

## **Predicting Current Voting Intentions by Big Five Personality Domains, Facets, and Nuances – A Random Forest Analysis Approach in a German Sample**

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### **Data Collection Procedure**

The sample was derived from two online studies in German language. One of the studies was created to investigate digital technology use (not in the focus of the current work) and personality; the other study mainly dealt with susceptibility to falling for fake news. Note that the latter study was preregistered but this specific research question (i.e., the present work) was not part of the preregistration. Both studies comprised the measures of interest in the present work and were conducted on the SurveyCoder platform (<https://www.surveycoder.com/>; <https://ckannen.com/>). The samples of both studies were convenience samples. Both studies were advertised on various media outlets including TV and radio shows and social media posts. Recruitment of participants was mainly implemented during the year 2019 and in the beginning of 2020. All participants gave informed electronic consent prior to participation. After finishing the survey, all participants received automatic anonymous feedback on, for example, their personality trait scores in comparison to other participants as an incentive. Since the recruitment strategy and survey environment was the same in both studies and because the sample sizes differed between studies ( $n = 3,530$  (study on digital technology use) versus  $n = 756$  (study on susceptibility to fall for fake news)), we decided to collapse the samples for our analyses instead of analyzing data separately.

### **Overlap of Present Sample with Samples of Other Studies**

As mentioned in the main manuscript, the present sample partly overlaps with samples of other studies with different research objectives (Marengo et al., 2020; Rozgonjuk et al., 2021; Rozgonjuk, Sindermann, Elhai, Christensen, et al., 2020; Rozgonjuk, Sindermann, Elhai, & Montag, 2020a, 2020b; Sindermann, Duke, et al., 2020; Sindermann, Elhai, et al., 2020; Sindermann, Kuss, et al., 2020). The studies by Marengo et al. (2020), Rozgonjuk, Sindermann, Elhai, & Montag (2020b), Sindermann, Duke et al. (2020), and Sindermann, Kuss et al. (2020) also utilized the Big Five Inventory but investigated links to technology use, Fear of Missing out, and/or acceptance of the data business model. The studies by Rozgonjuk, Sindermann, Elhai, Christensen, et al. (2020) and Rozgonjuk, Sindermann, Elhai, & Montag (2021; 2020a) did not make use of any of the questionnaires used in the present study. The study by Sindermann, Elhai, Moshagen, and Montag (2020) analyzed the Big Five Inventory and associated it with the risk to be caught in a homogeneous information environment. In the Supplementary Material of this previous work also associations of the Big Five domains with voting intentions are reported; however, no machine learning technique was used, facets and nuances were not investigated, and the sample was smaller compared to the present one. Moreover, the present sample overlaps with the sample of the study on fake news (Sindermann et al., 2021). More information on the variables utilized in each study can be found in the publications or the OSF projects linked to and mentioned in the publications. Importantly, we could not analyze the present research question alongside one of these other works because the foci of the previous works were different from the focus of the present work.

## Data Cleaning

The study on technology use allowed individuals from Austria, Switzerland, and Liechtenstein to participate. However, only individuals from Germany were investigated in the present research project ( $N = 4,832$  remaining in the total sample). After excluding individuals who responded with "I do not want to answer" ( $n = 42$ ) or provided incomplete data ( $n = 1$ ) in the measures of interest for the present study, reported being younger than 18 or older than 100 years ( $n = 497$ ), and/or reported the same response option throughout the 45<sup>1</sup> items of the Big Five Inventory (see "Self-Report Measures" in the main manuscript;  $n = 6$ ), a sample of  $N = 4,286$  individuals remained. The effective sample comprised  $n = 1,972$  men,  $n = 2,307$  women, and  $n = 7$  individuals stating "third gender" as their gender identity; note that the "third gender" option was only presented in one of the two online studies. The mean age of the sample was  $M = 38.03$  years ( $SD = 12.98$ ) with a range from 18 to 100 and a median of 36 years.

