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Personality and political news consumption online: A comparison between self-reports and webtracking data

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ABSTRACT

Research has explored the links between personality and political news consumption, resulting in mixed results that vary across platforms. One potential reason for these inconclusive patterns might be that previous work has exclusively relied on self-reported measures of political news consumption. Considering that personality has been linked to biased response behavior in the past, we investigate to what extent the relationship is affected by potential measurement errors associated with different capturing methods. To do so, we introduce an innovative measurement technique capturing actual internet use through webtracking. While we do not find strong evidence that personality is systematically related to over- or underestimating one's political news consumption, the comparison between the behavioral webtracking measure and self-reported news consumption nevertheless reveals significant differences: notably, openness is positively associated with self-reported online news consumption, but this relationship does not hold in the webtracking data. Instead, when using behavioral measures, neuroticism is a better predictor of political news consumption – an association not observed in the self-reported data. Our insights refine our understanding of the interplay between personality and online political news consumption and enhance the broader discourse on survey response behaviors linked to personality.

The Internet has revolutionized the news environment by providing access to a vast array of news sources, challenging the previous constraints of offline media (e.g., Van Aelst et al., 2017). As people are forced to be more selective about their media diets, individual-level factors become more important for these selection processes (Prior, 2005). Against this backdrop, research has begun to explore the characteristics of those who engage with political news, examining not only demographics like gender and education (e.g., Merten et al., 2022), but also the influence of personality (e.g., Freitag, 2017; Gerber et al., 2011; Mondak, 2010; Mondak & Halperin, 2008; but see also Sindermann et al., 2020, 2021; Tsfati, 2020). Against the theoretical expectations linking personality to news habits, empirical findings have been mixed and vary across media platforms. One potential explanation for these mixed results could be measurement errors. Previous studies have primarily relied on self-reported measures to identify people's political news consumption, which suffer from a plethora of measurement issues (e.g., Prior, 2009). Additionally, there is evidence suggesting that personality may affect how individuals report their behavior, which could further contribute to the observed variability. To examine this possibility, we rely on webtracking – a technique we believe is pioneering in this area of research – and compare it to self-reported online political news consumption. The analysis is based on data from a German sample collected during the 2021 parliamentary elections ($N = 378$). All data, scripts, and supplementary materials are available for replication at the following Open Science Foundation (OSF) repository: https://osf.io/r8nsj/?view_only=f00a3f48abc34778bc5a61f9d36acc32.

1. Big Five and political information consumption

To hypothesize about the relationship between personality and citizens' online news consumption, we rely on the Five-Factor Model that captures personality on openness, conscientiousness, extraversion, agreeableness, and neuroticism (Costa & McCrae, 1992).

Because individuals high on *openness* tend to embrace new ideas and perspectives, they should be drawn to political information, which "typically include[s] an airing of differing preferences and proposals" (Gerber et al., 2011, p. 37). In line with this, open individuals are more attentive to politics (Mondak & Halperin, 2008), spend more time consuming news (e.g., Jordan et al., 2015) and have diverse news environments (Sindermann et al., 2021). Zooming in on individual news

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platforms, the evidence becomes somewhat inconclusive, however: despite their need to engage in cognitive endeavors, there is no evident association between openness and reading the newspapers (Gerber et al., 2011; Mondak, 2010; Mondak & Halperin, 2008: but see Freitag, 2017) or watching television news (Freitag, 2017; Gerber et al., 2011; Mondak, 2010; Mondak & Halperin, 2008). When it comes to online political information consumption, open individuals are expected to explore the diverse content available on the web. While evidence on their social media news use is conflicting (Freitag, 2017; Gil De Zuniga et al., 2017; Hughes et al., 2012; Xiao & Su, 2022), there is relatively good evidence that open individuals use the Internet to get politically informed (Freitag, 2017; Gerber et al., 2011; Russo & Amnå, 2016; but see Tuten & Bosnjak, 2001).

As highly *conscientious* individuals are described as diligent and reliable, scholars often argue that their need to "comply with conventional rules, norms, and standards" (Costa & McCrae, 1992, p.9) translates into a higher sense of civic duty. Arguing that being politically informed can be considered a civic duty, we would expect a positive association between conscientiousness and political information consumption. Indeed, there are some positive trends, particularly in offline news channels such as the TV and the radio (Freitag, 2017; Gerber et al., 2011; Mondak, 2010; Mondak & Halperin, 2008; Sindermann et al., 2020), potentially reflecting their traditionalist nature (Furnham, 2017). However, the relationship between conscientiousness and the use of newer, unconventional forms of news sources, such as social media, is inconclusive (Freitag, 2017; Hughes et al., 2012; Xiao & Su, 2022; but see Gil De Zuniga et al., 2017), as is the association with online political news consumption more broadly (Freitag, 2017; Russo & Amnå, 2016; Tuten & Bosnjak, 2001).

