



# PANDERAM

## Follow-up study “Smartphone and App usage behavior” Results extreme groups

Susen Döbelt

Chemnitz, September 2021



## Objective(s) of the survey

- **Overview of app and smartphone usage behavior** to prepare behavioral level-specific personas.
- Further characterization of different **behavior levels** regarding privacy-protecting behavior in smartphone app use.
- Research question: How do individuals of different behavioral levels go about informing and adjusting app data collection?
- **N = 9 subjects participated in the follow-up study.**





# Data preparation and analysis

## Quantitative data analysis

- Selection of non-/parametric methods
  - Differences in behavioral levels tested one-sided if directed hypotheses exist otherwise two-sided

## Qualitative data analysis (thinking aloud)

- Documentation of the results in the form of frequencies and according to importance

## Qualitative data analysis (open answers examiner protocol)

- Indication of relative frequencies of responses



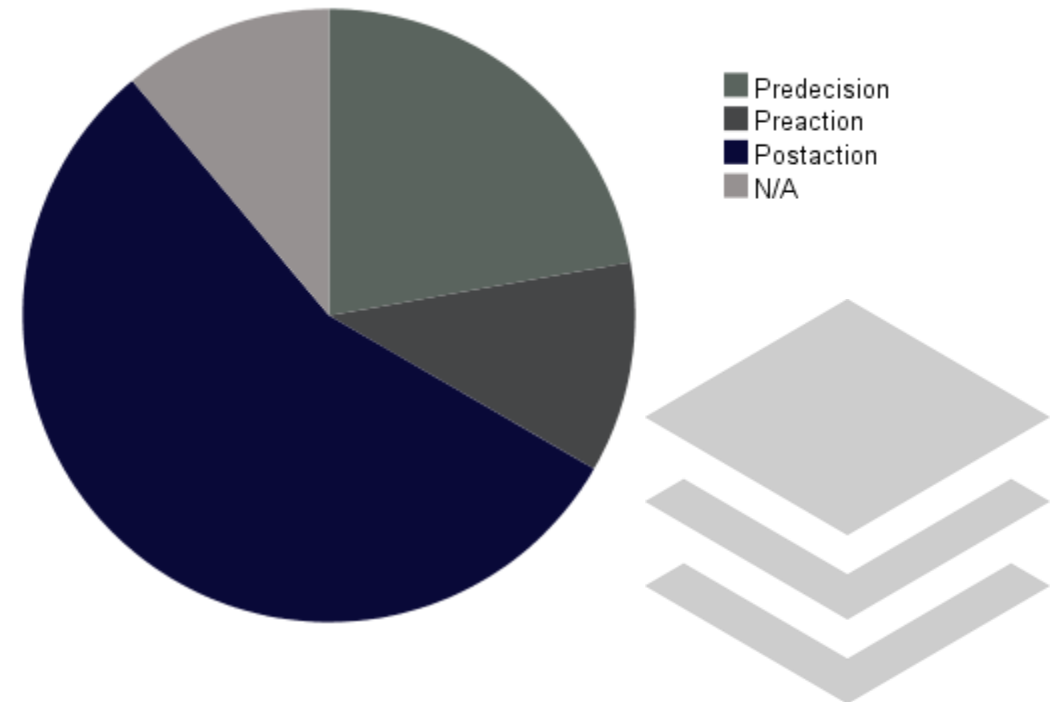


# Data questionnaire: behavioral levels ([1], [2])

Selection of two "extreme groups"

$n_1 = 5$  Postaction

$n_2 = 4$  Predecision, Preaction, N/A (Self-description:  
"not particularly interested in data protection"  
= subsequent assignment to the Predecision level)