## R Packages Used

We used the statistical software R version 4.1.0 (R Core Team, 2018) and RStudio version 1.4.1106 (RStudio Team, 2020). Descriptive statistics of the BFI domain, facet, and item level scores were calculated using the psych package version 2.1.3 (Revelle, 2021).

To build the folds and for the random forest analyses, we used the caret package version 6.0-88 (Kuhn, 2021). For the random forest analyses we additionally used the ranger package version 0.12.1 (Wright & Ziegler, 2017).

Other packages like readxl version 1.3.1 (Wickham & Bryan, 2019) and dplyr version 1.0.6 (Wickham et al., 2021) were used as well to work with the data.

## Big Five Inventory – Psychometric Properties

Internal consistency estimates of the Big Five personality domains (using Cronbach's alpha) in the total sample ranged from .72 (Agreeableness) to .87 (Extraversion). In another study on German students, retest correlations lied between .72 and .93 for domains; the BFI was assessed two times with six weeks in between (Rammstedt & Danner, 2017). Internal consistency estimates of the facets (using Cronbach's alpha) in the present sample ranged from .47 (Compliance) to .83 (Assertiveness). Despite some of the Cronbach's alphas being small in absolute terms, it needs to be noted that several of the facets consist of only two or three items. Moreover, the Cronbach's alphas of the facets are similar to the ones reported by Rammstedt and Danner (2017). Additionally, mean inter-item correlations are presented in Supplementary Table 1. Finally, the study on a German student sample already mentioned above found retest correlations for facets ranging between .69 and .91 (Rammstedt & Danner, 2017).

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<sup>1</sup> Although we only investigate 44 items in the present work (see main manuscript), we included all 45 items in this check for careless responding – responding with the same response option to all items of the Big Five Inventory was used as indicator of careless responding.

**Descriptive Statistics****Supplementary Table 1***Descriptive Statistics of the Big Five Inventory in the sample of  $N = 4,286$  participants*

|                                 | <i>M</i> | <i>SD</i> | Median | Minimum | Maximum | Skewness | Kurtosis | <i>SE</i> | Mean<br>inter-item<br>correlation |
|---------------------------------|----------|-----------|--------|---------|---------|----------|----------|-----------|-----------------------------------|
| Openness                        | 3.61     | 0.62      | 3.60   | 1.50    | 5.00    | -0.32    | -0.22    | 0.01      | .29                               |
| Conscientiousness               | 3.55     | 0.66      | 3.56   | 1.11    | 5.00    | -0.38    | 0.00     | 0.01      | .36                               |
| Extraversion                    | 3.36     | 0.79      | 3.38   | 1.00    | 5.00    | -0.22    | -0.56    | 0.01      | .45                               |
| Agreeableness                   | 3.53     | 0.55      | 3.56   | 1.22    | 5.00    | -0.23    | -0.05    | 0.01      | .22                               |
| Neuroticism                     | 2.86     | 0.79      | 2.88   | 1.00    | 5.00    | 0.18     | -0.47    | 0.01      | .44                               |
| Openness for aesthetics         | 3.49     | 0.98      | 3.67   | 1.00    | 5.00    | -0.37    | -0.63    | 0.01      | .56                               |
| Openness for ideas              | 3.66     | 0.61      | 3.60   | 1.20    | 5.00    | -0.33    | 0.05     | 0.01      | .24                               |
| Order                           | 3.29     | 1.04      | 3.50   | 1.00    | 5.00    | -0.15    | -0.80    | 0.02      | .50                               |
| Self-discipline                 | 3.51     | 0.68      | 3.60   | 1.00    | 5.00    | -0.38    | 0.08     | 0.01      | .34                               |
| Assertiveness                   | 3.33     | 0.88      | 3.40   | 1.00    | 5.00    | -0.17    | -0.66    | 0.01      | .49                               |
| Activity                        | 3.46     | 0.83      | 3.50   | 1.00    | 5.00    | -0.30    | -0.21    | 0.01      | .43                               |
| Altruism                        | 3.57     | 0.62      | 3.50   | 1.00    | 5.00    | -0.36    | 0.20     | 0.01      | .25                               |
| Compliance                      | 3.49     | 0.71      | 3.67   | 1.00    | 5.00    | -0.30    | -0.12    | 0.01      | .23                               |
| Anxiety                         | 2.93     | 0.86      | 3.00   | 1.00    | 5.00    | 0.15     | -0.55    | 0.01      | .46                               |
| Depression                      | 2.67     | 0.97      | 2.50   | 1.00    | 5.00    | 0.20     | -0.65    | 0.01      | .43                               |
| BFI_01 (E; Ass.)                | 3.81     | 1.09      | 4.00   | 1.00    | 5.00    | -0.76    | -0.20    | 0.02      |                                   |
| BFI_02 <sup>R</sup> (A; Compl.) | 2.92     | 1.00      | 3.00   | 1.00    | 5.00    | 0.17     | -0.77    | 0.02      |                                   |
| BFI_03 (C)                      | 4.06     | 0.89      | 4.00   | 1.00    | 5.00    | -1.07    | 1.16     | 0.01      |                                   |
| BFI_04 (N; Depr.)               | 2.41     | 1.16      | 2.00   | 1.00    | 5.00    | 0.43     | -0.81    | 0.02      |                                   |