Because individuals who score high on *extraversion* have a desire for interpersonal relations, they are expected to use political information as "raw material that fuels political discussion" (Mondak, 2010, p. 94). In line with this, there is evidence that extraverts consume more news (e.g., Mondak, 2010; Mondak & Halperin, 2008; Trilling & Schoenbach, 2013), particularly through newspapers and television programs (Freitag, 2017; Gerber et al., 2011; Mondak, 2010; Mondak & Halperin, 2008). Reflecting the idea that social media gives them the opportunity to "socialize and connect with others online" (Gil De Zuniga et al., 2017, p.540), extraverts frequently engage in social media news use (Freitag, 2017; Gil De Zuniga et al., 2017; Xiao & Su, 2022; but see Hughes et al., 2012). In terms of online news behavior more generally, some studies find a positive association (Freitag, 2017; Russo & Amnå, 2016), while others report null results (Gerber et al., 2011; Tuten & Bosnjak, 2001; Xiao & Su, 2022).

Agreeable individuals are known to seek harmonious relationships with others (John et al., 2008). Because they avoid conflict, agreeable individuals are expected to avoid political information due to its focus on political conflicts (Cappella & Jamieson, 1997). However, most studies reveal insignificant or conflicting relationships between agreeableness and news-seeking behavior (Xiao & Su, 2022; see also Sindermann et al., 2020); the use of newspapers (Freitag, 2017; Gerber et al., 2011; Mondak, 2010; Mondak & Halperin, 2008); political TV consumption (Freitag, 2017; Gerber et al., 2011; Mondak, 2010; Mondak & Halperin, 2008); informational uses of social media (Hughes et al., 2012; Xiao & Su, 2022; but see Gil De Zuniga et al., 2017); and internet news use (Tuten & Bosnjak, 2001; but see Russo & Amnå, 2016 for a negative association).

Individuals who score high on *neuroticism* tend to be nervous, anxious, and tense (e.g., John et al., 2008). Following the previous argument, the contentious nature of politics may deter neurotic individuals from getting politically informed. Although some studies suggest they enjoy sources that alleviate negative feelings (see Bakker, 2022), most fail to find significant associations between neuroticism and the use of newspapers (Gerber, Huber, Doherty, Dowling, 2011; Mondak, 2010; Mondak & Halperin, 2008; but see Freitag, 2017) and the TV (Freitag, 2017; Gerber et al., 2011; Mondak & Halperin, 2008), however. While it is too early to reach a definite conclusion, we have evidence that neurotic individuals prefer political information online (Sindermann et al., 2020). This is primarily reflected in the informational use of social media (Freitag, 2017; Gil De Zuniga et al., 2017; but see Xiao & Su, 2022), which might allow them to create a sense of group-belonging and avoid loneliness (Hughes et al., 2012). For the political use of the Web more broadly, the pattern is unclear, with some negative (Freitag, 2017; Russo & Amnå, 2016) and some insignificant results (Gerber et al., 2011; Tuten & Bosnjak, 2001).

Except for openness, the empirical evidence for the relationship between the Big Five and political news consumption on the Web – which serves as our baseline comparison – remains largely inconclusive. We, thus, propose only one hypothesis:

H1. Openness is positively associated with political news consumption online.

1.1. Big Five and survey response behavior

Currently, our hypothesis is solely based on the findings of self-reported data, which can be subject to various biases. Moreover, personality traits are related to a range of survey response behaviors, including panel attrition (Cheng et al., 2020), item non-response (Klingler et al., 2018), extreme response styles and acquiescence biases (Hibbing et al., 2019). While it would exceed the scope of this study to propose specific hypotheses, we aim to leverage our rich dataset and explore to what extent personality traits shape people's tendency to over- or underestimate their political news consumption. We, thus, address the following research question: *What is the relationship between the Big Five personality traits and the accuracy of reported online political news consumption?*

2. Data and methods

2.1. Study design[1]

In this study, we combine a three-wave panel survey with web-tracking data collected five weeks before and after the German federal elections in 2021. After completing the first wave of the survey, respondents were invited to install a browser extension on their desktops. The browser extension for this study was developed by Adam et al. (2024) and is based on a screen-scarping principle that captures the html of the content participants access in their browsers.[2]

Demographics, political interest and political knowledge were measured in W1, personality was measured in W2, and the self-reported political news consumption was captured in W3[3], with participants receiving €25 per wave as monetary compensation.

