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Personality Profiles And Political Regions: A Latent Profile Analysis Approach

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Personality Profiles and Political Regions: A Latent Profile Analysis Approach

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This Thesis is submitted in partial fulfillment of
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Master of Science

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ABSTRACT

Big Five personality traits have been shown to be one important psychological process that underlie differences in political orientation. An abundance of work has found that political conservatism is consistently predicted by trait Conscientiousness, whereas political liberalism is consistently predicted by Openness to Experience. Other work found that political behaviors may be related to regional differences in personality. The present study extended existing work by examining the numbers and features of distinct personality profiles within Republican, Democratic, and swing regions of the United States. To do so, we conducted latent profile analysis (LPA) to determine different personality profiles within different political regions of the US. Across two different datasets with a total sample size of over 6 000, our results revealed that while all regions shared similar numbers (3-5 profiles per region) and patterns of personality profiles (e.g., well-adapted and maladapted individuals), some regions also showed unique personality profile patterns (e.g., "Disorganized & Reclusive" , "Rigid & Antisocial"). Overall, these results provide initial evidence suggesting that different personality profiles do exist among different political regions of the US, and offer insights on the interplay between trait personality, political orientation, and geographical differences.

TABLE OF CONTENTS

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The journey continues, amid the pandemic, in this turbulent world. Tianfang, you know it's hard, so you gotta knock a little harder, thanks.

Introduction

Differences in personality profiles across United States political regions

The impact of individual differences on political ideology has been extensively documented both in personality and political psychology. It has consistently been shown that the Big Five trait Openness to Experience is linked with increased liberalism, whereas higher trait Conscientiousness predicts increased conservatism (e.g., Caprara, Schwartz, Capanna, Vecchione, & Barbaranelli, 2006; Carney, Jost, Gosling, & Potter, 2008; Sibley, Osborne, & Duckitt, 2012; Xu, Plaks, & Peterson, 2016, etc.). These findings remain robust across different measures of Big Five personality and political orientation, and across different geographical regions (Caprara et al., 2006, Sibley et al., 2012). The relationships between trait personality and political ideology extend beyond questionnaire measures to real-life political events and behaviors. One set of studies found that personality differences between liberals and conservatives manifest in non-verbal behaviors (Carney et al., 2008). For instance, the bedrooms and office spaces of people higher in liberalism contained more variety of books and music, reflecting their higher levels of Openness to Experience. On the other hand, the bedrooms/work spaces of conservative individuals contained more organizational items, such as calendars, cleaning supplies, and stamps, reflecting their higher Conscientiousness (Carney et al., 2008).

Perhaps even more importantly, these personality differences were evident in real-life voting and election patterns. Rentfrow and colleagues (2008) examined how state-level personality traits predicted voting patterns in US presidential elections, and found that higher state-level Openness to Experience predicted more votes for Democratic candidates, and higher state-level Conscientiousness predicted more votes for Republican candidates. Further reanalysis of these data controlling for sociodemographic variables (e.g., income, ethnicity, gender)

obtained similar results (Rentfrow, 2010), suggesting that state-level personality traits are significant predictors of voting patterns above and beyond the influences of other important sociodemographic factors. Similar findings have also been obtained in European samples (Caprara et al., 2006).

These effects of personality on political orientation were further confirmed via a large-scale meta-analysis of 73 studies (Sibley et al., 2012), which reported the observed link between Openness to Experience and political conservatism to be $r = -0.18$, and the link between Conscientiousness and political conservatism to be $r = 0.10$. Furthermore, this meta-analysis also found a weak yet reliable negative correlation between Neuroticism and political conservatism ($r = -0.03$; Sibley et al., 2012). Given the characteristics of these traits, it can therefore be inferred that individuals who endorse liberal political ideologies tend to be more motivated by creativity, curiosity, and novel experiences, and may also be more sensitive to negative emotionality. Individuals who endorse more conservative political ideologies, however, may be more motivated by maintaining order and structure, as well as following routines and rules (Carney et al., 2008; Xu et al., 2016).

Although personality traits are reliable predictors of political ideology, their effect sizes are still relatively small. It may be the case then that the expressions of personality traits are not uniform across all liberals and conservatives. That is, different conservatives may show different levels of Conscientiousness, and different liberals may show different levels of Openness to Experience. One possible explanation for this may be due to geographical locations. Specifically, in context of the US, where different geographical locations are associated with different political climates, it is possible that individuals in different political regions would exhibit different variations of personality expressions. For example, a self-identified conservative living

in California may show very different levels of Conscientiousness than a self-identified

conservative from Texas. Support for this comes from work showing that self-identified

conservatives from "blue" states demonstrated greater support for liberal policies than their

counterparts from in "red" states (Feinberg, Tullett, Mensch, Hart, & Gottlieb, 2017). Other

work have highlighted that that certain personality characteristics may be more prevalent or

adaptive in specific types of locations, regions, or cultures, which may lead to differences in their

expression based on an individual's region or community (Oishi & Graham, 2010). Therefore, it

would be worthwhile to further examine how geographical locations may play a role in the

relationship between personality and political ideology.

Geographical Variation in Personality Traits

Geographical psychology, which explores how psychological phenomena may differ

based on spatial differences and general macro environment (Rentfrow & Jokela, 2016), could

provide new perspectives on the relationship between trait personality and political ideology.

Some recent work has begun to examine how differences in personality traits may be dependent

on the geographical regions that people reside in, specifically analyzing whether there may be

different personality profiles in different geographical regions. One study (Rentfrow et al., 2013)

used a large-scale cluster analyses to explore regional differences in personality, and found that

the United States can be categorized into three different "personality" regions based on

variations of trait expression. The first of these three regions was labeled as Friendly &

Conventional, which consisted of states in central US, where residents reported lower levels of

Neuroticism and Openness to Experience, but higher levels of the other three traits. The second

region, Relaxed & Creative, included most states on the West Coast, Rocky Mountains, and

Sunbelt. Residents in this region reported higher in Openness to Experience, but lower in

Extraversion, Agreeableness, and Neuroticism. The third region, named Temperamental & Uninhibited, primarily consisted of Mid-Atlantic and Northeast states. Residents in this region reported lower levels of Agreeableness and Conscientiousness, and higher levels of the other three traits (Rentfrow et al., 2013). Follow-up analysis revealed relationships between these regions and political ideology (as well as other sociodemographic variables). Specifically, positive correlations were found between Friendly & Conventional regions and the state-level percentage of votes for Republican candidates. However, negative correlations with voting for Republican candidates were found in Relaxed & Creative and Temperamental & Uninhibited regions.

