

Krämer, Michael et al.

**Research Report**

## SOEP-IS 2023 - DIPS3\_HOURLY: Smartphone sensing on the hourly level (DIPS project)

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# 1431<sup>2025</sup>

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Series D – Variable Descriptions and Coding

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Michael Krämer, Vanessa Brandes, Martin Gerike, Yannick Roos, Ramona Schoedel, Cornelia Wrzus, and David Richter

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Michael Krämer, Vanessa Brandes, Martin Gerike, Yannick Roos, Ramona Schoedel, Cornelia Wrzus,  
and David Richter

2025

## Contents

|          |                                                                 |          |
|----------|-----------------------------------------------------------------|----------|
| <b>1</b> | <b>Introduction</b>                                             | <b>4</b> |
|          | Overall Project Description . . . . .                           | 4        |
|          | DIPS3 Data Collection . . . . .                                 | 4        |
|          | Hourly-Level Data . . . . .                                     | 4        |
|          | References . . . . .                                            | 5        |
| <b>2</b> | <b>Identifiers</b>                                              | <b>5</b> |
|          | pid – Person ID . . . . .                                       | 5        |
|          | subsample – Subsample . . . . .                                 | 6        |
|          | syear – Survey Year . . . . .                                   | 6        |
|          | n_days – Study Day Count . . . . .                              | 6        |
|          | n_hour – Hour of the day . . . . .                              | 7        |
|          | day – Day of the Week . . . . .                                 | 7        |
|          | weekend – Weekend . . . . .                                     | 7        |
| <b>3</b> | <b>Texts</b>                                                    | <b>7</b> |
|          | texts_outgoing_freq – Number of Texts Sent . . . . .            | 8        |
|          | texts_outgoing_length – Character Count of Texts Sent . . . . . | 8        |
| <b>4</b> | <b>App Usage</b>                                                | <b>8</b> |
|          | comm_app_freq – Communication Apps: Frequency . . . . .         | 9        |
|          | comm_app_time – Communication Apps: Duration . . . . .          | 9        |
|          | socmed_app_freq – Social Media Apps: Frequency . . . . .        | 9        |
|          | socmed_app_time – Social Media Apps: Duration . . . . .         | 10       |
|          | audio_app_freq – Audio Entertainment Apps: Frequency . . . . .  | 10       |
|          | audio_app_time – Audio Entertainment Apps: Duration . . . . .   | 11       |
|          | career_app_freq – Career Apps: Frequency . . . . .              | 11       |
|          | career_app_time – Career Apps: Duration . . . . .               | 11       |
|          | create_app_freq – Creativity Apps: Frequency . . . . .          | 12       |
|          | create_app_time – Creativity Apps: Duration . . . . .           | 12       |
|          | dating_app_freq – Dating Apps: Frequency . . . . .              | 12       |
|          | dating_app_time – Dating Apps: Duration . . . . .               | 13       |
|          | finance_app_freq – Finance Apps: Frequency . . . . .            | 13       |
|          | finance_app_time – Finance Apps: Duration . . . . .             | 14       |
|          | food_app_freq – Food Apps: Frequency . . . . .                  | 14       |
|          | food_app_time – Food Apps: Duration . . . . .                   | 14       |
|          | game_app_freq – Game Apps: Frequency . . . . .                  | 15       |
|          | game_app_time – Game Apps: Duration . . . . .                   | 15       |
|          | health_app_freq – Health Apps: Frequency . . . . .              | 16       |
|          | health_app_time – Health Apps: Duration . . . . .               | 16       |
|          | internet_app_freq – Internet Apps: Frequency . . . . .          | 16       |
|          | internet_app_time – Internet Apps: Duration . . . . .           | 17       |
|          | know_app_freq – Knowledge Apps: Frequency . . . . .             | 17       |
|          | know_app_time – Knowledge Apps: Duration . . . . .              | 18       |
|          | news_app_freq – News Apps: Frequency . . . . .                  | 18       |
|          | news_app_time – News Apps: Duration . . . . .                   | 18       |
|          | orientat_app_freq – Orientation Apps: Frequency . . . . .       | 19       |
|          | orientat_app_time – Orientation Apps: Duration . . . . .        | 19       |
|          | photo_app_freq – Photography Apps: Frequency . . . . .          | 20       |

|                                                                  |           |
|------------------------------------------------------------------|-----------|
| photo_app_time – Photography Apps: Duration . . . . .            | 20        |
| read_app_freq – Reading Apps: Frequency . . . . .                | 20        |
| read_app_time – Reading Apps: Duration . . . . .                 | 21        |
| security_app_freq – Security Apps: Frequency . . . . .           | 21        |
| security_app_time – Security Apps: Duration . . . . .            | 21        |
| settings_app_freq – Settings Apps: Frequency . . . . .           | 22        |
| settings_app_time – Settings Apps: Duration . . . . .            | 22        |
| shop_app_freq – Shopping Apps: Frequency . . . . .               | 23        |
| shop_app_time – Shopping Apps: Duration . . . . .                | 23        |
| spirit_app_freq – Spirituality Apps: Frequency . . . . .         | 23        |
| spirit_app_time – Spirituality Apps: Duration . . . . .          | 24        |
| time_app_freq – Time Apps: Frequency . . . . .                   | 24        |
| time_app_time – Time Apps: Duration . . . . .                    | 24        |
| tools_app_freq – Tools Apps: Frequency . . . . .                 | 25        |
| tools_app_time – Tools Apps: Duration . . . . .                  | 25        |
| transport_app_freq – Transport Apps: Frequency . . . . .         | 26        |
| transport_app_time – Transport Apps: Duration . . . . .          | 26        |
| visual_app_freq – Visual Entertainment Apps: Frequency . . . . . | 26        |
| visual_app_time – Visual Entertainment Apps: Duration . . . . .  | 27        |
| weather_app_freq – Weather Apps: Frequency . . . . .             | 27        |
| weather_app_time – Weather Apps: Duration . . . . .              | 27        |
| <b>5 Conversation Detection . . . . .</b>                        | <b>28</b> |
| n_aware – AWARE Conversations: Samplings . . . . .               | 28        |
| n_voice – AWARE Conversations: Conv. Detected . . . . .          | 29        |
| prop_voice – Proportion of Conversations . . . . .               | 29        |

# 1 Introduction

## Overall Project Description

The DIPS3 study was part of a larger DFG-funded project on “Personality and social relationship dynamics: Short- and medium-term processes in daily life” with Cornelia Wrzus and David Richter as principal investigators. This project had the overall goal to investigate the dynamic, interdependent short-term and medium-term processes that define multiple social relationships and to better understand how these processes differ between people depending on diverse personality characteristics. To this aim, several modes of data collection were employed jointly, such as active daily diary assessments and passive smartphone sensing of behavioral indicators related to social contact (for measurement properties of these social contact indicators, see Roos et al., 2023). The project was given Institutional Review Board approval by Johannes Gutenberg University Mainz (Process Number: 2018JGU-psychEK-002).