2.2. Sample

The participants were recruited by the German ISO-certified panel *Dynata* and were screened according to gender, age, education, and geographical residency. The final sample of $N = 378$ only included participants who passed the quality checks. The final sample is slanted towards men (55.8 %), older participants (23 % between 40 and 49) and

[1] Ethical approval was granted by the ethics committee of GESIS - Leibniz-Institut for the Social Science, Cologne.

[2] To protect the participants' privacy, sensitive website visits were not logged, all data was stored on encrypted servers, identifying information was removed, and participants could pause tracking for 15-minute intervals as needed.

[3] W1 and W2 of the panel survey inquired about news consumption related to the federal election, while W3 focused on general political news consumption. Given our aim to capture broader political news consumption, we selected the measurement from W3, which was collected after the election.

respondents with a higher education (54.5 % with a tertiary education). Overall, the respondents show high interest in politics ($M = 3.81/5$), and are somewhat left-leaning with 48 % placing themselves on the left side of the political spectrum. These biases have been recognized in other webtracking studies (Gil-López et al., 2023).

2.3. Personality traits

In this study, we use the validated German translation of the Ten Items Personality Inventory (TIPI: Muck et al., 2007), which captures the five trait dimensions with 10 items on a 5-point Likert-scale. Although this short scale is both time- and cost-efficient, it usually produces weaker associations (Bakker & Lelkes, 2018). However, the German scale has been validated in terms of internal consistency, factor structure, convergent and discriminant validity and has been shown to be a reliable proxy for longer measurements of the Big Five (Muck et al., 2007). The distribution of the personality traits (Fig. 1) mostly resembles that of representative German samples in terms of means and skewness scores (Krieger et al., 2019).

2.4. Political news consumption online

We rely on three different measures of political news consumption online (see Fig. 2 and Table A1 in Appendix A for descriptive statistics).

2.4.1. Self-reported political news consumption

Participants reported the frequency of reading German political news on websites of newspapers, magazines, or similar sources per week. Choices ranged from 0 to 7 days ($M = 3.45$; $SD = 2.65$).

2.4.2. Webtracked political news consumption

To measure respondents' online news behavior via webtracking, we employed an automated content analysis based on web domain filtering and machine learning proposed by de León, Vermeer, and Trilling (2023a). We began by filtering the tracking data to include only news websites, identified through existing lists of German and international news media (Stier et al., 2020; de León et al., 2023) and manually inspected the top visited domains.

Next, we classified this set of news articles as either political or not. We extracted each URLs title by scraping the title element of each page. To classify articles as political or not, we relied on a 'distant' supervised machine learning approach, which takes cues from article URLs provided by news webpages themselves (de León & Vermeer, 2023; de León, Vermeer, & Trilling, 2023a; Stier et al., 2020). Here, we leveraged the fact that many news organizations have explicit topic sections in their websites that are reflected in the URL structure (e.g., 'bild.de/*politik*/news-article'), providing us with clues as to the article's topic. Where possible, we labelled articles as political or not by this method, using these categories to then train a supervised machine learning model to distinguish between them (see Appendix C for details). For testing, we withheld a random 25 % of the sample, resulting in an F1-score of 0.87 (precision = 0.82, recall = 0.93). To further validate the model, 200 random articles were sampled and manually annotated as political or not. We then tested the classifier on this 'Gold Standard', revealing an F1-score of 0.83 (precision = 0.86, recall = 0.81).

This resulted in 13′588 political news articles ($M = 35.39$; $SD = 90.84$; $min = 0$; $max = 1169$) and 28′208 non-political news articles ($M = 73.46$; $SD = 156.29$; $min = 0$; $max = 1336$) visited by participants.

To consider contextual factors, we calculate the variables below for the full tracking period; the pre-election period – covering the five weeks before the election, along with one additional week after the election as coverage is expected to still focus on the election outcome during this time (de León, Vermeer, & Trilling, 2023b); and the post-election period – spanning the remaining three weeks. The numbers reported below correspond to the full period, the remaining statistics can be found in Appendix A, Table A1.

2.4.2.1. Total amount of visits.

Visits were matched at the individual level, and ranged from 0 visits to a maximum of 1169 visits ($M = 35.39$; $SD = 90.84$).