Findings from other countries also suggest geographical differences in personality traits. One study examined the geographical personality differences in the United Kingdom using participant zip codes (Rentfrow, Jokela, & Lamb, 2015). It was found that metropolitan areas (e.g., London, Cambridge) reported higher levels of Openness to Experience compared to East Midlands and Eastern England. On the other hand, Conscientiousness was found to be higher among regions such as Southern England, Midlands, and the Scottish Highlands compared to London, Wales, and Northern England. The geographical differences in personality also predicted voting behavior, with Openness to Experience positively predicting votes for the Liberal Democrats Party, and Conscientiousness positively predicting votes for the Conservative Party (Rentfrow et al., 2013). Follow-up studies (Jokela, Bleidorn, Lamb, Gosling, & Rentfrow, 2015) delved even more precisely into regional differences in personality by closer examining different regions within the same metropolitan city. Personality scores from residents of the Great London metropolitan area were categorized according to postal codes. It was found that Openness to Experience was higher in central London, and lower in suburban and other regions

(Jokela et al., 2015). Similar findings were reported in other European regions, e.g., in

Switzerland (Gotz, Ebert, & Rentfrow, 2018).

Overall, then, these findings suggest that geographical variation in personality profiles

exists and is related to regional differences in various sociodemographic variables. However,

previous studies mainly focused on the relationship among aggregated personality scores for

each region, but offered less insights into the within-region variance of resident personality

profiles.

Present research

Although research thus far has suggested that generally, liberalism is associated with

Openness to Experience and conservatism with Conscientiousness, is it still possible that

people's personality profiles could exhibit more nuanced differences depending on their region

of residence? That is, would the personality profiles of individuals differ between more liberal vs.

more conservative regions of the US? Could these different personality profiles shed further light

on who may live in a certain region, and why these people may be more inclined to be liberal or

conservative?

The current studies therefore examined how personality profiles may differ among

specific political regions of the US. The goals of the present research are to extend the existing

research by 1) exploring the characteristics of within-region personality profiles and 2) exploring

how differences in personality trait profiles can help us understand the regional difference in

political ideology. Preceded by an initial pilot study (See Appendix for details), which used two-

step cluster analysis to provide basic insight into potential personality profiles, Study 1 adopted

an exploratory approach to examine in a relatively large sample whether there exists different

personality profiles among different political regions in the USA. Study 2 aimed to replicate and confirm the findings of Study 1 using a separate sample.

Study 1

In Study 1, participants were asked to complete measures of Big Five personality, as well as to indicate their current state of residence. We created political regions based on the state-level voting preference for the past four presidential elections (adjusted for participants' date of participation). We then explored the personality profiles within each region using latent profile analysis (LPA).

Method

Participants

A total of 3218 participants (1324 males) who were residents of the US were recruited online via Amazon's Mechanical Turk (mturk). In order to ensure participant quality, only US residents with prior mturk approval ratings of ≥97% were recruited. Participant recruitment occurred from 2011 to 2013. Participants who did not report or misreported their state of residence (e.g., responding with "USA") were excluded from analysis. This led to a total of 240 participants being excluded, leaving a final sample of 2978 participants (1216 males). This final sample reported an average age of 33.07 years old ($SD = 11.90$) and average education of 15.35 years $(SD = 2.70)$.

Materials

Participant personality was assessed using the Big Five Aspect Scales (BFAS; DeYoung, Quilty, & Peterson, 2007). The BFAS consists of 100 descriptive items about a person's personality characteristics and preferences, which participants indicated their agreement for on a 5-point Likert scale ranging from "Strongly disagree" to "Strongly agree." The scale measures

both the personality traits, as well as two aspects within each trait. Sample items include "I carry

out my plans" (Consciousness) and "I enjoy the beauty of nature" (Openness to Experience).

Data Preparation

We used OpenRefine to clean and sort the data based on information provided by

participants about their state of residence. After excluding participants who misreported state of

residence information, we created five regional categories based on the results of the most recent

past four presidential elections, based the date that the responses were collected from each

participant. Specifically, we wanted to create political geographical regions that map onto each

state's overall political leanings across four elections. Therefore, we classified states that voted

for Republican candidates in all four elections as "Highly Republican" regions. States that voted

Republican three times were classified as "Moderately Republican." The "Swing" regions

consisted of states that voted for each party twice. The "Moderately Democratic" regions

consisted of states that voted for the Democrats three times. Lastly, the "Highly Democratic"

regions were made up of states that voted for the Democratic candidate all four times. Each

participant was assigned to one of these five regions based on their reported state of residence

and the date their data was collected. For example, for a participant who completed the study

materials in 2013, we used their state's election results from the 2012, 2008, 2004, and 2000

elections.

Data Analysis

Our goal was to identify the makeup of personality profiles among the five political

regions. To do so, we made use of latent profile analysis (LPA), which allowed us to determine

the optimal number of personality profiles within each region through model comparison and

specification. First, based on previous work examining Big Five personality profiles using LPA,

in order to determine the numbers of profiles among participants within each political region, we standardized the Big Five personality trait scores within each region and performed three rounds of LPA, specifying for three, four, and five latent classes. Then we examined multiple fit indices (specifically, the AIC, BIC and BLRT) to determine the most optimal number of latent class for each political region (Nylund, Asparouhov, & Muthén, 2007) based on the output solution from Mplus version 8.3 via tidyLPA through the "compare solutions" command. Lastly, we explored and summarized each personality profile from the model with the best fit for each of the five political regions. We conducted the analysis using the tidyLPA r package, along with MPlusAutomation r package and Mplus version 8.00.

Results

Highly Republican Region

A total of 705 (287 males) participants were categorized into the Highly Republican region. These participants averaged 33.57 years ($SD = 11.69$), and received 15.11 years of education ($SD = 2.61$). Based on the results from our LPA comparing solutions with three (AIC = 9567.668, BIC = 9667.948, BLRT = 90.012), four (AIC = 9500.522, BIC = 9628.152, BLRT = 79.147), and five profiles (AIC = 9454.992, BIC = 9609.971, BLRT = 57.529), we identified the most optimal number of profiles for the Highly Republican region to be five (see Figure 1 for depictions of the five different profiles).

Profile 1 in the Highly Republican region included personality scores from 26 (3.69% of total participants from this region) participants. The standardized scores for this profile revealed slightly higher levels of Openness to Experience ($z = 0.60$), average levels of Neuroticism ($z = 0.32$), Conscientiousness ($z = -0.41$), and Extraversion ($z = 0.19$), and very low levels of Agreeableness ($z = -2.09$). Based on the high levels of Openness to Experience and low levels of

Agreeableness, it is likely that these individuals enjoy intellectual stimuli and novel experiences but are also quite unfriendly and have little care for others' opinions or wellbeing. We therefore tentatively named this profile "Independent & Free-Spirited," as these types of individuals may be creative and open to novelty but are also set on their own ways and are less likely to appease others around them.