## Data questionnaire: tech-savvy (ATI Scale; [3])

**Medium approval:**  $MW = 3,37$  („Rather not true“;  $SD = 1,07$ ; Min = 2,00; Max = 5,11)

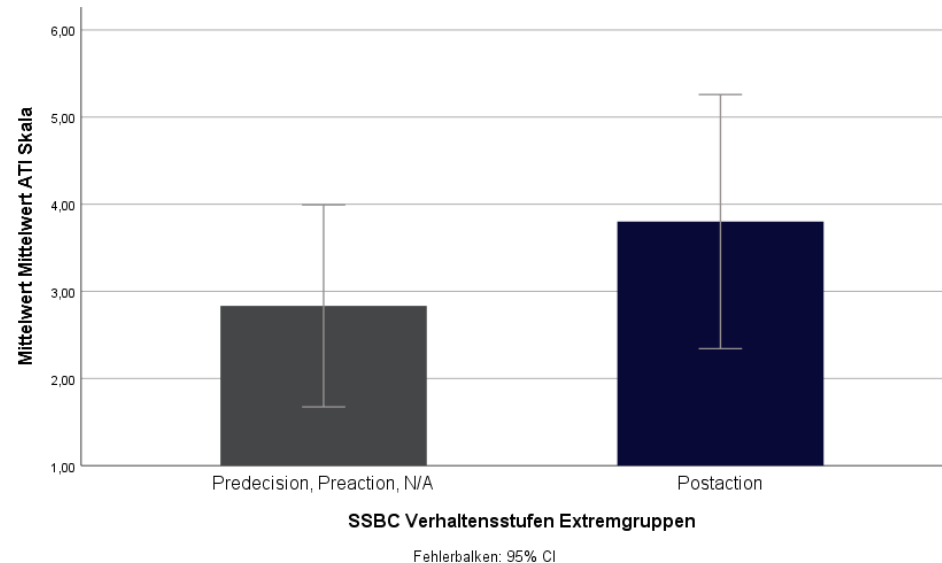
Comparison with norm sample ( $N = 300$ ;  $MW = 4,14$ ): marginal significant ( $t(8) = -2,16$ ;  $p = .063$ ;  $r = 0,61$ )

**less tech-savvy**

Normal distribution: given

**Group differences** (two-sided):

**No**





# Data questionnaire: smartphone competence (TAEG; [4])

Normal distribution: given

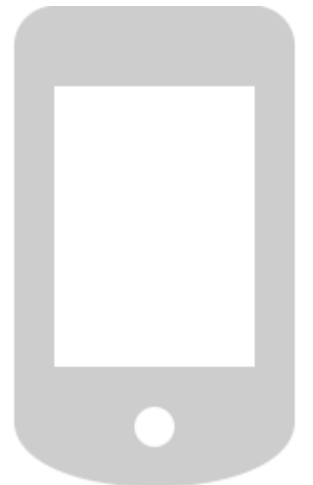
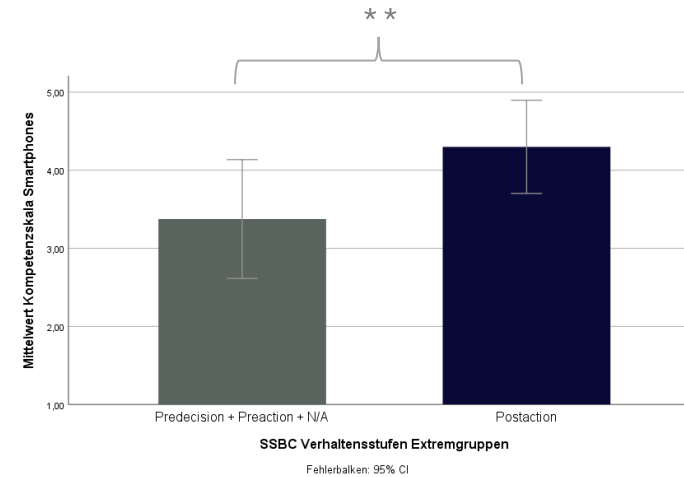
Descriptive statistics:

$MW = 3,89$  (= „**rather true**“;  $SD = 0,66$ ; Min = 3,00;

Max = 5,00)

**Group differences** (one-sided): **yes**;

( $t(7) = -2,87$ ,  $p = .012$ ,  $r = 0,74$ )



Individuals who categorize themselves in the **Postaction** stage also report **higher scores** in **smartphone competence**.



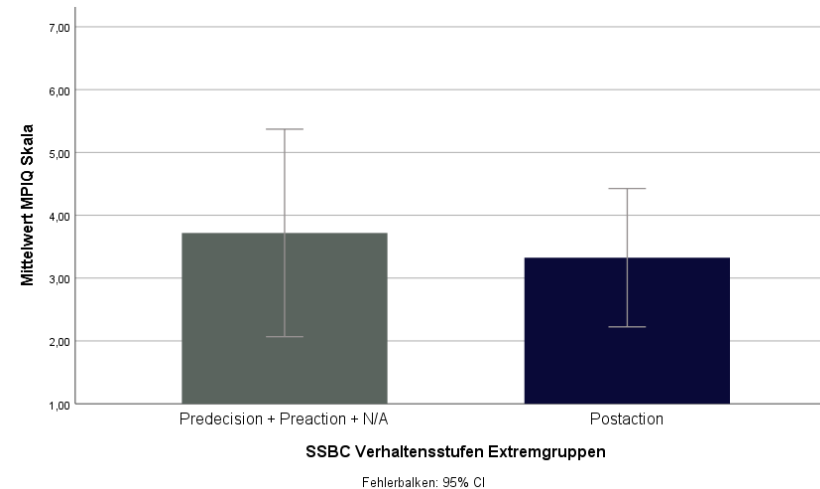
## Data questionnaire: cell phone "addiction". (MPIQ Scale; [5])