2.4.2.2. Weekly average consumption.

To make it comparable to the self-reported scale, we calculated the average number of days each individual consumed political news weekly. The final measure ranges from 0 to 7 days per week ($M = 1.09$; $SD = 1.50$).

2.5. Online political news consumptions: discrepancies

We estimate the discrepancies between the two measurement methods with three measures (see Fig. 3).

2.5.1. Total discrepancy

First, we rounded the weekly average consumption obtained from webtracking and subtracted it from the self-reported consumption. This measure indicates the total discrepancy between the measures and ranges between −4 to 7 days ($M = 2.43$; $SD = 2.54$). Negative values indicate an underestimation, where participants reported less consumption than what was recorded by the webtracking. Conversely, positive values indicate an overestimation, where participants reported more online news consumption than the webtracking data reflects. The value of 0 indicates 'accurate' reporting. 70 % of the sample overestimated their online news consumption (see Fig. 3). It must be noted that the two measures slightly deviate from each other, however. First, the self-reported measure asked about the past 7 days while the webtracking measure calculates their average consumption over the full tracking period. Second, the webtracking data is limited to desktop devices, while the self-reported asked about online consumption without specifying the device. Nonetheless, the relatively low Pearson's correlation between the two measures of $r = 0.37$[4] is still substantive and mirrors previous findings (Prior, 2009).

2.5.2. Overestimation

The measure described above assesses the total discrepancy and does not distinguish between instances of under- and overestimation. Following Araujo et al. (2017), we, therefore, create two additional variables that capture these phenomena separately. For the scale capturing overestimation, instances of underestimation and accurate reporting were set to 0. The resulting scale ranges from 0 to 7 ($M = 2.57$; $SD = 2.34$).

2.5.3. Underestimation

To measure underestimation, instances where individuals accurately reported or overestimated their consumption were set to 0. The scale was reversed, such that higher values indicate a higher degree of underestimation. The final scale ranges from 0 to 4 ($M = 0.14$; $SD = 0.5$).

2.6. Covariates

Our models control for gender, age and education, as well as for political ideology, political interest and political knowledge (see Appendix A Table A1 for descriptive statistics).

2.7. Analytical strategy

We mainly employ OLS regressions to estimate the relationship between the Big Five and political information consumption. Because the distributions of 1) the total political news visits and 2) underestimation violate numerous assumptions of OLS models, we opt for negative

[4] The Pearson's correlation is even lower for the post-election period, which, timewise, comes closest to the measurement of the self-reported news consumption ($r = 0.35$).