# Supplementary Material

|                                  |      |      |      |      |      |       |       |      |
|----------------------------------|------|------|------|------|------|-------|-------|------|
| BFI_05 (O)                       | 3.52 | 0.98 | 4.00 | 1.00 | 5.00 | -0.44 | -0.39 | 0.01 |
| BFI_06 <sup>R</sup> (E; Ass.)    | 3.15 | 1.18 | 3.00 | 1.00 | 5.00 | -0.05 | -1.04 | 0.02 |
| BFI_07 (A; Altr.)                | 3.92 | 0.83 | 4.00 | 1.00 | 5.00 | -0.85 | 1.07  | 0.01 |
| BFI_08 <sup>R</sup> (C; Ord.)    | 3.32 | 1.13 | 3.00 | 1.00 | 5.00 | -0.20 | -0.96 | 0.02 |
| BFI_09 <sup>R</sup> (N; Anx.)    | 2.99 | 1.14 | 3.00 | 1.00 | 5.00 | 0.03  | -0.97 | 0.02 |
| BFI_10 (O; O.I.)                 | 4.24 | 0.87 | 4.00 | 1.00 | 5.00 | -1.28 | 1.69  | 0.01 |
| BFI_11 (E; Act.)                 | 3.37 | 0.97 | 3.00 | 1.00 | 5.00 | -0.33 | -0.38 | 0.01 |
| BFI_12 <sup>R</sup> (A; Compl.)  | 4.21 | 0.93 | 4.00 | 1.00 | 5.00 | -1.16 | 0.89  | 0.01 |
| BFI_13 (C; Self-d.)              | 4.14 | 0.81 | 4.00 | 1.00 | 5.00 | -1.07 | 1.59  | 0.01 |
| BFI_14 (N)                       | 3.00 | 1.03 | 3.00 | 1.00 | 5.00 | -0.08 | -0.81 | 0.02 |
| BFI_15 (O; O.I.)                 | 4.10 | 0.89 | 4.00 | 1.00 | 5.00 | -0.98 | 0.74  | 0.01 |
| BFI_16 (E; Act.)                 | 3.54 | 0.98 | 4.00 | 1.00 | 5.00 | -0.37 | -0.40 | 0.02 |
| BFI_17 (A; Compl.)               | 3.34 | 1.11 | 4.00 | 1.00 | 5.00 | -0.30 | -0.82 | 0.02 |
| BFI_18 <sup>R</sup> (C; Ord.)    | 3.26 | 1.26 | 3.00 | 1.00 | 5.00 | -0.15 | -1.11 | 0.02 |
| BFI_19 (N; Anx.)                 | 3.35 | 1.19 | 4.00 | 1.00 | 5.00 | -0.33 | -0.90 | 0.02 |
| BFI_20 (O)                       | 3.82 | 0.98 | 4.00 | 1.00 | 5.00 | -0.69 | -0.01 | 0.01 |
| BFI_21 <sup>R</sup> (E; Ass.)    | 3.45 | 1.25 | 4.00 | 1.00 | 5.00 | -0.37 | -0.96 | 0.02 |
| BFI_22 (A; Altr.)                | 3.72 | 1.01 | 4.00 | 1.00 | 5.00 | -0.75 | 0.10  | 0.02 |
| BFI_23 <sup>R</sup> (C; Self-d.) | 2.94 | 1.15 | 3.00 | 1.00 | 5.00 | 0.17  | -0.94 | 0.02 |
| BFI_24 <sup>R</sup> (N)          | 2.81 | 1.08 | 3.00 | 1.00 | 5.00 | 0.20  | -0.86 | 0.02 |
| BFI_25 (O; O.I)                  | 3.58 | 0.96 | 4.00 | 1.00 | 5.00 | -0.51 | -0.24 | 0.01 |
| BFI_26 (E; Ass.)                 | 3.41 | 1.02 | 4.00 | 1.00 | 5.00 | -0.40 | -0.52 | 0.02 |
| BFI_27 <sup>R</sup> (A; Altr.)   | 2.68 | 1.12 | 2.00 | 1.00 | 5.00 | 0.32  | -0.83 | 0.02 |
| BFI_28 (C; Self-d.)              | 3.66 | 0.93 | 4.00 | 1.00 | 5.00 | -0.63 | 0.05  | 0.01 |
| BFI_29 (N; Depr.)                | 2.94 | 1.13 | 3.00 | 1.00 | 5.00 | 0.01  | -0.92 | 0.02 |
| BFI_30 (O; O.Ae.)                | 3.73 | 1.12 | 4.00 | 1.00 | 5.00 | -0.64 | -0.43 | 0.02 |
| BFI_31 <sup>R</sup> (E; Ass.)    | 2.84 | 1.17 | 3.00 | 1.00 | 5.00 | 0.23  | -0.95 | 0.02 |
| BFI_32 (A; Altr.)                | 3.98 | 0.82 | 4.00 | 1.00 | 5.00 | -0.83 | 0.96  | 0.01 |