Normal distribution: not given

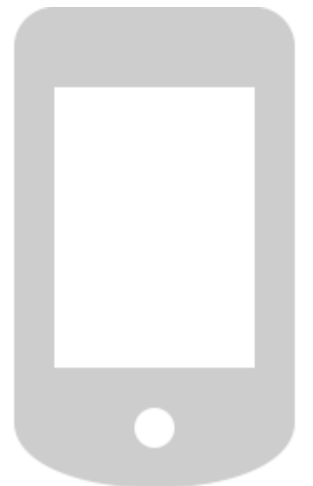
Descriptive statistics sample:

$MW = 3,50$  (= **partly**;  $SD = 0,92$ ; Min = 1,75; Max = 4,88)

**Group differences** (two-sided): **No**



There are **no statistical differences** between the behavioral level groups regarding their assessment of **cell phone "addiction"**.





# Data questionnaire: app usage 1/3

**Apps installed:**  $MW = 89,33$  ( $SD = 43,00$ ; Min = 35,00; Max = 151,00)

**Apps used regularly:**  $MW = 16,33$  ( $SD = 8,76$ ; Min = 6,00; Max = 30,00)

**Percentage of apps used/installed :**  $MW = 23,65$  ( $SD = 16,88$ ; Min = 4,51; Max = 52,83)

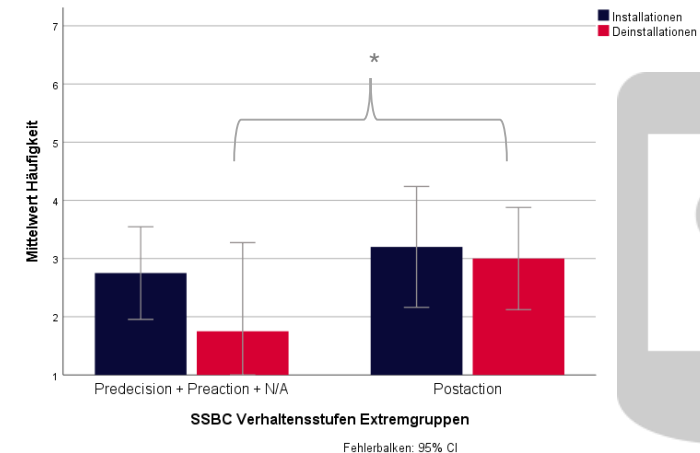
**Installation frequency:**  $Mdn = 3,00$  (= „Once a quarter“; Min = 2,00; Max = 4,00)

**Uninstall frequency:**  $Mdn = 3,00$  (= „Once a quarter“; Min = 1,00; Max = 4,00)

Normal distribution: not given

- For all subjects: Marginally significant difference between uninstall and install frequencies ( $T = 1,99$ ;  $p = .096$ ,  $r = 0,56$ ), slightly more frequent installs than uninstalls.
- **Group differences** (two-sided): **yes, marginal** for uninstalls ( $U = 17,00$ ;  $z = 1,81$ ,  $p = .071$ ,  $r = 0,60$ )

People who categorize themselves in **Postaction level** say they uninstall apps **slightly more often**.