## DIPS3 Data Collection

The third part of data collection within this project was integrated into the SOEP-IS in wave 2022 with the goal of recruiting members of this already existing panel study to take part in an additional, opt-in data collection with a smartphone app. As reported in Roos et al. (2024), 2,507 participants took part in the SOEP-IS study in 2022 of which 1,322 (53%) reported initial interest in the smartphone study and 844 (34%) fulfilled all requirements (i.e., regularly using a smartphone running on Android Version 6.1 or higher). Finally, roughly 15% of the 2022 SOEP-IS sample, that is,  $N = 386$  participants, took part in the 14-day smartphone study and answered at least one daily diary. A detailed examination of sample selectivity and different person-related sampling biases associated with selection into mobile sensing studies (including the DIPS3 study) will be available in Schoedel et al. (2024).

At the end of the 2022 interview, SOEP-IS respondents were asked if they owned a smartphone running on Android OS Version 6.1 or higher and if they were interested in participating in an additional 14-day smartphone study. Those who agreed to participate were sent a postal invitation to take part in the study along with instructions on how to install and set up the PhoneStudy app which runs on Android OS (for more information on the app, see <https://phonestudy.org/en/>). Respondents were informed during the onboarding process about the study procedure and data protection. Informed consent was obtained during the setup of the app.

After the installation of the app, respondents received daily notifications to fill out a brief questionnaire on their mood and social interactions each evening for 14 days. Questionnaires were available each day from 8:00 p.m. to 4:00 a.m. of the following day. Respondents were instructed to answer the questionnaire right before going to bed and received up to two reminders between 8:00 p.m. and 12:00 a.m. Additionally, smartphone sensing ran on the respondents' phones, passively gathering data on anonymized social interactions, phone and app usage, and contact entries. Respondents received 40€ for participation.

Additional study documentation materials including the wording of all items in English and German, the recruitment flyer, and a report on different app versions can be found on <https://osf.io/zhc49/>. Here, we only present the translated, English version of the items.

## Hourly-Level Data

Raw data of smartphone sensing cannot be shared publicly due to privacy concerns and potential identification of respondents due to the richness of these data, especially when

linked with the SOEP-IS panel data. Therefore, for this data release, we selected only the most meaningful behavioral indicators and aggregated them over time.

The second of the three DIPS3 datasets presents the smartphone sensing data on the hourly level with each individual observation defined as an hourly interval, that is, from one full hour to the next, over the entire study period. The very first interval of each respondent starts with the hour of installing the PhoneStudy app and the last interval ends with the hour of deinstallation of the study app.

The purpose of this aggregation time window was to provide a more fine-grained temporal resolution of the smartphone sensing indicators. Thereby, temporal dynamics in these continuously assessed indicators can be examined. Data can be linked to the daily-level data via the “pid” and “n\_days” identifiers.

For the other two datasets, see:

Aggregated on the daily level:

[https://www.diw.de/documents/publikationen/73/diw\\_01.c.936884.de/diw\\_ssp1430.pdf](https://www.diw.de/documents/publikationen/73/diw_01.c.936884.de/diw_ssp1430.pdf)

Short surveys after calls:

[https://www.diw.de/documents/publikationen/73/diw\\_01.c.936889.de/diw\\_ssp1432.pdf](https://www.diw.de/documents/publikationen/73/diw_01.c.936889.de/diw_ssp1432.pdf)

## References

Roos, Y., Krämer, M. D., Richter, D., Schoedel, R., & Wrzus, C. (2023). Does Your Smartphone “Know” Your Social Life? A Methodological Comparison of Day Reconstruction, Experience Sampling, and Mobile Sensing. *Advances in Methods and Practices in Psychological Science*, 6(3), 1–12.

<https://doi.org/10.1177/25152459231178738>

Roos, Y., Krämer, M. D., Richter, D., & Wrzus, C. (2024). Persons in contexts: The role of social networks and social density for the dynamic regulation of face-to-face interactions in daily life. *Journal of Personality and Social Psychology*. Advance online publication.

<https://doi.org/10.1037/pspp0000512>

Schoedel, R., Reiter, T., Krämer, M. D., Roos, Y., Bühner, M., Richter, D., Mehl, M. R., & Wrzus, C. (2024). Person-Related Selection Bias in Mobile Sensing Research: Robust Findings from Two Panel Studies [Manuscript submitted for publication].

## 2 Identifiers

Data was processed by adding general identifiers to track study progress over time and provide easier filtering. Temporal observations are defined as hourly intervals, that is, from one full hour to the next, over the entire study period. The very first temporal observation of each participant starts with the hour of installing the PhoneStudy App and the last temporal observation ends with the hour of deinstallation of the Study App.

### pid – Person ID

---

|         |     |
|---------|-----|
| 1233703 | 349 |
| 1247702 | 356 |
| 1344403 | 342 |
| 2001401 | 349 |
| 2012702 | 346 |
| 2037404 | 344 |
| 2043004 | 355 |



|          |                    |        |
|----------|--------------------|--------|
| ...      | (372 rows omitted) | 129825 |
| 41824401 |                    | 348    |
| 41824901 |                    | 356    |
| 41827601 |                    | 348    |
| 41830701 |                    | 348    |
| 41830702 |                    | 357    |
| 41831501 |                    | 345    |
| 41833601 |                    | 353    |

Same person identifier as in SOEP-IS data files.

#### subsample – Subsample

---

|   |         |        |
|---|---------|--------|
| 0 | [0] no  | 109559 |
| 1 | [1] yes | 25162  |

During the study period, an older, outdated app version was distributed for a restricted time window due to a technical error (N = 72 with outdated version; N = 313 with correct version). This older app version differed slightly in some wordings of the daily diary items. Here, we present documentation for the correct app version that the majority of respondents installed. For more details on this matter and an extensive comparison of the two app versions, see OSF repository.

