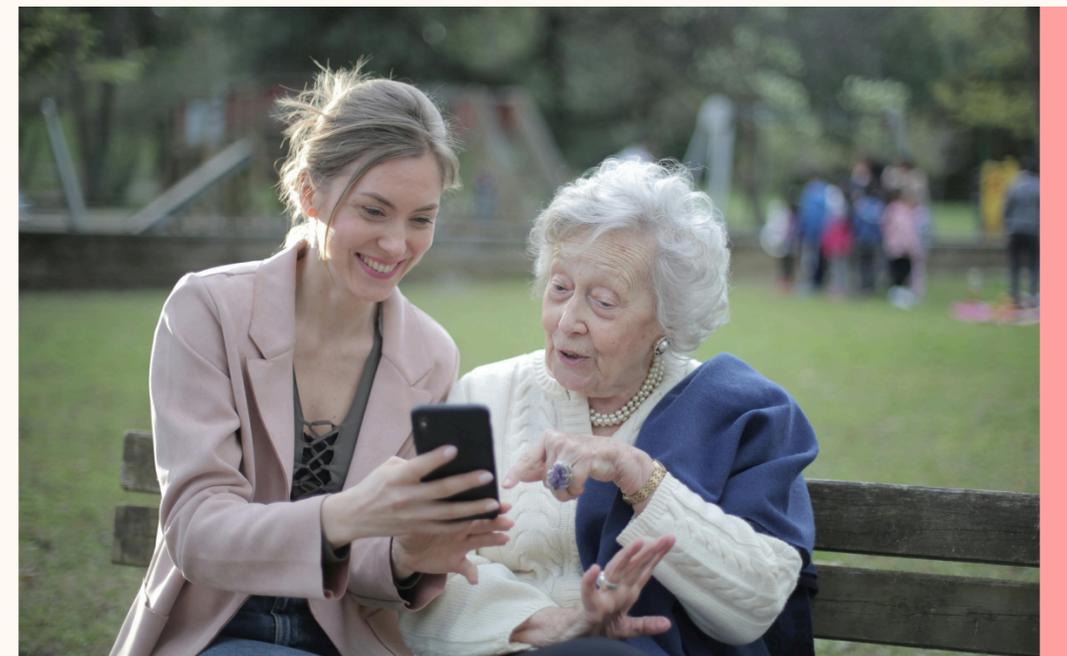
- Sessions with multiple apps lined up to look for patterns.
- Compare each person's multi-app sessions to find similarities by grouping sessions into clusters based on common patterns.

- **Mobile Trajectories**

- Connected each user's sessions with breaks (times when the phone is off) to form timeline ("mobile trajectory")
- Measure how likely someone is to switch from being off phone to starting a session ("mobile re-engagement")

- **Time-of-Day Patterns & Differences Among People**

- Analyzed how phone use changed through different times of day (i.e. morning or evening) & how it varied between people (i.e. by gender, age, or job).
- Linear mixed modeling



RESULTS

RQ1. CHARACTERIZING SESSIONS

- **Daily Mobile Use:**
 - Avg. 47 sessions per day, ~262 seconds per session
 - Longer sessions = more app switches
- **App Variety:**
 - Avg. 15 app types per user
 - <1% use all 20 types
 - ~10% use fewer than 10 types
 - Similar app types within sessions
- **Multi-App Sessions:**
 - Typically start with Communication, then Tools, SNS, Search
- **Single-App Sessions:**
 - Top apps: Communication, Tools, SNS, Games, and Search

RQ2. MAPPING SEQUENCES

- **Unique Patterns:**
 - 1.8M Multi-App Sessions: only 2,203 unique patterns; top 30 patterns = 50% of sessions
- **Gender Differences:**
 - Males: Patterns end with Games after brief Communication or Tools
 - Females: Patterns often start with SNS & end with Communication
- **Age Differences:**
 - 18-40 y.o.: Patterns with Communication at start & end, heavy SNS in middle
 - 41-64 y.o.: Start sessions with Email, end with Search or News

RQ3. INTRAINDIVIDUAL CHANGES & DIFFERENCES

- **Mobile Re-engagement:**
 - Follows inverse U shape, peaking midday, dipping in evening hours
- **Age Differences:**
 - Younger users (18-30) re-engage more than older users, especially in the evening.
- **Education Differences:**
 - Medium education level re-engages the most, particularly in later hours
- **Gender Differences:**
 - Minimal differences, but males re-engage slightly more in the morning & evening

IMPLICATIONS OF RESULTS

- *Demographic Implications:*

- **Male** users focus more on task-oriented apps while **female** users focus on more socially-oriented apps.
- **Younger** users (18–40) prefer Communication & SNS apps & use mobile apps more frequently.
- **Older** users (41–64) favor News, Search, & Email apps.
- Despite small variations, re-engagement patterns are largely similar across social groups..

- *Overall Implications:*

- Mobile phone usage is becoming increasingly uniform across society, reflecting that modern life is becoming more organized.
- People are less likely to engage with their phones during private time (late night & evening hours), & more during public time (morning & afternoon).
 - Aligns with the idea that people have more control over their accessibility during private time.
 - Users view the phone as a way to disrupt the monotony of the day.
- Mobile phones act as tools to manage time & social engagement.
- Users actively control & construct their own time by choosing how & when to use their phones.

STRENGTHS

On-phone meter only tracked the use of active apps and filtered ones running in the background

-Prevents skew of data based on apps one simply failed to close or does not use

Application of multiplicity framework

Given most sessions were not discrete and included multiple apps, the discreteness framework wouldn't have been as applicable

Views users' mobile phone usage as a logical & timely process of patterns, unlike previous studies that exclude routine

-More accurate to real-life usage

Large and representative sample

2,500 diverse users of varying demographics, allowing for more generalizability

WEAKNESSES

On-phone meters did not record if the use of an app was triggered by a notification or not.

-May skew data based on whether or not a user has notifications enabled for certain apps.

-Would provide interesting insight into the influence of notifications on user

Assumes all mobile phone use is a rational choice & does not address “habitual” use, which is characterized by a lack of control and can occur outside of one’s awareness.

-Opportunity for insight into mental health’s impact on mobile phone use if considered.

Study conducted in Hong Kong only

-Would need to be replicated in a variety of other societies in order to make any general claims

CONTRIBUTIONS

- ***Introduces a sequential perspective***, highlighting the importance of time/timing in human behavior.
 - Shows how the sequential approach can improve media use research.
- Enhances understanding of mobile phone integration into daily routines.
- ***Contributes to media theories*** like media richness and media affordance by showing how app combinations meet varied needs.
- Reveals patterns in phone use, advancing insights on its ***psychological and social impacts***.



REFERENCE

Peng, T. Q., & Zhu, J. J. H. (2020). Mobile phone use as sequential processes: From discrete behaviors to sessions of behaviors and trajectories of sessions. *Journal of Computer-Mediated Communication*, 25(2), 129–146. <https://doi.org/10.1093/jcmc/zmz029>