Profile 2 included personality scores from 115 (16.31% of total participants from this region) participants. These participants scored around average in Neuroticism ($z = 0.40$) and Conscientiousness ($z = -0.32$), and low in Openness to Experience ($z = -1.22$), Agreeableness ($z = -0.84$), and Extraversion ($z = -0.68$). These individuals appear to be unfriendly and less willing to form social connections, as well as being highly averse to novel experiences. Thus, we tentatively named this profile "Rigid & Antisocial" to reflect these traits.

Profile 3 included 78 (11.06%) participants, who were generally high in Openness to Experience ($z = 0.88$), Agreeableness ($z = 1.08$), Conscientiousness ($z = 1.00$), and Extraversion ($z = 1.20$), but low in Neuroticism ($z = -1.32$). This pattern represents the type of individuals who are generally well-adapted in their lives – they appear to be emotionally stable, as well as goal-oriented, friendly, outgoing, and open to novelty. As such, we named this profile "Well-Adapted."

Profile 4 included 374 (53.05%) participants. The standardized scores from this profile of participants revealed average-level scores for all five traits – Openness to Experience: $z = 0.10$; Neuroticism: $z = -0.25$; Agreeableness: $z = 0.18$; Conscientiousness: $z = 0.19$; and Extraversion: $z = 0.17$. Given the somewhat average levels across all traits, we named this profile the "Average Folks."

Finally, Profile 5 in the Highly Republican region consisted of 112 (15.89%) participants. This profile reported high levels of Neuroticism ($z = 1.24$), average levels of Openness to

Experience ($z = 0.20$) and Agreeableness ($z = 0.14$), and low levels of Conscientiousness ($z = -0.89$) and Extraversion ($z = -0.75$). Higher levels of Neuroticism suggest more proneness to negative emotionality, and lower Conscientiousness and Extraversion suggest decreased likelihoods to pursue goals, maintain order, and seek out social support. Based on these trait characteristics, we named this profile "Disorganized & Reclusive."

Moderately Republican Region

A total of 354 (118 males) participants were categorized into the Moderately Republican region. Participants' mean age was 33.93 years ($SD = 11.58$) and on average had 15.31 years of education ($SD = 2.79$). Results from the LPA comparing solutions with three (AIC = 4892.0300, BIC = 4977.155, BLRT = 51.516), four (AIC = 4859.130, BIC = 4967.470, BLRT = 44.899), and five profiles (AIC = 4850.720, BIC = 4982.276, BLRT = 20.41) identified four personality profiles in this region (Figure 3).

Profile 1 in the Moderately Republican region included personality scores from 18 (5.08%) participants. These participants reported high levels of Conscientiousness ($z = 1.35$), Extraversion ($z = 1.58$), Openness to Experience ($z = 1.18$), and Agreeableness ($z = 1.05$), and low levels of Neuroticism ($z = -1.30$). This personality profile mimics Profile 3 from the Highly Republican region, and we therefore named it "Well-Adapted."

Profile 2 ($n = 71$, 20.00 %) revealed average levels of Neuroticism ($z = 0.04$), Conscientiousness ($z = -0.07$), and Extraversion ($z = -0.55$), as well as low levels of Openness to Experience ($z = -0.91$) and Agreeableness ($z = -1.13$). The personality profile for this group suggest general unfriendliness, and a tendency to avoid social interactions and new experiences, which bears strong resemblance to the "Rigid & Antisocial" personality profile observed in the Highly Republican region.

Profile 3 included 202 (57.06%) participants. Similar to a previously observed pattern, these participants' profile revealed average-level scores for five traits – Openness to Experience: $z = 0.20$; Neuroticism: $z = -0.13$; Agreeableness: $z = 0.17$; Conscientiousness: $z = 0.14$; and Extraversion: $z = 0.42$. We therefore decided to keep the label "Average Folks" for this profile due to its overall similarity to Profile 4 from the Highly Republican Region.

Profile 4 ($n = 58$, 16.38%) revealed high levels of Neuroticism ($z = 0.72$), average to high levels of Agreeableness ($z = 0.52$), average level of Openness to Experience ($z = 0.12$), and low levels of Conscientiousness ($z = -0.73$) and Extraversion ($z = -1.58$). Thus, individuals in this profile are generally highly prone to negative emotions, less willing to engage in social interactions, and may also be less organized and responsible. These patterns are similar to the "Disorganized & Reclusive" profile from Highly Republican regions, and we therefore labeled them as such.

Swing Region

A total of 400 (173 males) participants were categorized into the Swing Region, with a mean age of 34.16 years ($SD = 12.036$) and mean education level of 15.35 years ($SD = 2.55$). Based on the LPA comparing solutions with three (AIC = 5405.312, BIC = 5493.124, BLRT = 66.103), four (AIC = 5352.340, BIC = 5464.101, BLRT = 64.971), and five profiles (AIC = 5330.196, BIC = 5465.906, BLRT = 34.144), we identified five personality profiles in this region (Figure 5).

Profile 1 ($n = 17$, 4.25%) reported high levels of Neuroticism ($z = 1.60$), average levels of Openness to Experience ($z = 0.18$), Agreeableness ($z = 0.49$), and low levels of Conscientiousness ($z = -1.51$) and Extraversion ($z = -1.54$). Similar to the profiles observed in

Highly and Moderately Republican regions, individuals in this profile also appear to reflect the "Disorganized & Reclusive" personality characteristics.

Profile 2 ($n = 89$, 22.15%) participants reported high levels of Neuroticism ($z = 0.50$), but low levels of all the other traits (Openness to Experience: $z = -1.19$; Agreeableness: $z = -0.92$; Conscientiousness: $z = -0.39$; Extraversion: $z = -0.71$). This profile appears to be the opposite of the "Well-Adapted" individuals found in the other regions, as individuals in this profile tend to be low on emotional stability, but are also less friendly, outgoing, structured, and creative. Because they scored lower on adaptive traits, but higher on less adaptive traits, we therefore named this profile "Maladapted" to reflect these characteristics.

Profile 3 ($n = 177$, 44.25%) revealed generally average-level scores for all five traits – Openness to Experience: $z = 0.14$; Agreeableness: $z = 0.23$; Conscientiousness: $z = 0.36$; Extraversion: $z = 0.46$ (high-average); plus low level score for Neuroticism ($z = -0.68$). Besides low Neuroticism, which represents better emotional stability, the average levels of these traits suggests that this profile is generally similar to the "Average Folks" profiles observed in Highly and Moderately Republican regions.

Profile 4 ($n = 19$, 4.75%) reported higher levels of Openness to Experience ($z = 1.46$), Agreeableness ($z = 1.05$), Conscientiousness ($z = 1.55$), and Extraversion ($z = 1.62$), but low levels of Neuroticism ($z = -1.37$). This pattern, previously described in both the Highly Republican and Republican regions, again seem to represent the personality profile of "Well-Adapted" individuals.