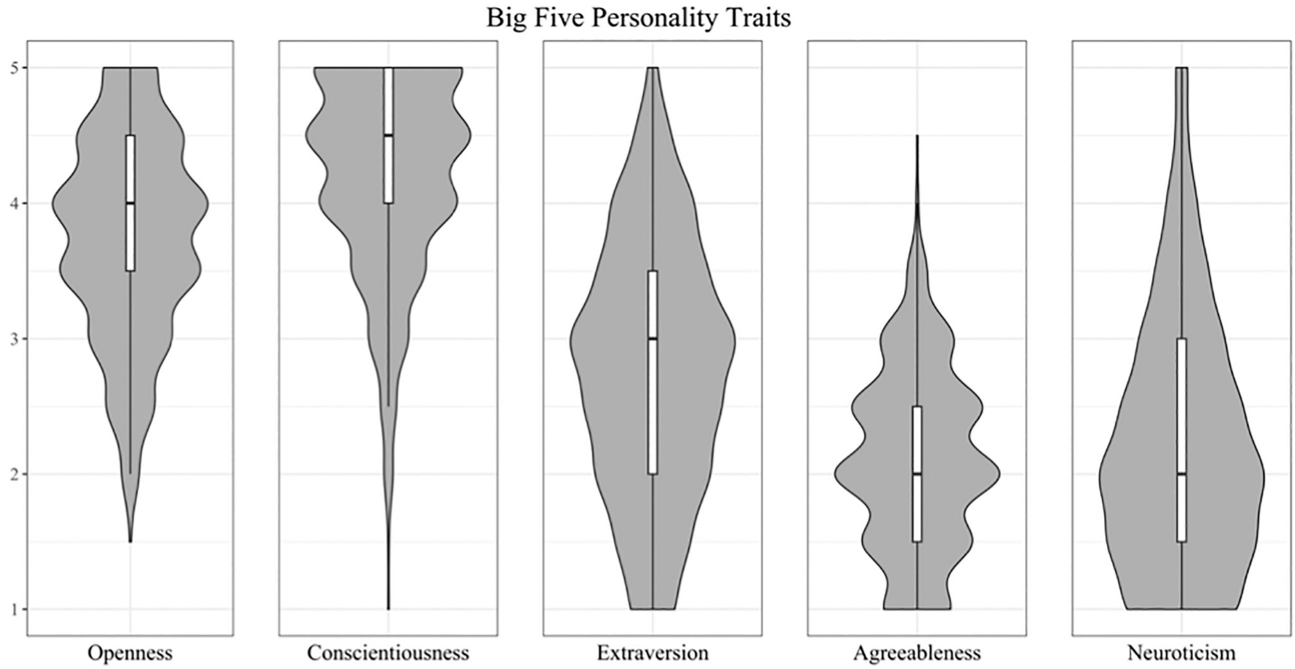

Fig. 1. Distribution Big Five Personality Traits.

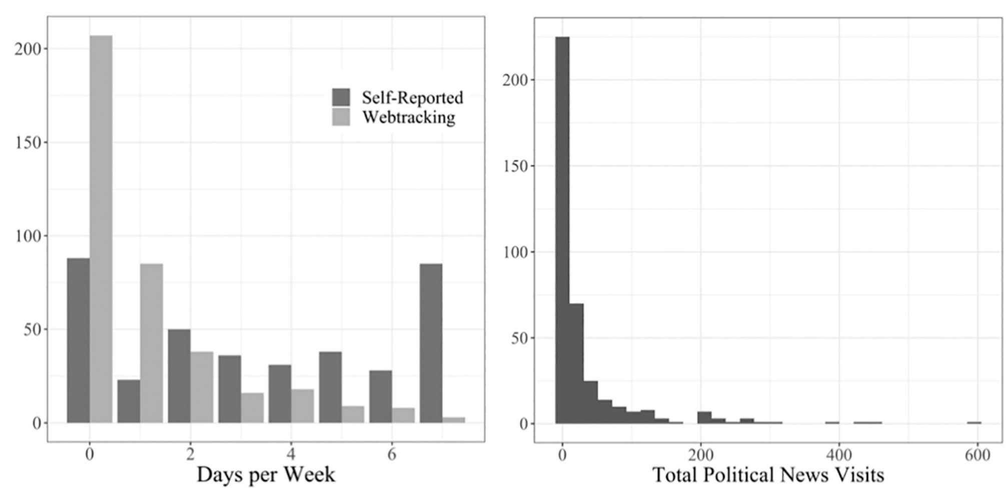

Fig. 2. Frequency Political News Consumption.
Notes. Histogram for the webtracking data in the left plot is based on the rounded measure. For the visualization of the right plot, the outlier with 1169 visits was removed for better visibility.

binomial regressions, which account for the zero-inflated and negative binomial distribution of the data. For robustness checks, we replicate the models using the webtracking data for the pre-election and post-election phase (see Appendix B, Table B2–4).

3. Results

3.1. Political news consumption

We begin by estimating the relationship between personality traits and *self-reported* consumption (Fig. 4). The only effect identified is a positive association between openness and online political news consumption ($\beta = 0.56$, $p = 0.048$), which is in line with our hypothesis (see Appendix B Table B1 for regression table). In other words, those scoring highest on openness consume political news on approximately 2.6 more days a week than those scoring lowest on this trait. Notably, the size of this effect exceeds that of education, which is known to be a strong predictor of political news consumption (e.g., Shehata & Strömbäck, 2011).

Next, we replicate this model using the weekly average of political news consumption obtained by our webtracking data (see Fig. 4; Appendix Table B2 for full results and robustness tests). In contrast to the previous model, openness is no longer associated with political news consumption ($\beta = 0.13$, $p > 0.1$) – a pattern that holds across the three time-periods. Yet, neuroticism seems negatively related to webtracked news consumption. While this effect slightly fails to reach the significance level in the full period ($\beta = -0.18$, $p = 0.057$), it is more pronounced in the post-election period ($\beta = -0.2$, $p = 0.031$). For this latter period, the average news consumption in the webtracked data decreases by approximately one day per week for individuals with high versus low neuroticism.