<https://osf.io/zhc49/>

#### syear – Survey Year

---

|      |        |
|------|--------|
| 2022 | 134721 |
|------|--------|

#### n\_days – Study Day Count

---

|     |                   |
|-----|-------------------|
| 0   | 4704              |
| 1   | 8973              |
| 2   | 9233              |
| 3   | 9207              |
| 4   | 9208              |
| 5   | 9212              |
| 6   | 9189              |
| ... | (16 rows omitted) |
| -7  | 102               |
| -8  | 72                |
| -9  | 57                |
| -10 | 48                |
| -11 | 48                |
| -12 | 42                |
| -13 | 12                |

Counts the number of days after installation starting with 1 at the day after installation where the first daily diary was available to be answered. In contrast to `n_diary`, this variable takes into account when respondents fill out a questionnaire the following day or have gaps when they skipped a questionnaire. Negative values indicate days before a person answered their first daily diary.

#### `n_hour` – Hour of the day

---

|                       |       |
|-----------------------|-------|
| 1                     | 6176  |
| 2                     | 6174  |
| 3                     | 5950  |
| 4                     | 5780  |
| 5                     | 5767  |
| 6                     | 5748  |
| 7                     | 5723  |
| ... (10 rows omitted) | 55628 |
| 18                    | 5416  |
| 19                    | 5403  |
| 20                    | 5396  |
| 21                    | 5390  |
| 22                    | 5390  |
| 23                    | 5390  |
| 24                    | 5390  |

Counts the hours over which data are aggregated per person and per study day going from 0 to 23.

#### `day` – Day of the Week

---

|   |               |       |
|---|---------------|-------|
| 0 | [0] Monday    | 19103 |
| 1 | [1] Tuesday   | 19083 |
| 2 | [2] Wednesday | 19338 |
| 3 | [3] Thursday  | 19648 |
| 4 | [4] Friday    | 19307 |
| 5 | [5] Saturday  | 19135 |
| 6 | [6] Sunday    | 19107 |

#### `weekend` – Weekend

---

|   |         |       |
|---|---------|-------|
| 0 | [0] no  | 96479 |
| 1 | [1] yes | 38242 |

### 3 Texts

Smartphone sensing data is aggregated to track the number of text messages sent per hour as well as the aggregated count of typed characters within these text messages. Only texts typed

in various communication apps are taken into account. Texts typed into search or navigation bars within those apps have been excluded. SMS texts were also not considered because of low occurrence.

#### texts\_outgoing\_freq – Number of Texts Sent

---

|                       |        |
|-----------------------|--------|
| 0                     | 119201 |
| 1                     | 6787   |
| 2                     | 3319   |
| 3                     | 1832   |
| 4                     | 1156   |
| 5                     | 734    |
| 6                     | 461    |
| ... (21 rows omitted) | 1222   |
| 28                    | 2      |
| 29                    | 1      |
| 30                    | 1      |
| 32                    | 2      |
| 34                    | 1      |
| 35                    | 1      |
| 50                    | 1      |

#### texts\_outgoing\_length – Character Count of Texts Sent

---

|                         |        |
|-------------------------|--------|
| 0                       | 119205 |
| 1                       | 78     |
| 2                       | 384    |
| 3                       | 142    |
| 4                       | 278    |
| 5                       | 164    |
| 6                       | 195    |
| ... (1022 rows omitted) | 14268  |
| 5357                    | 1      |
| 5392                    | 1      |
| 5808                    | 1      |
| 6016                    | 1      |
| 6290                    | 1      |
| 8226                    | 1      |
| 49830                   | 1      |

## 4 App Usage

Smartphone sensing data is aggregated on an hourly level to track participants' usage of different apps per hour. This includes continuous tracking of the frequency of opening an app and the time period using each app. Smartphone sensing starts after setup of the Phone-Study app and is active until the app is uninstalled. App usage duration times are given in minutes. For more details on the app categorization procedure, see Schoedel et al. (2022).

**comm\_app\_freq** – Communication Apps: Frequency

---

|                       |       |
|-----------------------|-------|
| 0                     | 86980 |
| 1                     | 11717 |
| 2                     | 9253  |
| 3                     | 6530  |
| 4                     | 4760  |
| 5                     | 3479  |
| 6                     | 2623  |
| ... (41 rows omitted) | 9028  |
| 50                    | 2     |
| 56                    | 1     |
| 58                    | 1     |
| 62                    | 1     |
| 68                    | 1     |
| 109                   | 1     |
| -1                    | 344   |

Schoedel, R., Oldemeier, M., Bonauer, L., & Sust, L. (2022). Systematic categorisation of 3,091 smartphone applications from a large-scale smartphone sensing dataset. *Journal of Open Psychology Data*, 10(1), 7.

<https://doi.org/10.5334/jopd.59>

**comm\_app\_time** – Communication Apps: Duration

---

|                          |       |
|--------------------------|-------|
| 0                        | 86980 |
| 0.0000166654586791992    | 29    |
| 0.0000166694323221842    | 18    |
| 0.0000333309173583984    | 8     |
| 0.0000333348910013835    | 12    |
| 0.0000333388646443685    | 1     |
| 0.0000499963760375977    | 5     |
| ... (43751 rows omitted) | 47268 |
| 59.8718666672707         | 1     |
| 59.8820166667302         | 1     |
| 59.9744333346685         | 1     |
| 59.9745833317439         | 1     |
| 59.9914833347003         | 1     |
| 60                       | 51    |
| -1                       | 344   |

**socmed\_app\_freq** – Social Media Apps: Frequency

---

|   |        |
|---|--------|
| 0 | 117232 |
| 1 | 4485   |
| 2 | 3852   |
| 3 | 2623   |

|                       |      |
|-----------------------|------|
| 4                     | 1796 |
| 5                     | 1229 |
| 6                     | 843  |
| ... (27 rows omitted) | 2311 |
| 37                    | 1    |
| 39                    | 1    |
| 46                    | 1    |
| 52                    | 1    |
| 53                    | 1    |
| 62                    | 1    |
| -1                    | 344  |

### socmed\_app\_time – Social Media Apps: Duration

---

|                          |        |
|--------------------------|--------|
| 0                        | 117232 |
| 0.0000166654586791992    | 24     |
| 0.0000166694323221842    | 10     |
| 0.0000333309173583984    | 19     |
| 0.0000333348910013835    | 18     |
| 0.0000333388646443685    | 3      |
| 0.0000499963760375977    | 4      |
| ... (16380 rows omitted) | 17056  |
| 56.6878499984741         | 1      |
| 56.7776333332062         | 1      |
| 57.8850666681925         | 1      |
| 59.1285166660945         | 1      |
| 59.2715166687965         | 1      |
| 60                       | 6      |
| -1                       | 344    |