Profile 5 ($n = 98$, 24.50%) revealed high levels of Neuroticism ($z = 0.69$), average to high level of Openness to Experience ($z = 0.46$), average levels of Agreeableness ($z = 0.11$) and Extraversion ($z = -0.19$), and average to low levels of Conscientiousness ($z = -0.3$). These

individuals are somewhat more open to novelty, but at the same time are less emotionally stable

and less organized. This personality pattern may reflect some form of worrisome liberalism, as

evidenced by the higher levels of Neuroticism and Openness to Experience, as well as the lower

levels of Conscientiousness (e.g., Sibley et al., 2012). Thus, we named this profile "Worrisome

Liberals" to reflect the observed traits.

Moderately Democratic Region

A total of 65 (21 males) participants were categorized into the Moderately Democratic

region. On average, participants were 33.75 years old ($SD = 12.65$) and received 15.82 years of

education ($SD = 2.74$). Based on our analyses with three (AIC = 875.220, BIC = 923.057, BLRT

= 30.747), four (AIC = 859.244, BIC = 920.127, BLRT = 27.977), and five profiles (AIC =

858.20, BIC = 932.129, BLRT = 13.044), we identified four personality profiles in this region

(Figure 7).

Profile 1 participants ($n = 3$, 4.62% of total participants from this region) showed high

level of Conscientiousness ($z = 1.81$), average to low levels of Openness ($z = -0.45$), average

level of Extraversion ($z = 0.15$), as well as low levels of Neuroticism ($z = -1.71$) and

Agreeableness ($z = -2.09$). These individuals tend to be less prone to negative emotions, but are

also somewhat less receptive to novelty. They also appear to be more responsible, yet very

disagreeable. Combined, these patterns are generally in line with what is observed for rigid

conservative individuals (e.g., lower Openness, higher Conscientiousness). As such, we labeled

this profile as "Rigid Conservatives." However, given the small sample size for this profile, we

do caution the interpretation of this profile.

Profile 2 in this region ($n = 19$, 29.23%) had high levels of Neuroticism ($z = 1.09$),

average to low levels of Extraversion ($z = -0.48$), and lower levels of Conscientiousness ($z = -$

0.85), Openness to Experience ($z = $ -1.08), and Agreeableness ($z = $ -1.59). Similar to the patterns

previously observed in the Swing regions, these individuals appear to reflect a "Maladapted"

personality profile.

Profile 3 ($n = $ 33, 50.77%) revealed average-level scores for all five traits – Openness to

Experience: $z = $ 0.02; Agreeableness: $z = $ 0.14; Conscientiousness: $z = $ -0.15; Extraversion: $z = $

0.15; and Neuroticism: $z = $ -0.22. We therefore kept the label "Average Folks" for this profile

given its similarity to other similar profiles from other regions.

Profile 4 in this region ($n = $ 10, 15.38%) revealed high levels of Openness to Experience

($z = $ 0.76), Conscientiousness ($z = $ 1.55), Agreeableness ($z = $ 0.95), and Extraversion ($z = $ 1.15),

and low levels of Neuroticism ($z = $ -0.88). This pattern is consistent with what was observed in

the previous regions as "Well-Adapted."

Highly Democratic Region

A total of 1454 (617 males) participants were categorized into the Highly Democratic

region. The mean age in this group was 32.29 years ($SD = $ 11.96), and mean years of education

received was 15.46 ($SD = $ 2.75). Based on our LPA comparing solutions with three (AIC=

19802.448, BIC = 19918.654, BLRT = 169.566), four (AIC = 19662.812, BIC = 19810.710,

BLRT = 151.636), and five profiles (AIC = 19583.666, BIC = 19763.257, BLRT = 91.147), we

identified five personality profiles in this region (Figure 9).

Profile 1 ($n = $110, 7.57% of total participants from this region) reported high levels of

Neuroticism ($z = $ 1.48), average levels of Agreeableness ($z = $ -0.10), average to low levels of

Openness to Experience ($z = $ -0.55), and low levels of Conscientiousness ($z = $ -0.68) and

Extraversion ($z = $ -1.48). Similar to the profiles observed in other regions, individuals in this

profile also appear to reflect the "Disorganized & Reclusive" personality characteristics.

Profile 2 ($n = 291$, 20.01%) showed higher levels of Neuroticism ($z = 0.75$), average to high levels of Openness to Experience ($z = 0.55$), average levels of Agreeableness ($z = 0.25$) and Extraversion ($z = 0.01$), and lower levels of Conscientiousness ($z = -0.698$). This personality pattern is similar to the one found in Profile 5 of Swing regions, which indicates lower emotional stability and responsibility, but also higher levels of kindness and openness. Thus, we also labeled this profile as "Worrisome Liberals."

Profile 3 ($n = 640$, 44.02%) represented average-level scores for Openness to Experience: $z = 0.01$; Agreeableness: $z = 0.17$; Conscientiousness: $z = 0.24$; Extraversion: $z = 0.24$ and Neuroticism: $z = -0.49$. This profile again resembles the "Average Folks" profiles from previous regions.

Profile 4 ($n = 291$, 20.01%)) included average levels of Neuroticism ($z = 0.29$), but average to lower levels of Conscientiousness ($z = -0.37$), Extraversion ($z = -0.488$), Openness to Experience ($z = -1.04$), and Agreeableness ($z = -0.99$). According to similar profiles observed before, we again adopted the "Maladapted" label for this profile.

Lastly, Profile 5 participants ($n = 122$, 8.39%) reported high levels of Openness to Experience ($z = 1$), Agreeableness ($z = 0.93$), Conscientiousness ($z = 1.12$), and Extraversion ($z = 1.25$), and low levels of Neuroticism ($z = -1.41$). This pattern again reflects the "Well-Adapted" individuals that were also found across the other regions.

Summary

The analyses from Study 1 revealed both similarities and difference on personality profiles and their distributions in five different political regions. Among all repeating profiles, average folks, well-adapted, and maladapted profiles can be put into one category, as they all can be interpreted as indicators on how well one individual is adapting and thriving in their living

context: some people strive, some people struggle, but most are in the middle. Besides these three profiles, other repeating profiles that are more indicative on unique types of characteristics also emerged, such as "Rigid & Antisocial", "Disorganized & Reclusive", as well as "Worrisome Liberals". Some profiles appear often in Republican regions and others more frequent in Democrat areas. In order to see whether the profile constructs and their distributions can be considered as stable, further replication using a different dataset will be necessary to confirm findings from Study 1.

Study 2

Although Study 1 found potentially interesting personality profiles among different political regions of the US, our analyses were all exploratory. Therefore, in order to examine whether these different personality profiles are consistent and robust, we decided to replicate our findings using a separate large sample. Study 2, then, adopted the same methodology and analyses to see whether our findings from Study 1 would replicate across samples. We hypothesize that, across the political regions, we would find a similar number of personality profiles as in Study 1 (H1). As well, the personality profiles in each region would be similar to those from Study 1 (H2). Study 2 is preregistered on OSF at https://osf.io/ap9ks/ .