We additionally regress the total number of political news visits on

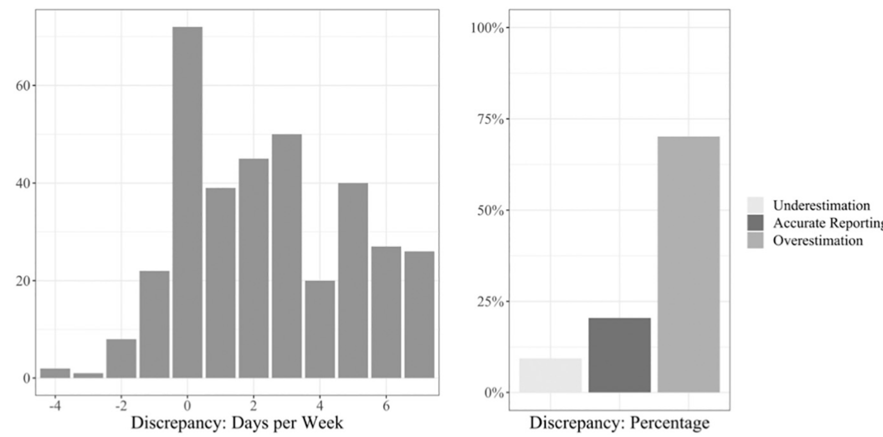

Fig. 3. Frequency Discrepancy
Notes. Negative values in the left panel indicate underestimation, positive values indicate overestimation (in days).

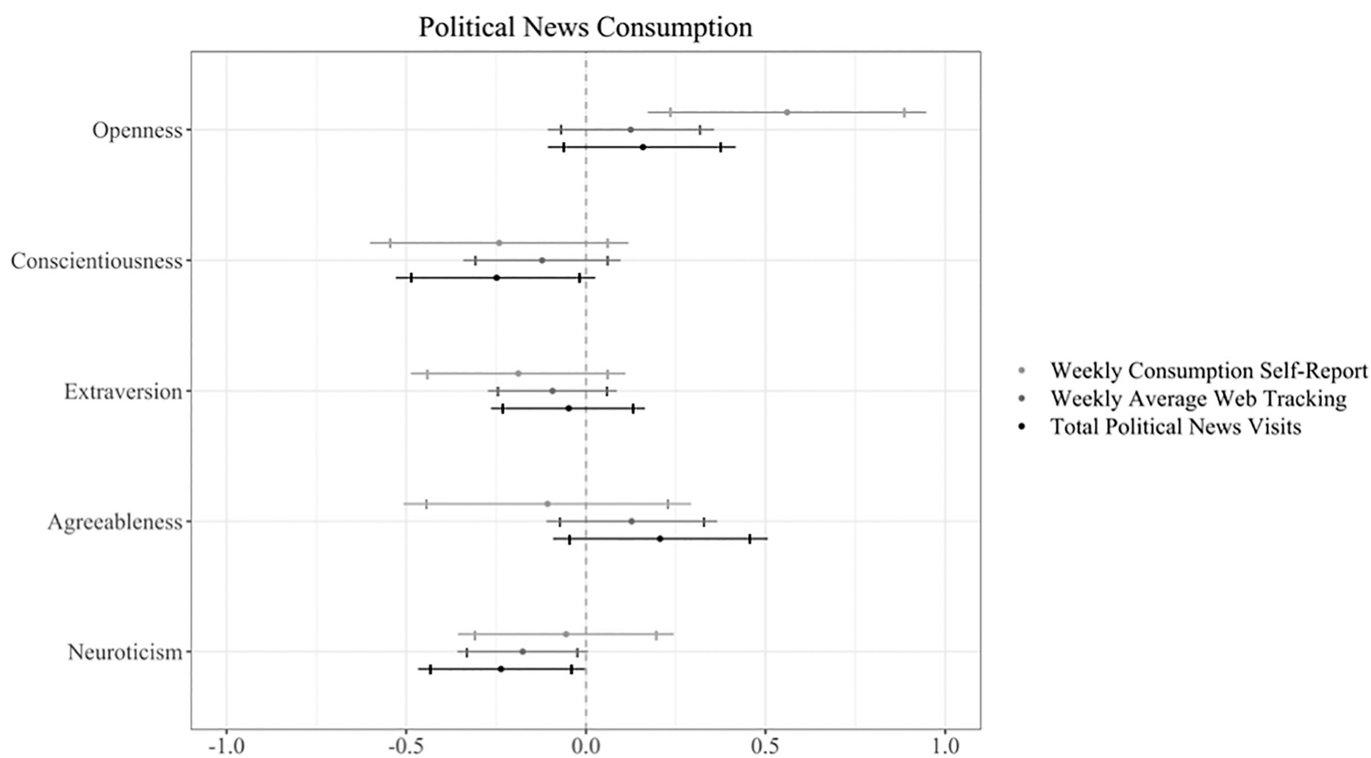

Fig. 4. Coefficient plots: political news consumption
Notes. 95 % (outer-cap) and 90 % (inner-cap) confidence intervals. The first two models represent OLS regressions. Model 3 (Total Political News Visits) is a negative binomial regression with normalised coefficients – every one step-increase in the dependent variable is equal to a log coefficient change in the dependent variable.