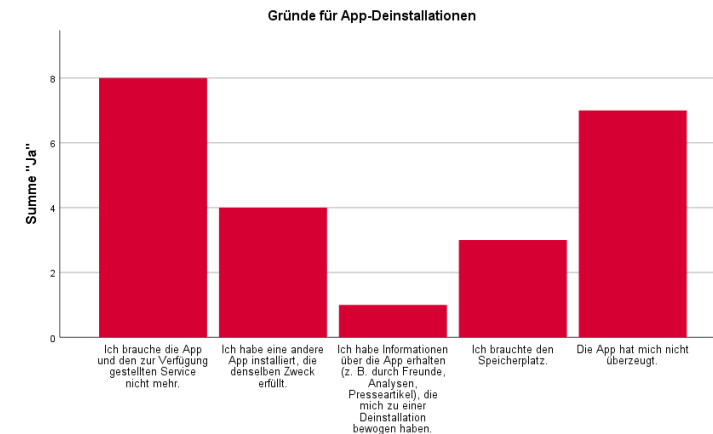
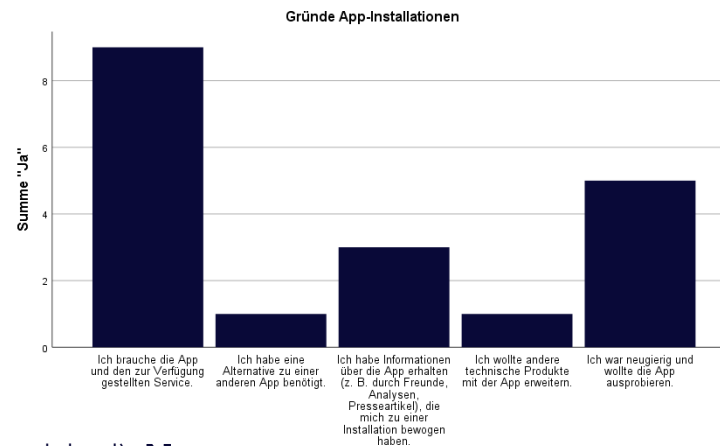




# Data questionnaire: app usage 2/3

**Typical reasons for installations** (multiple choice) :1.) „ **I need the app and the service provided.**“ (9), 2. „ **I was curious and wanted to try the app.**“ (5), 3.) „ *I received information about the app (e.g., through friends, analyses, press articles) that prompted me to install it.*“ (3)

**Typical reasons for uninstal** (multiple choice): 1.) „ **I no longer need the app and the service provided.**“ (8), 2.) „ **The app did not convince me.**“ (7), 3.) „ *I have installed another app that serves the same purpose.*“ (4)



**Group differences (two-sided): No**



# Data questionnaire: app usage 3/3

**Current frequently used apps** (multiple choice possible,  $n = 44$ ): 1. **WhatsApp** (10), 2.) **Instagram** (5), 3.) **Spotify** (3)

**Daily views of frequently used apps** ( $n = 8$ ):  $MW = 11,54$  ( $SD = 6,27$ ; Min = 4,67; Max = 22,67)

**Estimated usage time in min/d of these apps** :  $MW = 52,39$  ( $SD = 27,74$ ; Min = 12,50; Max = 101,67)

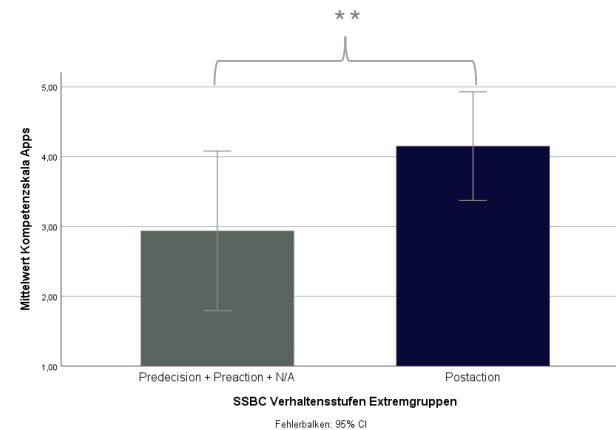
## Self-assessed competence:

Normal distribution: given

Descriptive statistics complete sample:

$MW = 3,61$  (= „rather true“;  $SD = 0,89$ ; Min = 2,00; Max = 5,00)

**Group differences** (one-sided): **yes**, ( $t(7) = -2,707$ ,  $p = .015$ ,  $r = 0,72$ )



Individuals who assign themselves to **Postaction level** report **slightly higher app competence**.



## Summary: Sample

The behavioral stage groups studied differ in ...

... self-assessed **smartphone** and **app competence**.  
This is more pronounced in the Postaction level.

... the **uninstallation frequency** of apps. People in the Postaction stage uninstall an app slightly more often.





## **Results:** information strategies (Thinking aloud, Task 1)

Please use your smartphone to find out what data this app collects and comment your actions aloud.

**Starting point Strategy** (multiple strategies possible):

- 1.) Settings (6 persons, 4x of them as 1st strategy)
- 2.) App (5 people, of which 4x as 1st strategy)
- 3.) Internet search engine (2 people, of which 1x as 1st strategy)

Additional: Reminder (of previous consent, deposited data) (3 people),  
App Store (1 person).