Method

Participants and Procedure

A total of 3240 participants (1411 males) who were residents of the US were recruited for Study 2 via Amazon's Mechanical Turk (mturk). In order to ensure participant quality, only US residents with prior mturk approval ratings of ≥97% were recruited. Participants were recruited from 2012 to 2015. Participants who did not report or misreported their state of residence (e.g., responding with "USA") were excluded from analysis. This led to a total of 70 participants being

excluded, leaving a final sample of 3170 participants (1367 males). This final sample reported an

average age of 36.5 years old (*SD* = 12.5) and average education of 15.22 years *(SD* = 2.46).

Participants were directed to and completed all study materials online.

Materials

As in Study 1, Big Five personality was assessed using the BFAS (DeYoung, Quilty, &

Peterson, 2007).

Data Preparation and Analysis

We followed the same procedure as in Study 1 to prepare our data in OpenRefine. We

adopted the same set of LPA analyses and criteria for selecting the most optimal number of

profiles.

<div align="center">

Results

</div>

Highly Republican Region

A total of 911 (357 males) participants were categorized into the Highly Republican

region. These participants averaged 36.43 years (*SD* = 12.50), and received 15.04 years of

education (*SD* = 2.45). The LPA comparing solutions with three (AIC= 12116.26, BIC =

12222.18, BLRT = 186.137), four (AIC = 11997.66, BIC = 12132.47, BLRT = 130.602), and

five profiles (AIC = 11957.98, BIC = 12121.67, BLRT = 51.684) ended up identifying five

personality profiles in this region (Figure 2).

Profile 1 in the Highly Republican region consisted of 61 (6.70% of total participants

from this region) participants. Participants with this profile reported high levels of Neuroticism (*z*

= 1.67), average levels of Agreeableness (*z* = 0.07), average to low levels of Openness to

Experience (*z* = -0.42), and lower levels of Conscientiousness (*z* = -0.52) and Extraversion (*z* = -

1.72). This highly resembles the characteristics of the "Disorganized & Reclusive" profile

discussed in Study 1, and we therefore adopted the same label.

Profile 2 in this region ($n = 181$, 19.87%) had high levels of Neuroticism ($z = 0.61$), yet

low levels of Conscientiousness ($z = -0.70$) and Extraversion ($z = -0.58$), Openness to Experience

($z = -0.91$) and Agreeableness ($z = -1.14$). This represents the "Maladapted" personality profile.

Profile 3 included 430 (47.20%) participants. The standardized scores from this profile

revealed average-level scores for all five traits – Openness to Experience: $z = 0.06$; Neuroticism:

$z = -0.44$; Agreeableness: $z = 0.13$; Conscientiousness: $z = 0.20$; and Extraversion: $z = 0.20$. This

therefore represents the "Average Folks" personality profile.

Profile 4 included 108 (11.86%) participants. This profile was high in Openness to

Experience ($z = 0.91$), Agreeableness ($z = 0.98$), Conscientiousness ($z = 1.18$), and Extraversion

($z = 1.33$), but low in Neuroticism ($z = -1.27$). We therefore retained the "Well-Adapted" label to

describe this type of profile.

Finally, Profile 5 ($n = 131$, 14.38%) participants reported higher levels of Neuroticism (z

$= 0.78$), average to high levels of Openness to Experience ($z = 0.40$), average levels of

Agreeableness ($z = 0.20$) and Extraversion ($z = -0.14$), and slightly lower levels of

Conscientiousness ($z = -0.42$). This personality profile can be observed among individuals who

value novel experiences, but may be less goal-oriented or structured, and less emotionally stable.

These characteristics, especially levels of Neuroticism and Openness, appear to fit with the

general personality profile of the "Worrisome Liberals," as was found in previous regions in

Study 1.

Moderately Republican Region

A total of 176 (62 males) participants were categorized into the Moderately Republican region. Participants' mean age was 35.78 years ($SD = 11.62$) and on average had 15.12 years of education ($SD = 2.48$). Based on the results from our LPA comparing solutions with profiles (AIC= 2378.868, BIC = 2448.61865, BLRT = 48.72300), four (AIC= 2368.788, BIC = 2457.562, BLRT = 22.08), and five profiles (AIC= 2361.648, BIC = 2469.444, BLRT = 19.14), we identified three personality profiles in this region (Figure 4).

Profile 1 included 76 (43.18%) participants. These participants' profile revealed average-level scores for almost all five traits – Openness to Experience: $z = -0.42$; Neuroticism: $z = 0.32$; Agreeableness: $z = -0.50$ (lower); Conscientiousness: $z = -0.34$; and Extraversion: $z = -0.09$. Thus, the overall pattern of the profile fits with the "Average Folks" category.

Profile 2 ($n = 27$, 15.34%) revealed high levels of Neuroticism ($z = 1.40$), average levels of Agreeableness ($z = 0.24$) and Openness to Experience ($z = 0.28$), and lower levels of Conscientiousness ($z = -0.63$) and Extraversion ($z = -1.44$). This profile is similar to the "Disorganized & Reclusive" profile that appeared in multiple regions in Study 1.

Profile 3 in the Moderately Republican region included personality scores from 73 (41.48%) participants. These participants reported higher levels of Conscientiousness ($z = 0.62$), Extraversion ($z = 0.63$), and Agreeableness ($z = 0.50$), average levels of Openness to Experience ($z = 0.38$), and lower levels of Neuroticism ($z = -0.87$). Although slightly lower in Openness to Experience, the overall feature of this profile most closely resembles the "Well-Adapted" profile.

Swing Region

A total of 541 (247 males) participants were categorized into the Swing Region, with a mean age of 37.20 years ($SD = 13.02$) and mean education level of 14.93 years ($SD = 2.37$). The LPA comparing solutions with three (AIC= 7214.34, BIC = 7308.795, BLRT = 68.093), four

(AIC= 5352.340, BIC = 5464.101, BLRT = 64.971), and five profiles (AIC= 7168.124, BIC =

7288.340, BLRT = 59.876) identified five personality profiles in this region Figure 6).

Profile 1 ($n = 9$, 1.66%) reported high levels of Neuroticism ($z = 2.03$), average levels of

Openness to Experience ($z = -0.40$), and low levels of Conscientiousness ($z = -1.34$)

Agreeableness ($z = -1.48$), and Extraversion ($z = -2.52$). These characteristics appear to reflect

the "Disorganized & Reclusive" personality profile that emerged in Study 1.

Profile 2 ($n = 54$, 9.98%) showed high levels of Neuroticism ($z = 1.23$), average to high

levels of Openness to Experience ($z = 0.57$), average levels of Agreeableness ($z = 0.35$), and

lowers levels of Extraversion ($z = -0.54$) and Conscientiousness ($z = -1.10$). This personality

pattern is somewhat similar to what was observed in the "Worrisome Liberals" profile.