## Supplementary Material

|                                  |      |      |      |      |      |       |       |      |
|----------------------------------|------|------|------|------|------|-------|-------|------|
| BFI_33 (C)                       | 3.72 | 0.90 | 4.00 | 1.00 | 5.00 | -0.59 | 0.06  | 0.01 |
| BFI_34 <sup>R</sup> (N; Anx.)    | 2.63 | 1.05 | 2.00 | 1.00 | 5.00 | 0.38  | -0.63 | 0.02 |
| BFI_35 <sup>R</sup> (O; O.I)     | 2.68 | 1.12 | 3.00 | 1.00 | 5.00 | 0.29  | -0.77 | 0.02 |
| BFI_36 (E)                       | 3.33 | 1.09 | 4.00 | 1.00 | 5.00 | -0.32 | -0.72 | 0.02 |
| BFI_37 <sup>R</sup> (A)          | 3.05 | 1.10 | 3.00 | 1.00 | 5.00 | 0.00  | -0.93 | 0.02 |
| BFI_38 (C; Self-d.)              | 3.68 | 0.91 | 4.00 | 1.00 | 5.00 | -0.61 | 0.07  | 0.01 |
| BFI_39 (N; Anx.)                 | 2.77 | 1.10 | 3.00 | 1.00 | 5.00 | 0.24  | -0.83 | 0.02 |
| BFI_40 (O; O.I)                  | 3.69 | 1.05 | 4.00 | 1.00 | 5.00 | -0.55 | -0.46 | 0.02 |
| BFI_41 <sup>R</sup> (O; O.Ae.)   | 3.50 | 1.23 | 4.00 | 1.00 | 5.00 | -0.43 | -0.89 | 0.02 |
| BFI_42 (A)                       | 3.98 | 0.92 | 4.00 | 1.00 | 5.00 | -0.89 | 0.63  | 0.01 |
| BFI_43 <sup>R</sup> (C; Self-d.) | 3.14 | 1.12 | 3.00 | 1.00 | 5.00 | -0.17 | -0.85 | 0.02 |
| BFI_44 (O; O.Ae.)                | 3.24 | 1.15 | 3.00 | 1.00 | 5.00 | -0.26 | -0.78 | 0.02 |