### audio\_app\_freq – Audio Entertainment Apps: Frequency

---

|                       |        |
|-----------------------|--------|
| 0                     | 130075 |
| 1                     | 1550   |
| 2                     | 1024   |
| 3                     | 630    |
| 4                     | 405    |
| 5                     | 230    |
| 6                     | 128    |
| ... (13 rows omitted) | 325    |
| 20                    | 3      |
| 22                    | 1      |
| 23                    | 2      |
| 26                    | 2      |
| 32                    | 1      |
| 41                    | 1      |
| -1                    | 344    |

**audio\_app\_time** – Audio Entertainment Apps: Duration

---

|                         |        |
|-------------------------|--------|
| 0                       | 130075 |
| 0.0000166654586791992   | 5      |
| 0.0000166694323221842   | 3      |
| 0.0000333309173583984   | 3      |
| 0.0000333348910013835   | 8      |
| 0.0000333388646443685   | 1      |
| 0.0000500003496805827   | 10     |
| ... (4082 rows omitted) | 4266   |
| 34.5599999984105        | 1      |
| 36.9872333327929        | 1      |
| 38.9351333340009        | 1      |
| 41.6595833261808        | 1      |
| 41.7905000011126        | 1      |
| 47.8323000033697        | 1      |
| -1                      | 344    |

**career\_app\_freq** – Career Apps: Frequency

---

|                      |        |
|----------------------|--------|
| 0                    | 133672 |
| 1                    | 273    |
| 2                    | 225    |
| 3                    | 102    |
| 4                    | 32     |
| 5                    | 19     |
| 6                    | 12     |
| ... (2 rows omitted) | 18     |
| 9                    | 8      |
| 10                   | 7      |
| 11                   | 1      |
| 12                   | 4      |
| 13                   | 3      |
| 17                   | 1      |
| -1                   | 344    |

**career\_app\_time** – Career Apps: Duration

---

|                       |        |
|-----------------------|--------|
| 0                     | 133672 |
| 0.0000166654586791992 | 10     |
| 0.0000166694323221842 | 6      |
| 0.0000333309173583984 | 6      |
| 0.0000333348910013835 | 6      |
| 0.0000499963760375977 | 1      |

|                        |     |
|------------------------|-----|
| 0.0000500003496805827  | 10  |
| ... (653 rows omitted) | 660 |
| 8.58173333803813       | 1   |
| 9.04731666644414       | 1   |
| 9.07821666399638       | 1   |
| 9.64501666625341       | 1   |
| 12.2878499984741       | 1   |
| 13.7912666678429       | 1   |
| -1                     | 344 |

### create\_app\_freq – Creativity Apps: Frequency

---

|    |        |
|----|--------|
| 0  | 134199 |
| 1  | 69     |
| 2  | 46     |
| 3  | 25     |
| 4  | 14     |
| 5  | 12     |
| 6  | 6      |
| 7  | 2      |
| 8  | 2      |
| 11 | 1      |
| 13 | 1      |
| -1 | 344    |

### create\_app\_time – Creativity Apps: Duration

---

|                        |        |
|------------------------|--------|
| 0                      | 134199 |
| 0.0000166654586791992  | 1      |
| 0.0000166694323221842  | 1      |
| 0.0000499963760375977  | 1      |
| 0.000233332316080729   | 1      |
| 0.00115000009536743    | 1      |
| 0.00121666590372721    | 1      |
| ... (166 rows omitted) | 166    |
| 19.6731499950091       | 1      |
| 24.2014166673024       | 1      |
| 24.762216659387        | 1      |
| 26.1843166589737       | 1      |
| 26.7029166658719       | 1      |
| 33.5357333302498       | 1      |
| -1                     | 344    |

### dating\_app\_freq – Dating Apps: Frequency

---

|                       |        |
|-----------------------|--------|
| 0                     | 133815 |
| 1                     | 165    |
| 2                     | 127    |
| 3                     | 97     |
| 4                     | 41     |
| 5                     | 17     |
| 6                     | 22     |
| ... (13 rows omitted) | 84     |
| 25                    | 3      |
| 29                    | 1      |
| 31                    | 1      |
| 33                    | 1      |
| 37                    | 2      |
| 38                    | 1      |
| -1                    | 344    |

#### dating\_app\_time – Dating Apps: Duration

---

|                        |        |
|------------------------|--------|
| 0                      | 133815 |
| 0.0000166654586791992  | 5      |
| 0.0000333309173583984  | 3      |
| 0.0000333348910013835  | 3      |
| 0.000150001049041748   | 1      |
| 0.000199997425079346   | 1      |
| 0.0012500007947286     | 1      |
| ... (541 rows omitted) | 542    |
| 21.6357666691144       | 1      |
| 24.8163500030835       | 1      |
| 27.6878833293915       | 1      |
| 32.3519833405813       | 1      |
| 38.5241999983788       | 1      |
| 48.1976833303769       | 1      |
| -1                     | 344    |

#### finance\_app\_freq – Finance Apps: Frequency

---

|                       |        |
|-----------------------|--------|
| 0                     | 130660 |
| 1                     | 1733   |
| 2                     | 884    |
| 3                     | 485    |
| 4                     | 261    |
| 5                     | 116    |
| 6                     | 70     |
| ... (13 rows omitted) | 161    |
| 20                    | 1      |
| 21                    | 1      |
| 25                    | 2      |



|    |     |
|----|-----|
| 30 | 1   |
| 31 | 1   |
| 33 | 1   |
| -1 | 344 |

#### finance\_app\_time – Finance Apps: Duration

---

|                         |        |
|-------------------------|--------|
| 0                       | 130660 |
| 0.0000166654586791992   | 14     |
| 0.0000166694323221842   | 7      |
| 0.0000333309173583984   | 14     |
| 0.0000333348910013835   | 19     |
| 0.0000333388646443685   | 2      |
| 0.0000499963760375977   | 4      |
| ... (3589 rows omitted) | 3651   |
| 17.0163499951363        | 1      |
| 17.2330666700999        | 1      |
| 19.0231000026067        | 1      |
| 19.15740000000954       | 1      |
| 28.5066166639328        | 1      |
| 42.1579499959946        | 1      |
| -1                      | 344    |