Profile 3 ($n = 197$, 36.41%) revealed average-level scores for all five traits – Openness to

Experience: $z = -0.10$; Agreeableness: $z = 0.06$; Conscientiousness: $z = 0.22$; Extraversion: $z = 0.00$; and Neuroticism: $z = -0.11$. These individuals therefore again reflect the "Average Folks"

profile.

Profile 4 ($n = 127$, 23.48%) participants reported slightly average to high levels of

Neuroticism ($z = 0.49$), average low level of Conscientiousness ($z = -0.58$), but lower levels of

Openness to Experience ($z = -0.98$), Agreeableness ($z = -0.72$), and Extraversion ($z = -0.74$). The

high Neuroticism and average to low scores in for other traits suggested a "Maladapted" type of

personality.

Profile 5 ($n = 154$, 28.47%) reported higher levels of Openness to Experience ($z = 0.80$),

Agreeableness ($z = 0.53$), Conscientiousness ($z = 0.71$), and Extraversion ($z = 0.99$), but low

levels of Neuroticism ($z = -0.85$). This suggested a typical "Well-Adapted" personality profile.

Moderately Democratic Region

A total of 66 (24 males) participants were categorized into the Moderately Democratic region. On average, participants were 39.18 years old ($SD = 14.18$) and received 15.32 years of education ($SD = 2.12$). Based on the results comparing solutions with three (AIC= 914.458, BIC = 962.630, BLRT = 34.782), four (AIC= 911.856, BIC = 973.166, BLRT = 14.601), and five profiles (AIC= 910.242, BIC = 984.690, BLRT = 13.851), we identified three personality profiles in this region (Figure 8).

Profile 1 in this region ($n = 19$, 28.79% of total participants from this region) had above average level of Neuroticism ($z = 0.44$), but generally lower levels on the remaining four traits: Conscientiousness ($z = -0.43$), Extraversion ($z = -0.33$), Openness to Experience ($z = -1.02$), and Agreeableness ($z = -0.56$). Similar to the patterns previously observed in the Swing regions, these individuals appear to reflect the "Maladapted" profile.

Profile 2 in this region ($n = 34$, 51.52%) revealed average to slightly higher levels of Openness to Experience ($z = 0.34$), Conscientiousness ($z = 0.33$), Agreeableness ($z = 0.31$), and Extraversion ($z = 0.31$), but lower levels of Neuroticism ($z = -0.81$). This pattern is therefore most similar to the previous observed "Well-Adapted" profile.

Profile 3 ($n = 13$, 19.70%) showed higher levels of Openness to Experience ($z = 0.79$) and Neuroticism ($z = 1.46$), average levels of Agreeableness ($z = 0.10$), and average low levels of Extraversion ($z = -0.27$) and Conscientiousness ($z = -0.16$). This personality pattern is similar to "Worrisome Liberals" therefore we adopt this name to describe the current profile.

Highly Democratic Region

A total of 1476 (677 males) participants were categorized into the Highly Democratic region. The mean age in this group was 35.90 years ($SD = 12.29$), and mean years of education received was 15.44 ($SD = 2.50$). The LPA comparing solutions with three (AIC= 19671.050,

BIC = 19787.586, BLRT = 223.428), four (AIC= 19509.504, BIC = 19657.823, BLRT = 173.547), and five profiles (AIC= 19393.682, BIC = 19573.783, BLRT = 127.822) identified five personality profiles in this region (Figure 10).

Profile 1 in this region (n = 44, 2.98%) showed high level of Neuroticism (z = 1.66), but generally low levels of Conscientiousness (z = -0.79) Extraversion (z = -1.84), Openness to Experience (z = -1.68) and Agreeableness (z = -0.34). Based on similar profiles observed previously, we retained the "Maladapted" label for this profile.

Profile 2 participants (n = 345, 23.37%) showed average levels of Neuroticism (z = 0.33), average to low levels of Conscientiousness (z = -0.42) and Extraversion (z = -0.35), as well as low levels of Openness to Experience (z = -0.74) and Agreeableness (z = -1.09). These patterns, specifically the low Openness to Experience and Agreeableness, are similar to the ones observed in the previous "Rigid & Antisocial" profiles.

Profile 3 (n=653, 44.24%) participants reported average-level scores for all five traits – Openness to Experience: z = 0.15; Agreeableness: z = 0.25; Conscientiousness: z = 0.29; Extraversion: z = 0.33 and Neuroticism: z = -0.34. This profile resembles the "Average Folks" profiles from previous regions.

Profile 4 participants (n = 158, 10.7%) reported high levels of Openness to Experience (z = 1.07), Agreeableness (z = 0.95), Conscientiousness (z = 1.20), and Extraversion (z = 1.36), and low levels of Neuroticism (z = -1.32). This pattern again reflects the "Well-Adapted" individuals who were also found across the other regions.

Profile 5 (n =276, 18.7%) reported high levels of Neuroticism (z = 0.86), average levels of Openness to Experience (z = 0.24) and Agreeableness (z = 0.31), and, specifically, low levels

of Conscientiousness ($z = -0.72$) and Extraversion ($z = -0.80$). Individuals in this profile appeared

most similar to the "Disorganized & Reclusive" personality profiles found previously.

Summary

Findings from Study 2 confirmed several of our findings from Study 1. First, the numbers

of personality profiles from each region in Study 2 largely match the ones from Study 1.

Secondly, several previously observed personality profiles emerged repeatedly in the Study 2

sample (see Table 1 for summary). These findings add more weights to our argument that stable

personality profiles and their variations exist among residents living in different political regions

in the US.

	Study 1	**Study 2**
Highly Republican Region	Independent & Free-Spirited (3.69%) Rigid & Antisocial (16.31%) Well-Adapted (11.06%) Average Folks (53.05%) Disorganized & Reclusive (15.89%)	Disorganized & Reclusive (6.70%) Maladapted (19.87%) Average Folks (47.20%) Well-Adapted (11.86%) Worrisome Liberals (14.38%)
Moderately Republican Region	Well-Adapted (5.08%) Highly Republican (20.00%) Average Folks (57.06%) Disorganized & Reclusive (16.38%)	Average Folks (43.18%) Disorganized & Reclusive (15.34%) Well-Adapted (41.48%)
Swing	Disorganized & Reclusive (4.25%) Maladapted (22.15%) Average Folks (44.25%) Well-Adapted (4.75%) Worrisome Liberals (24.5%)	Disorganized & Reclusive (1.66%) Worrisome Liberals (9.98%) Average Folks (36.41%) Maladapted (23.48%) Well-Adapted (28.47%)
Moderately Democratic Region	Rigid Conservatives (4,62%) Maladapted (29.23%) Average Folks (50.77%) Well-Adapted (15.38%)	Maladapted (28.79%) Well-Adapted (51.52%) Worrisome Liberals (19.70%)
Highly Democratic Region	Disorganized & Reclusive (7.57%) Worrisome Liberals (20.01%) Average Folks (44.02%)	Maladapted (2.98%) Rigid & Antisocial (23.37%) Average Folks (44.24%) Well-Adapted (10.7%))