*Note.* <sup>R</sup> indicates recoded items (descriptive statistics for recoded items are presented); the first letter in parentheses indicates the Big Five domain to which the respective item belongs (O: Openness, C: Conscientiousness, E: Extraversion, A: Agreeableness, N: Neuroticism); the second part in parentheses indicates the facet the item belongs to (O.Ae.: Openness for aesthetics, O.I.: Openness for ideas, Ord.: Order, Self-d.: Self-discipline, Ass.: Assertiveness, Act.: Activity, Altr.: Altruism, Compl.: Compliance, Anx: Anxiety, Depr: Depression). Mean inter-item-correlations were calculated using the sjPlot package version 2.8.8 (Lüdtke, 2021).

## Importance Statistics

To estimate the variable importance, we used the permutation importance. The permutation importance is calculated as follows: “For each tree, the prediction error on the out-of-bag portion of the data is recorded (error rate for classification [...]). Then the same is done after permuting each predictor variable. The difference between the two are then averaged over all trees [...]” (Liaw & Wiener, 2002, p. 6). In the specific package we used, these importance scores are then scaled from 0.00 (lowest importance score of all predictor variables in the model) to 100.00 (highest importance score of all predictor variables in the model). Therefore, comparison of variable importance across models is not possible.

### Supplementary Table 4

*Importance statistics for the random forest models presented in the main manuscript based on the final model (fitted on the whole sample investigated)*

|                                 | Non-voting<br>versus voting | Voting for a<br>specific party | Voting for a<br>left- versus<br>right-from-the<br>center party |
|---------------------------------|-----------------------------|--------------------------------|--|
| Openness                        | 100.00                      | 100.00                         | 100.00   |
| Conscientiousness               | 16.92                       | 43.65                          | 36.07  |
| Extraversion                    | 0.00                        | 0.00                           | 0.00   |
| Agreeableness                   | 37.50                       | 98.48                          | 83.95  |
| Neuroticism                     | 37.46                       | 55.25                          | 58.70  |
| Openness for aesthetics         | 0.00                        | 74.31                          | 100.00   |
| Openness for ideas              | 33.53                       | 37.16                          | 17.20  |
| Order                           | 100.00                      | 0.00                           | 38.54  |
| Self-discipline                 | 68.41                       | 16.20                          | 29.72  |
| Assertiveness                   | 90.10                       | 35.59                          | 55.06  |
| Activity                        | 71.32                       | 10.95                          | 0.00   |
| Altruism                        | 70.44                       | 100.00                         | 86.33  |
| Compliance                      | 74.51                       | 24.42                          | 57.82  |
| Anxiety                         | 3.24                        | 8.90                           | 1.52   |
| Depression                      | 80.97                       | 13.69                          | 14.75  |
| BFI_01 (E; Ass.)                | 88.95                       |                                |  |
| BFI_02 <sup>R</sup> (A; Compl.) | 65.76                       |                                |  |
| BFI_03 (C)                      | 77.62                       |                                | 27.13  |
| BFI_04 (N; Depr.)               | 75.44                       | 38.57                          | 27.16  |
| BFI_05 (O)                      |                             | 42.53                          | 26.82  |
| BFI_06 <sup>R</sup> (E; Ass.)   | 73.03                       | 61.54                          |  |
| BFI_07 (A; Altr.)               | 73.77                       | 32.30                          | 28.20  |
| BFI_08 <sup>R</sup> (C; Ord.)   | 72.88                       |                                | 25.61  |
| BFI_09 <sup>R</sup> (N; Anx.)   |                             | 37.15                          |  |