personality traits (Fig. 4; Appendix B, Table B3). Substantiating the previous findings, neuroticism is negatively related to total political news visits (β = −0.24, p = 0.028). This pattern holds over the three distinct time periods and is comparable to the effect size of political interest, which is probably one of the strongest predictors of political news consumption (e.g., Strömbäck & Shehata, 2010). Compared to the previous analysis, the model also shows a negative effect of conscientiousness on the 0.1 significance level (β = −0.25, p = 0.056), though this association is only observable for the full period.

3.2. Discrepancies between self-reported and behavioral news consumption measures

Next, we explore whether these inconsistencies can be explained by a tendency to under- or overestimate one's self-reported news consumption in comparison to the behavioral measure (see Fig. 5; Appendix Table B4 for regression tables).

First, we find a positive relationship for openness and the total discrepancy, albeit this association fails to reach significance on the conventional level (β = 0.38, p = 0.06). To get a better understanding of the direction of this discrepancy, we conduct separate regressions for under- and overestimation. Against what one might have expected, open individuals are less likely to underestimate their online political news consumption in comparison to the behavioral measure (β = −0.68, p = 0.025). The model also reports a positive effect of conscientiousness on underestimation, albeit on the 0.1 significance level (β = 0.59, p = 0.066). These results must be interpreted with caution, however: on the one hand, they seem to be driven by the webtracked data of the pre-

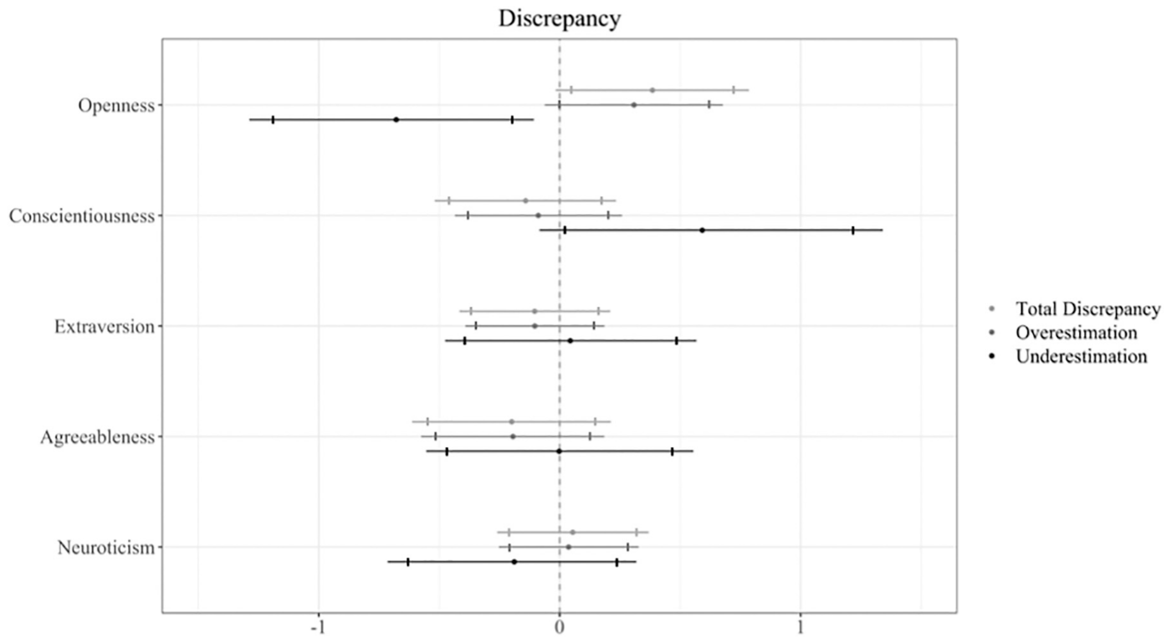

Fig. 5. Coefficient Plots: Discrepancy
Notes. 95 % (outer-cap) and 90 % (inner-cap) confidence intervals. The first two models represent OLS regressions. Model 3 (underestimation) is a negative binomial regression with normalised coefficients – every one step-increase in the dependent variable is equal to a log coefficient change in the dependent variable.

election phase, which is furthest away from the time point the self-reported measure was collected. On the other hand, the scale that captures underestimation is highly skewed and only contains 33 cases. Especially when comparing these relationships to the effects found for political interest, which is strongly and positively related to overestimating one's self-reported news consumption in all three periods, these associations seem negligible.