	Maladapted (20.01%) Well-Adapted (8.39%)	Disorganized & Reclusive (18.7%)

Table 1: Summary of personality profiles in five regions across Study 1 and Study 2

Discussion

The present study set out to explore whether there are different personality profiles within different political regions in the US. By clustering within each political region across two large samples with a total of more than 6,000 participants, we found a wide range of different personality profiles from Highly Republican to Highly Democratic regions. Although there were overlapping personality profiles across the regions, each region also was made up of their own distinct patterns of personality profile combinations. Interestingly, we observed profiles representing both individuals with well-adaptive personalities, as well as maladaptive personalities (including profiles with high levels of Neuroticism, which is generally negatively associated with important life outcomes, e.g., Ozer & Benet-Martinez, 2006), across almost all of the regions. This suggests that these types of personality profiles may potentially be removed from political ideology, as they are ubiquitous across the US. On the other hand, we observed other personality profiles that are unique to only one or two regions but not in others. For example, the "Independent & Free-Spirited" profile was only found among Highly Republican regions in Study 1. Given that Republican regions are generally lower on state-level Openness to Experience (Rentfrow et al., 2008), these individuals may likely be "outliers" in the region, i.e., non-conformist, free-spirited individuals who act against the social norm. As such, they may also be lower in Agreeableness, in order to be able to maintain their own ideals and values without yielding to their surroundings.

Another interesting finding was that the "Disorganized & Reclusive" and "Rigid & Antisocial" clusters have emerged in different political regions, suggesting that these personality

patterns are not distinct liberal or conservative personalities, per se. In both Study 1 and Study 2, the "Disorganized & Reclusive" profile appeared in all regions except the Moderately Democrat region, whereas the "Rigid & Antisocial" profile appeared in both Republican regions and the Highly Democratic region. While both profiles are manifested in aversion for social contact and social relationships, the "Disorganized & Reclusive" profile tend to be much lower in Conscientiousness, whereas the "Rigid & Antisocial" profile tend to be lower in Openness to Experience. Thus, is may be that these two profiles represent special cases of maladaptive personality characteristics, with one being the consequence of low Conscientiousness and the other the consequence of low Openness. Given the specific regions that these profiles appear in, it might be the case that "Disorganized & Reclusive" characterized poor-adapted liberals in different regions, while "Rigid & Antisocial" characterized poor-adapted conservatives.

Furthermore, it is also worth noting that these two types of profiles appeared more prominently in regions with stronger party affiliations, i.e., Highly Republican and Highly Democratic regions. This may therefore suggest that individuals who exhibit more extreme political endorsements to either end of the political spectrum are more similar to each other rather than to their more moderate counterparts. The radicalization of political ideology has been proposed to be motivated by the perceived loss of significance and dissatisfaction towards one's current situation (Kruglanski et al., 2014). Given that these two personality types capture poorly-adapted individuals in their living environments, it is possible that their dissatisfaction towards their living situations could lead them to become more extreme in their political ideology and endorsements. Work by van Prooijen and Krouwel (2019) proposed several psychological features of political extremism (regardless of which end of the spectrum), which include psychological distress originating from perceived uncertainty, cognitive simplicity,

overconfidence, and intolerance. It is possible that these psychological features are related to differences in personality traits (e.g., intolerance may be predicted by low Openness and low Agreeableness). Future work would benefit from examining how processes underlying political extremism may be related to differences in personality expression.

Some work (e.g., Motyl, 2014; Motyl, Iyer, Oishi, Trawalter, & Nosek, 2014; Motyl, 2016) has suggested that individuals may be more likely to settle down in regions with residents who share similar political ideologies to their own, therefore creating a congruency between an individual's own political orientation and the political leaning of their community. Thus, it may be possible that individuals with more extreme or pronounced personality profiles would eventually seek out regions with similar others. Given the increasing regional political gap in the US (Johnston, David, & Jones, 2016), we believe that in order to determine the underlying cause behind the current political divide, exploratory and confirmatory work looking at the dynamic of personality traits, political ideologies, as well as their interactions, would provide a better understanding of the "topology" of political polarization on a variety of levels.

Limitations and Future Directions

One limitation of our current study is that, although we have two relatively large samples in our analysis, it could still be improved to obtain an even more representative sample of the US population. It is also likely that our sample may not consistently reflect the actual population distribution of the US states (e.g., there are no participants from North Dakota in our Study 2 sample), which might lead to overweighing participants from certain states more than others in our analyses. Future work would benefit from examining larger, publicly available datasets to see whether the same patterns of results would hold constant.

Second, although our analyses revealed interesting, consistent patterns across different political regions, with these patterns being replicated using two different methods (two-step clustering, latent profile analysis) and across two large samples, it remains that our research questions were still exploratory in nature. Therefore, it would be of utmost importance to not only replicate the current findings in different samples, but to also examine how these profiles may be relevant to other social outcomes (e.g., voting patterns). The present studies serve as a stepping-stone for future work that examines how differences in personality profile may relate to important social phenomena.

Finally, future studies would benefit from analyses of personality differences in more nuanced regional differences, e.g., comparing different cities/towns, counties, or zip codes. Using such detailed residence information could provide more insights into the interplay between personality characteristics, geographical differences, and political orientation.

Conclusion

In personality research, latent profile analysis has increasingly been applied to identify specific personality profiles. However, although previous approaches have looked at personality profiles among populations in different age groups, different sample sizes, and different Big Five scales, none of the studies explored the similarities and differences in personality profile through a between group/geographical/political perspective. Our study adds onto existing research by incorporating latent profile analysis as a tool to explore the heterogeneity of residents' personality profiles among different political regions. The present work may serve as a stepping-stone to explore and explain increasing political polarization at both the ideological and geographical level.