# Supplementary Material

|                                  |        |        |        |
|----------------------------------|--------|--------|--------|
| BFI_10 (O; O.I.)                 |        |        |        |
| BFI_11 (E; Act.)                 |        |        |        |
| BFI_12 <sup>R</sup> (A; Compl.)  | 65.07  |        | 34.20  |
| BFI_13 (C; Self-d.)              | 66.82  |        |        |
| BFI_14 (N)                       |        |        |        |
| BFI_15 (O; O.I.)                 | 77.41  | 37.55  | 34.05  |
| BFI_16 (E; Act.)                 |        | 34.50  |        |
| BFI_17 (A; Compl.)               |        |        |        |
| BFI_18 <sup>R</sup> (C; Ord.)    | 74.81  | 43.81  | 26.57  |
| BFI_19 (N; Anx.)                 |        |        |        |
| BFI_20 (O)                       |        | 40.29  | 25.75  |
| BFI_21 <sup>R</sup> (E; Ass.)    | 77.66  | 36.37  |        |
| BFI_22 (A; Altr.)                |        | 79.29  | 53.62  |
| BFI_23 <sup>R</sup> (C; Self-d.) | 67.05  |        |        |
| BFI_24 <sup>R</sup> (N)          | 70.87  |        |        |
| BFI_25 (O; O.I.)                 |        |        | 24.76  |
| BFI_26 (E; Ass.)                 | 66.85  | 53.56  |        |
| BFI_27 <sup>R</sup> (A; Altr.)   |        | 36.40  | 26.54  |
| BFI_28 (C; Self-d.)              | 66.81  |        |        |
| BFI_29 (N; Depr.)                |        | 34.33  |        |
| BFI_30 (O; O.Ae.)                |        | 100.00 | 87.12  |
| BFI_31 <sup>R</sup> (E; Ass.)    | 75.36  |        | 25.23  |
| BFI_32 (A; Altr.)                |        | 34.21  |        |
| BFI_33 (C)                       |        |        |        |
| BFI_34 <sup>R</sup> (N; Anx.)    |        | 36.15  | 24.30  |
| BFI_35 <sup>R</sup> (O; O.I.)    | 78.71  | 33.18  | 37.67  |
| BFI_36 (E)                       | 100.00 |        |        |
| BFI_37 <sup>R</sup> (A)          |        |        | 36.81  |
| BFI_38 (C; Self-d.)              | 68.49  |        |        |
| BFI_39 (N; Anx.)                 |        |        |        |
| BFI_40 (O; O.I.)                 |        |        | 23.92  |
| BFI_41 <sup>R</sup> (O; O.Ae.)   |        | 97.01  | 89.91  |
| BFI_42 (A)                       |        |        |        |
| BFI_43 <sup>R</sup> (C; Self-d.) |        |        |        |
| BFI_44 (O; O.Ae.)                |        | 87.21  | 100.00 |

*Note.* <sup>R</sup> indicates recoded items; the first letter in parentheses indicates the Big Five domain to which the respective item belongs (O: Openness, C: Conscientiousness, E: Extraversion, A: Agreeableness, N: Neuroticism); the second part in parentheses indicates the facet the item belongs to (O.Ae.: Openness for aesthetics, O.I.: Openness for ideas, Ord.: Order, Self-d.: Self-discipline, Ass.: Assertiveness, Act.: Activity, Altr.: Altruism, Compl.: Compliance, Anx: Anxiety, Depr: Depression). For importance scores of items, only the 20 highest scores are presented.

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