**No differences** in information strategies were found **between behavioral levels.**





## Results: information strategies (Thinking aloud, Task 1)

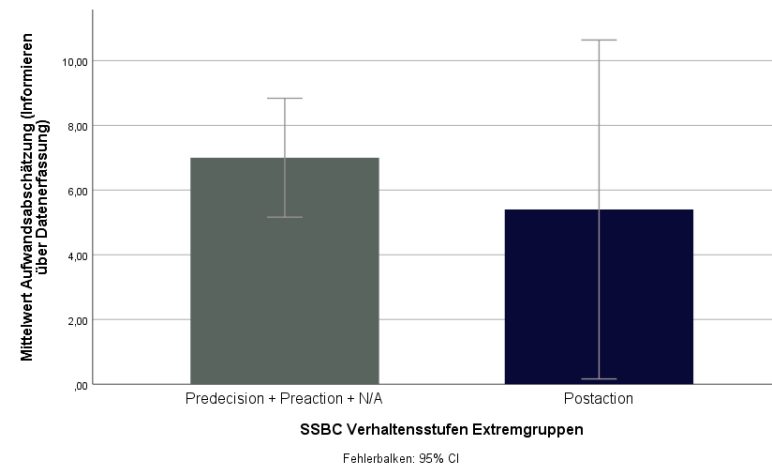
Mean effort estimation (0 = „no effortful at all“ bis 10 = „very effortful“):

$MW = 6,11$  (= **rather effortful**;  $SD = 3,18$  ; Min = 0,00 ; Max = 10,00)

Normal distribution: not given

Differences between groups: none

**Effort estimates vary greatly,**  
especially in the **Postaction group,**  
so, no statistical differences between  
the two groups can be determined  
in the study.





## **Results:** administrative strategies (Thinking aloud, Task 2)

If you want to influence what data the app collects, how do you do it? Comment your action aloud.

**Starting point Strategy** (multiple strategies possible):

- 1.) Settings (5, of which 5x as 1st strategy)
- 2.) App (5, of which 2x as 1st strategy)
- 3.) Internet search engine (1, thereof 1x as 1st strategy)

Additionally: own (app usage) behavior (2), Firewall (1)

Only participants from the **Postaction behavioral stage** described these **additional strategies**.





## Results: administrative strategies (Thinking aloud, Task 2)

Mean effort estimation (0 = "not at all effortful" to 10 = "very effortful")

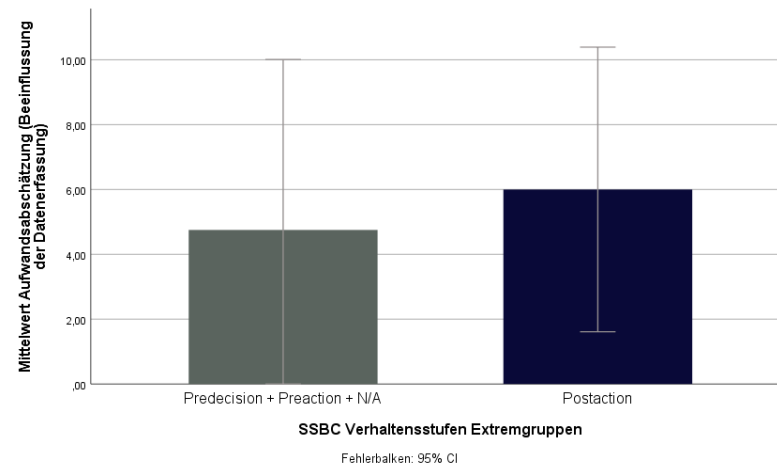
$MW = 5,44$  (= **mean effort**;  $SD = 3,28$ ; Min = 0,00; Max = 9,00)

Differences to effort estimation Task 1: no none

Normal distribution: given

**Group differences: No**

**Effort estimates vary widely in both groups**, so no differences between the groups can be identified in the survey..





## Results: summary

Inform about data collection of an app

**No differences** were found **between the behavioral levels** in terms of information strategies.

- The participants rated the **effort** as **rather high**.
  - These assessments varied greatly, which is why the study was unable to identify any differences in terms of behavioral levels.







## Results: summary

### Change Data acquisition of an app

- **Additional strategies** were only mentioned by participants of the **Postaction behavioral stage.**
- Most of **unsuccessful attempts** (= no (relevant) information found) were made by people in the **Postaction behavioral stage.**
- The participants estimated the effort to change the data collection of an app in the medium range.
  - These assessments varied greatly, which is why the study did not identify any differences between the behavioral levels.





# Thank you for your attention!

Susen Döbelt

Wilhelm-Raabe-Str. 43  
09120 Chemnitz

Telefon: 0371 531 33615

E-Mail: [susen.doebelt@psychologie.tu-chemnitz.de](mailto:susen.doebelt@psychologie.tu-chemnitz.de)