#### food\_app\_freq – Food Apps: Frequency

---

|                      |        |
|----------------------|--------|
| 0                    | 133229 |
| 1                    | 425    |
| 2                    | 342    |
| 3                    | 165    |
| 4                    | 76     |
| 5                    | 44     |
| 6                    | 39     |
| ... (4 rows omitted) | 45     |
| 11                   | 3      |
| 12                   | 1      |
| 13                   | 3      |
| 16                   | 3      |
| 17                   | 1      |
| 20                   | 1      |
| -1                   | 344    |

#### food\_app\_time – Food Apps: Duration

---

|                       |        |
|-----------------------|--------|
| 0                     | 133229 |
| 0.0000166654586791992 | 2      |

|                         |      |
|-------------------------|------|
| 0.0000166694323221842   | 3    |
| 0.0000333309173583984   | 2    |
| 0.0000333348910013835   | 4    |
| 0.0000499963760375977   | 2    |
| 0.0000500003496805827   | 3    |
| ... (1119 rows omitted) | 1126 |
| 15.0917000015577        | 1    |
| 15.2903333306313        | 1    |
| 15.6102000037829        | 1    |
| 15.6971499959628        | 1    |
| 16.8666833321253        | 1    |
| 17.8180499990781        | 1    |
| -1                      | 344  |

### game\_app\_freq – Game Apps: Frequency

---

|                       |        |
|-----------------------|--------|
| 0                     | 129515 |
| 1                     | 1942   |
| 2                     | 1258   |
| 3                     | 631    |
| 4                     | 409    |
| 5                     | 204    |
| 6                     | 129    |
| ... (22 rows omitted) | 281    |
| 35                    | 1      |
| 43                    | 2      |
| 46                    | 2      |
| 61                    | 1      |
| 62                    | 1      |
| 66                    | 1      |
| -1                    | 344    |

### game\_app\_time – Game Apps: Duration

---

|                         |        |
|-------------------------|--------|
| 0                       | 129515 |
| 0.0000166654586791992   | 33     |
| 0.0000166694323221842   | 13     |
| 0.0000333309173583984   | 15     |
| 0.0000333348910013835   | 11     |
| 0.0000333388646443685   | 2      |
| 0.0000499963760375977   | 6      |
| ... (4467 rows omitted) | 4776   |
| 43.5466500004133        | 1      |
| 44.0366666595141        | 1      |
| 44.7578166723251        | 1      |
| 46.1949166695277        | 1      |
| 50.4710500001907        | 1      |

|                  |     |
|------------------|-----|
| 51.3529666701953 | 1   |
| -1               | 344 |

### health\_app\_freq – Health Apps: Frequency

---

|                      |        |
|----------------------|--------|
| 0                    | 130678 |
| 1                    | 2231   |
| 2                    | 836    |
| 3                    | 309    |
| 4                    | 141    |
| 5                    | 80     |
| 6                    | 27     |
| ... (4 rows omitted) | 56     |
| 11                   | 10     |
| 12                   | 3      |
| 13                   | 2      |
| 14                   | 1      |
| 18                   | 2      |
| 45                   | 1      |
| -1                   | 344    |

### health\_app\_time – Health Apps: Duration

---

|                         |        |
|-------------------------|--------|
| 0                       | 130678 |
| 0.0000166654586791992   | 12     |
| 0.0000166694323221842   | 8      |
| 0.0000333309173583984   | 10     |
| 0.0000333348910013835   | 11     |
| 0.0000499963760375977   | 8      |
| 0.0000500003496805827   | 4      |
| ... (3511 rows omitted) | 3640   |
| 28.9384166638056        | 1      |
| 31.0644666671753        | 1      |
| 34.7492166678111        | 1      |
| 36.2890166680018        | 1      |
| 40.5395166635513        | 1      |
| 42.7018000046412        | 1      |
| -1                      | 344    |

### internet\_app\_freq – Internet Apps: Frequency

---

|   |        |
|---|--------|
| 0 | 113844 |
| 1 | 7844   |
| 2 | 5585   |
| 3 | 2778   |

|                       |      |
|-----------------------|------|
| 4                     | 1601 |
| 5                     | 988  |
| 6                     | 611  |
| ... (19 rows omitted) | 1119 |
| 27                    | 2    |
| 28                    | 1    |
| 30                    | 1    |
| 31                    | 1    |
| 36                    | 1    |
| 46                    | 1    |
| -1                    | 344  |

### internet\_app\_time – Internet Apps: Duration

---

|                          |        |
|--------------------------|--------|
| 0                        | 113844 |
| 0.0000166654586791992    | 30     |
| 0.0000166694323221842    | 9      |
| 0.0000333309173583984    | 11     |
| 0.0000333348910013835    | 17     |
| 0.0000499963760375977    | 5      |
| 0.0000500003496805827    | 9      |
| ... (17664 rows omitted) | 20446  |
| 54.3548000017802         | 1      |
| 55.7967333316803         | 1      |
| 56.1459333340327         | 1      |
| 57.2808666706085         | 1      |
| 57.9188833355904         | 1      |
| 59.4885666648547         | 1      |
| -1                       | 344    |

### know\_app\_freq – Knowledge Apps: Frequency

---

|                      |        |
|----------------------|--------|
| 0                    | 133462 |
| 1                    | 416    |
| 2                    | 240    |
| 3                    | 113    |
| 4                    | 53     |
| 5                    | 32     |
| 6                    | 27     |
| ... (4 rows omitted) | 24     |
| 11                   | 1      |
| 12                   | 3      |
| 14                   | 3      |
| 15                   | 1      |
| 17                   | 1      |
| 26                   | 1      |
| -1                   | 344    |

**know\_app\_time** – Knowledge Apps: Duration

---

|                        |        |
|------------------------|--------|
| 0                      | 133462 |
| 0.0000166654586791992  | 5      |
| 0.0000166694323221842  | 1      |
| 0.0000333309173583984  | 5      |
| 0.0000333348910013835  | 2      |
| 0.0000500043233235677  | 1      |
| 0.0000666618347167969  | 1      |
| ... (886 rows omitted) | 894    |
| 25.7483166694641       | 1      |
| 29.2025000135104       | 1      |
| 30.6985000014305       | 1      |
| 30.8660166660945       | 1      |
| 39.2304500023524       | 1      |
| 44.4092666665713       | 1      |
| -1                     | 344    |