4. Discussion

Our main results can be summarized as follows: while we do not find strong evidence that personality is systematically related to under- or overestimating one's political news consumption, we nevertheless find significant differences between the two measurement methods. First, in line with expectations, we find that openness is positively associated with self-reported political news consumption online. This effect disappears in the webtracking data, however. One plausible explanation for this discrepancy is that the consumption of political news satisfies people's self-image as it signals intellectual curiosity, even if their actual behavior does not fully reflect this claim (see Kahn et al., 2014 for a similar discussion). While we do not have a definite answer to this conundrum, our findings challenge the notion that openness is the primary personality driver of online political news consumption. At the same time, we find a negative association between neuroticism and online political news consumption in the webtracking data. This aligns with the idea that neurotics circumvent political information to alleviate psychological distress. Similar to openness, however, this trend lacks consistency between the measures. As neurotics tend to be more anxious about negative evaluations of others (Hazel et al., 2014), one could argue that neurotic individuals are hesitant to accurately report their (low) consumption of political news due to a social desirability bias (but see Stöber, 2001). An alternative explanation could be that neurotic individuals are simply not aware of their avoidance tendencies and that their aversion to political news could be driven by an unconscious desire to protect themselves from potential distress. When asked about their political news consumption in self-reports, neurotic individuals may, thus, not accurately recall their avoidance behaviors (see e.g., Gorski, 2023, for motives behind news avoidance).

These interpretations admittedly imply that the discrepancies stem from an issue with the self-reported measure. While webtracking is less subjected to response biases than self-reported measures, it comes with its own limitations, however (González-Bailón & Xenos, 2023). Most notably, webtracking does not capture political news accessed through mobile devices, such as news apps (Otto et al., 2024). This is essential to acknowledge, particularly when considering the intrusive nature of webtracking, which could potentially influence individual behavior and prompt a shift to different devices. Moreover, this limitation may have affected the comparability between the two measures of political news consumption: while the self-reported measure did not specify the device through which the online news articles were obtained, our webtracking data was limited to information accessed through participants' desktops. As the relationship between personality traits and political news consumption behavior appears to vary across different platforms, this discrepancy between the measurements might have impacted the results.

Another drawback of this study is that our measures do not provide any information on the actual content, the ideological leaning, or the valence of the news articles. These aspects likely matter for the different personality types: for example, one could theorize that agreeable individuals are particularly sensitive to conflictual news reporting. These aspects have not received the attention they deserve and might explain some of the nonsignificant associations found in this study.

Furthermore, it's important to consider that the timing of this study coincides with a period surrounding a major election. However, given that the primary aim of the study was to compare self-reported data with webtracked data, and because we have conducted separate analyses for each distinct time period, we do not anticipate that the timing of the election has substantially influenced our findings.

Last, relying on a relatively short personality inventory limits our ability to capture lower-level personality facets. Since facets might also compete with each other, nonsignificant results must be interpreted with caution (see e.g., Xu et al., 2021).

5. Conclusion

The discrepancies identified between the self-reported and the behavioral measures highlight the critical importance of rethinking how we examine personality effects. Although our investigation is limited to online political news consumption, the implications of our findings could extend to a variety of other behaviors. The demand for more comprehensive methods extends far beyond the boundaries of personality research. In the field of political psychology, there is a widespread search for innovative methodological approaches including neurological, psychophysiological, and behavioral measures to capture the psychological underpinning of political behavior. Following this call, we encourage future research to go beyond self-reported measures to get more objective insights into how psychological processes influence how citizens interact with the political world.

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CRediT authorship contribution statement

Chiara Valli: Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Formal analysis, Conceptualization. **Ernesto de León:** Writing – review & editing, Writing – original draft, Validation, Software, Methodology, Formal analysis, Data curation. **Mykola Makhortykh:** Writing – review & editing, Validation, Software, Methodology, Data curation.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used ChatGPT in order to improve language and readability. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

Declaration of competing interest

The authors declare no conflict of interest.

Data availability

All data, scripts, and supplementary materials are available for replication at the following Open Science Foundation (OSF) repository.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2024.112735.

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