**news\_app\_freq** – News Apps: Frequency

---

|                      |        |
|----------------------|--------|
| 0                    | 129477 |
| 1                    | 2317   |
| 2                    | 1287   |
| 3                    | 644    |
| 4                    | 319    |
| 5                    | 146    |
| 6                    | 91     |
| ... (5 rows omitted) | 85     |
| 12                   | 3      |
| 13                   | 3      |
| 14                   | 1      |
| 15                   | 1      |
| 16                   | 2      |
| 18                   | 1      |
| -1                   | 344    |

**news\_app\_time** – News Apps: Duration

---

|                       |        |
|-----------------------|--------|
| 0                     | 129477 |
| 0.0000166654586791992 | 70     |
| 0.0000166694323221842 | 27     |
| 0.0000333309173583984 | 42     |
| 0.0000333348910013835 | 63     |
| 0.0000333388646443685 | 7      |

|                         |      |
|-------------------------|------|
| 0.0000499963760375977   | 22   |
| ... (4475 rows omitted) | 4663 |
| 34.189483332634         | 1    |
| 34.4585333267848        | 1    |
| 36.5673500021299        | 1    |
| 39.7877000013987        | 1    |
| 40.0205500006676        | 1    |
| 41.3940500020981        | 1    |
| -1                      | 344  |

### orientat\_app\_freq – Orientation Apps: Frequency

---

|                       |        |
|-----------------------|--------|
| 0                     | 131221 |
| 1                     | 1432   |
| 2                     | 947    |
| 3                     | 387    |
| 4                     | 174    |
| 5                     | 74     |
| 6                     | 39     |
| ... (11 rows omitted) | 96     |
| 19                    | 1      |
| 21                    | 1      |
| 22                    | 1      |
| 23                    | 2      |
| 24                    | 1      |
| 26                    | 1      |
| -1                    | 344    |

### orientat\_app\_time – Orientation Apps: Duration

---

|                         |        |
|-------------------------|--------|
| 0                       | 131221 |
| 0.0000166654586791992   | 18     |
| 0.0000166694323221842   | 10     |
| 0.0000333309173583984   | 8      |
| 0.0000333348910013835   | 4      |
| 0.0000333388646443685   | 1      |
| 0.0000499963760375977   | 4      |
| ... (2953 rows omitted) | 3105   |
| 45.7206000049909        | 1      |
| 46.5072833339373        | 1      |
| 47.1935833334923        | 1      |
| 52.331366666158         | 1      |
| 53.6437833309174        | 1      |
| 54.8757166663806        | 1      |
| -1                      | 344    |

**photo\_app\_freq** – Photography Apps: Frequency

---

|                       |        |
|-----------------------|--------|
| 0                     | 125172 |
| 1                     | 3652   |
| 2                     | 2241   |
| 3                     | 1252   |
| 4                     | 671    |
| 5                     | 423    |
| 6                     | 253    |
| ... (29 rows omitted) | 705    |
| 37                    | 1      |
| 39                    | 3      |
| 44                    | 1      |
| 47                    | 1      |
| 53                    | 1      |
| 63                    | 1      |
| -1                    | 344    |

**photo\_app\_time** – Photography Apps: Duration

---

|                         |        |
|-------------------------|--------|
| 0                       | 125172 |
| 0.0000166654586791992   | 19     |
| 0.0000166694323221842   | 6      |
| 0.0000333309173583984   | 12     |
| 0.0000333348910013835   | 11     |
| 0.0000333388646443685   | 1      |
| 0.0000499963760375977   | 9      |
| ... (8149 rows omitted) | 9141   |
| 31.6125000079473        | 1      |
| 32.4375666618347        | 1      |
| 34.4092000007629        | 1      |
| 34.4886666695277        | 1      |
| 43.4587666670481        | 1      |
| 51.9833333333333        | 1      |
| -1                      | 344    |

**read\_app\_freq** – Reading Apps: Frequency

---

|   |        |
|---|--------|
| 0 | 134168 |
| 1 | 82     |
| 2 | 63     |
| 3 | 31     |
| 4 | 14     |
| 5 | 10     |
| 6 | 5      |
| 7 | 2      |
| 8 | 1      |

|    |     |
|----|-----|
| 11 | 1   |
| -1 | 344 |

### read\_app\_time – Reading Apps: Duration

---

|                        |        |
|------------------------|--------|
| 0                      | 134168 |
| 0.0000166654586791992  | 1      |
| 0.0000333309173583984  | 1      |
| 0.000116666158040365   | 1      |
| 0.000133335590362549   | 1      |
| 0.000333333015441895   | 1      |
| 0.000516668955485026   | 1      |
| ... (195 rows omitted) | 197    |
| 8.39638332923253       | 1      |
| 8.84966666698456       | 1      |
| 10.0002500017484       | 1      |
| 10.8863833347956       | 1      |
| 20.7452166676521       | 1      |
| 31.5631500005722       | 1      |
| -1                     | 344    |

### security\_app\_freq – Security Apps: Frequency

---

|                       |        |
|-----------------------|--------|
| 0                     | 130878 |
| 1                     | 2050   |
| 2                     | 661    |
| 3                     | 317    |
| 4                     | 160    |
| 5                     | 96     |
| 6                     | 59     |
| ... (10 rows omitted) | 147    |
| 17                    | 4      |
| 18                    | 1      |
| 19                    | 1      |
| 21                    | 1      |
| 23                    | 1      |
| 120                   | 1      |
| -1                    | 344    |

### security\_app\_time – Security Apps: Duration

---

|                       |        |
|-----------------------|--------|
| 0                     | 130878 |
| 0.0000166654586791992 | 10     |
| 0.0000166694323221842 | 3      |
| 0.0000333309173583984 | 3      |



|                         |      |
|-------------------------|------|
| 0.0000333348910013835   | 4    |
| 0.0000499963760375977   | 1    |
| 0.0000500003496805827   | 1    |
| ... (3107 rows omitted) | 3469 |
| 44.7582833210627        | 1    |
| 45.6130833307902        | 1    |
| 48.047866666317         | 1    |
| 50.0134166677793        | 1    |
| 51.3345833341281        | 1    |
| 60                      | 3    |
| -1                      | 344  |

### settings\_app\_freq – Settings Apps: Frequency

---

|                       |        |
|-----------------------|--------|
| 0                     | 129553 |
| 1                     | 3072   |
| 2                     | 907    |
| 3                     | 426    |
| 4                     | 159    |
| 5                     | 82     |
| 6                     | 41     |
| ... (17 rows omitted) | 131    |
| 26                    | 1      |
| 27                    | 1      |
| 28                    | 1      |
| 31                    | 1      |
| 34                    | 1      |
| 162                   | 1      |
| -1                    | 344    |

### settings\_app\_time – Settings Apps: Duration

---

|                         |        |
|-------------------------|--------|
| 0                       | 129553 |
| 0.0000166654586791992   | 2      |
| 0.0000333309173583984   | 2      |
| 0.0000333348910013835   | 4      |
| 0.0000499963760375977   | 1      |
| 0.0000500003496805827   | 3      |
| 0.0000500043233235677   | 3      |
| ... (4526 rows omitted) | 4802   |
| 38.7701999982198        | 1      |
| 40.2238333304723        | 1      |
| 40.7730666677157        | 1      |
| 41.949066666762         | 1      |
| 45.0309000015259        | 1      |
| 60                      | 2      |
| -1                      | 344    |

**shop\_app\_freq** – Shopping Apps: Frequency

---

|                       |        |
|-----------------------|--------|
| 0                     | 129438 |
| 1                     | 1557   |
| 2                     | 1417   |
| 3                     | 760    |
| 4                     | 421    |
| 5                     | 259    |
| 6                     | 152    |
| ... (10 rows omitted) | 360    |
| 17                    | 6      |
| 18                    | 1      |
| 19                    | 2      |
| 21                    | 2      |
| 39                    | 1      |
| 51                    | 1      |
| -1                    | 344    |

**shop\_app\_time** – Shopping Apps: Duration

---

|                         |        |
|-------------------------|--------|
| 0                       | 129438 |
| 0.0000166654586791992   | 25     |
| 0.0000166694323221842   | 12     |
| 0.0000333309173583984   | 11     |
| 0.0000333348910013835   | 14     |
| 0.0000333388646443685   | 2      |
| 0.0000499963760375977   | 4      |
| ... (4689 rows omitted) | 4865   |
| 36.84375                | 1      |
| 37.0136333187421        | 1      |
| 45.0166000008583        | 1      |
| 45.4253333449364        | 1      |
| 46.794950000445         | 1      |
| 59.6492000023524        | 1      |
| -1                      | 344    |

**spirit\_app\_freq** – Spirituality Apps: Frequency

---

|    |        |
|----|--------|
| 0  | 134327 |
| 1  | 32     |
| 2  | 13     |
| 3  | 4      |
| 4  | 1      |
| -1 | 344    |

**spirit\_app\_time** – Spirituality Apps: Duration

---

|                       |        |
|-----------------------|--------|
| 0                     | 134327 |
| 0.00981666644414266   | 1      |
| 0.0484000007311503    | 1      |
| 0.0717000007629394    | 1      |
| 0.0721666653951009    | 1      |
| 0.0850333372751872    | 1      |
| 0.0904833316802978    | 1      |
| ... (38 rows omitted) | 38     |
| 4.74623333215714      | 1      |
| 4.86641666889191      | 1      |
| 4.90411666631699      | 1      |
| 5.28281666835149      | 1      |
| 6.40525000095367      | 1      |
| 9.1451333284378       | 1      |
| -1                    | 344    |

**time\_app\_freq** – Time Apps: Frequency

---

|                      |        |
|----------------------|--------|
| 0                    | 126445 |
| 1                    | 4299   |
| 2                    | 2105   |
| 3                    | 806    |
| 4                    | 353    |
| 5                    | 170    |
| 6                    | 76     |
| ... (9 rows omitted) | 116    |
| 16                   | 1      |
| 17                   | 2      |
| 18                   | 1      |
| 19                   | 1      |
| 20                   | 1      |
| 21                   | 1      |
| -1                   | 344    |

**time\_app\_time** – Time Apps: Duration

---

|                       |        |
|-----------------------|--------|
| 0                     | 126445 |
| 0.0000166654586791992 | 7      |
| 0.0000166694323221842 | 4      |
| 0.0000333309173583984 | 6      |
| 0.0000333348910013835 | 2      |
| 0.0000499963760375977 | 4      |

|                         |      |
|-------------------------|------|
| 0.0000500003496805827   | 3    |
| ... (6245 rows omitted) | 7900 |
| 30.2243000030518        | 1    |
| 44.4071333289146        | 1    |
| 48.3297000010808        | 1    |
| 52.7702000021934        | 1    |
| 55.3194000005722        | 1    |
| 60                      | 1    |
| -1                      | 344  |

### tools\_app\_freq – Tools Apps: Frequency

---

|                       |        |
|-----------------------|--------|
| 0                     | 121935 |
| 1                     | 6969   |
| 2                     | 2535   |
| 3                     | 1213   |
| 4                     | 681    |
| 5                     | 365    |
| 6                     | 215    |
| ... (23 rows omitted) | 456    |
| 34                    | 1      |
| 36                    | 2      |
| 42                    | 1      |
| 45                    | 2      |
| 49                    | 1      |
| 52                    | 1      |
| -1                    | 344    |

### tools\_app\_time – Tools Apps: Duration

---

|                         |        |
|-------------------------|--------|
| 0                       | 121935 |
| 0.0000166654586791992   | 29     |
| 0.0000166694323221842   | 11     |
| 0.0000333309173583984   | 6      |
| 0.0000333348910013835   | 20     |
| 0.0000333388646443685   | 3      |
| 0.0000499963760375977   | 9      |
| ... (9229 rows omitted) | 12356  |
| 54.8064833323161        | 1      |
| 55.3410500009855        | 1      |
| 55.4262500007947        | 1      |
| 56.9213500022888        | 1      |
| 59.9074833313624        | 1      |
| 60                      | 3      |
| -1                      | 344    |

**transport\_app\_freq** – Transport Apps: Frequency

---

|                      |        |
|----------------------|--------|
| 0                    | 133356 |
| 1                    | 415    |
| 2                    | 250    |
| 3                    | 134    |
| 4                    | 75     |
| 5                    | 49     |
| 6                    | 28     |
| ... (4 rows omitted) | 56     |
| 11                   | 2      |
| 12                   | 5      |
| 13                   | 2      |
| 14                   | 3      |
| 15                   | 1      |
| 16                   | 1      |
| -1                   | 344    |

**transport\_app\_time** – Transport Apps: Duration

---

|                         |        |
|-------------------------|--------|
| 0                       | 133356 |
| 0.0000166654586791992   | 5      |
| 0.0000333309173583984   | 1      |
| 0.0000333348910013835   | 2      |
| 0.0000333388646443685   | 1      |
| 0.000133335590362549    | 1      |
| 0.000199989477793376    | 1      |
| ... (1002 rows omitted) | 1004   |
| 11.6909333348274        | 1      |
| 11.7400166710218        | 1      |
| 12.2229666789373        | 1      |
| 12.7977833390236        | 1      |
| 15.3481666684151        | 1      |
| 15.867766670386         | 1      |
| -1                      | 344    |

**visual\_app\_freq** – Visual Entertainment Apps: Frequency

---

|                      |        |
|----------------------|--------|
| 0                    | 128819 |
| 1                    | 2619   |
| 2                    | 1555   |
| 3                    | 669    |
| 4                    | 331    |
| 5                    | 145    |
| 6                    | 91     |
| ... (7 rows omitted) | 135    |
| 14                   | 2      |

|    |     |
|----|-----|
| 15 | 3   |
| 16 | 3   |
| 18 | 2   |
| 19 | 1   |
| 21 | 2   |
| -1 | 344 |

#### visual\_app\_time – Visual Entertainment Apps: Duration

---

|                         |        |
|-------------------------|--------|
| 0                       | 128819 |
| 0.0000166654586791992   | 33     |
| 0.0000166694323221842   | 17     |
| 0.0000333309173583984   | 24     |
| 0.0000333348910013835   | 22     |
| 0.0000333388646443685   | 3      |
| 0.0000499963760375977   | 7      |
| ... (4989 rows omitted) | 5443   |
| 58.4353166699409        | 1      |
| 58.4410166660945        | 1      |
| 58.7876666665077        | 1      |
| 59.5952666640282        | 1      |
| 59.8918666680654        | 1      |
| 60                      | 4      |
| -1                      | 344    |

#### weather\_app\_freq – Weather Apps: Frequency

---

|    |        |
|----|--------|
| 0  | 132271 |
| 1  | 1332   |
| 2  | 552    |
| 3  | 136    |
| 4  | 39     |
| 5  | 20     |
| 6  | 14     |
| 7  | 6      |
| 8  | 3      |
| 9  | 2      |
| 12 | 1      |
| 17 | 1      |
| -1 | 344    |

#### weather\_app\_time – Weather Apps: Duration

---

|                       |        |
|-----------------------|--------|
| 0                     | 132271 |
| 0.0000166654586791992 | 5      |

|                         |      |
|-------------------------|------|
| 0.0000166694323221842   | 1    |
| 0.0000333309173583984   | 3    |
| 0.0000333348910013835   | 2    |
| 0.0000499963760375977   | 3    |
| 0.0000500003496805827   | 1    |
| ... (2054 rows omitted) | 2085 |
| 13.1122833331426        | 1    |
| 14.083349998792         | 1    |
| 21.1301166653633        | 1    |
| 33.7301500002543        | 1    |
| 42.0308333317439        | 1    |
| 43.1320666670799        | 1    |
| -1                      | 344  |

Schoedel, R., Oldemeier, M., Bonauer, L., & Sust, L. (2022). Systematic categorisation of 3,091 smartphone applications from a large-scale smartphone sensing dataset. *Journal of Open Psychology Data*, 10(1), 7.

<https://doi.org/10.5334/jopd.59>

## 5 Conversation Detection

Using the AWARE Conversation plugin from Ferreira & Mulukutla (2020), ambient audio signal around the smartphone was sampled following a cycle of one-minute sampling and three-minutes break. A privacy-protective algorithm inferred whether conversation prevailed in ambient sound around the device (binary classification “noise/”voice” where “voice” indicates conversation). This information is used to compute the proportion of detected conversation samplings per hour. In practice, the software sampled at lower rates on several devices, most likely because the operating system aborted the background process to conserve battery life. For more considerations on validity and reliability and comparison with self-report measures of in-person contact, see Roos et al. (2023).

### n\_aware – AWARE Conversations: Samplings

|                       |       |
|-----------------------|-------|
| 0                     | 66743 |
| 1                     | 2853  |
| 2                     | 2720  |
| 3                     | 3658  |
| 4                     | 3878  |
| 5                     | 4300  |
| 6                     | 5147  |
| ... (67 rows omitted) | 45410 |
| 74                    | 3     |
| 75                    | 3     |
| 76                    | 1     |
| 77                    | 2     |
| 78                    | 1     |
| 79                    | 1     |
| 81                    | 1     |

Ferreira, D., & Mulukutla, R. (2020). AWARE Plugin: Conversations.

Retrieved from [https://github.com/denzilferreira/com.aware.plugin.studentlife.audio\\_final](https://github.com/denzilferreira/com.aware.plugin.studentlife.audio_final)

Roos, Y., Krämer, M. D., Richter, D., Schoedel, R., & Wrzus, C. (2023). Does Your Smartphone “Know” Your Social Life? A Methodological Comparison of Day Reconstruction, Experience Sampling, and Mobile Sensing. *Advances in Methods and Practices in Psychological Science*, 6(3), 1–12.

<https://doi.org/10.1177/25152459231178738>

#### **n\_voice** – AWARE Conversations: Conv. Detected

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|                       |        |
|-----------------------|--------|
| 0                     | 117094 |
| 1                     | 4975   |
| 2                     | 2371   |
| 3                     | 1486   |
| 4                     | 1134   |
| 5                     | 903    |
| 6                     | 734    |
| ... (48 rows omitted) | 5937   |
| 55                    | 18     |
| 56                    | 17     |
| 57                    | 18     |
| 58                    | 15     |
| 59                    | 6      |
| 60                    | 7      |
| 61                    | 6      |

#### **prop\_voice** – Proportion of Conversations

---

|                        |        |
|------------------------|--------|
| 0                      | 117094 |
| 0.0133333333333333     | 1      |
| 0.0136986301369863     | 1      |
| 0.0149253731343284     | 2      |
| 0.0161290322580645     | 1      |
| 0.0163934426229508     | 1      |
| 0.02                   | 1      |
| ... (905 rows omitted) | 17581  |
| 0.979591836734694      | 1      |
| 0.982758620689655      | 1      |
| 0.983050847457627      | 1      |
| 0.9833333333333333     | 3      |
| 0.983606557377049      | 5      |
| 0.983870967741935      | 1      |
| 1                      | 27     |

This variable is computed by dividing n\_voice by n\_aware.