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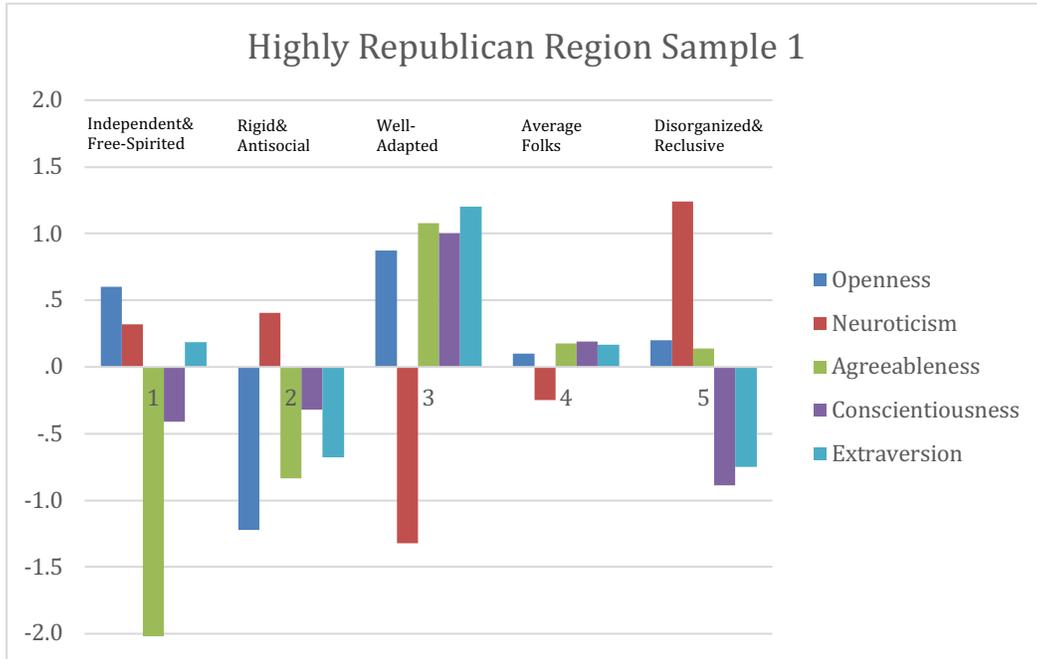
Figure 1: Profiles of personality traits in Highly Republican Region
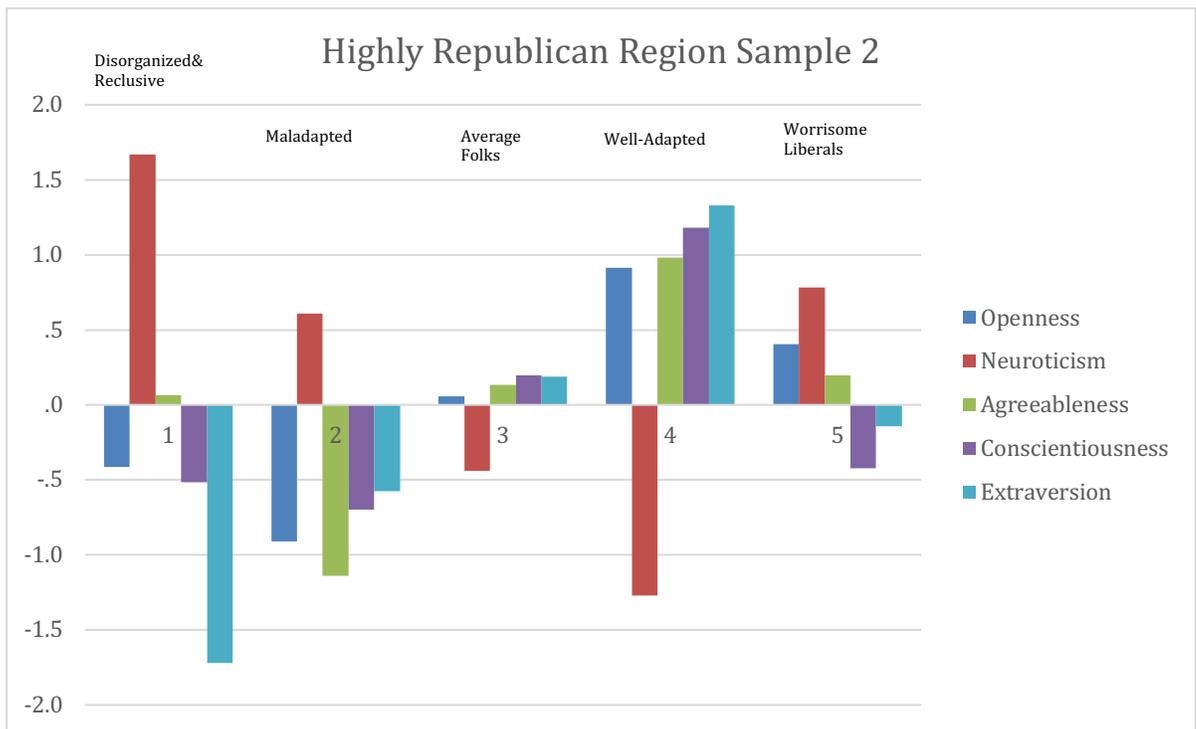
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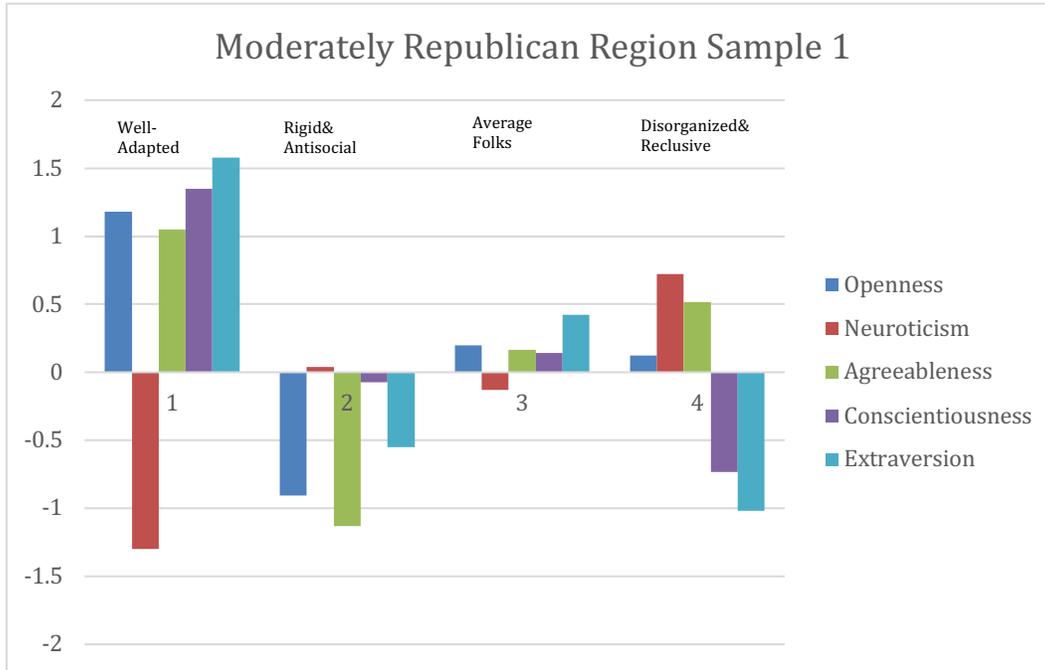
Figure 3: Profiles of personality traits in Moderately Republican Region
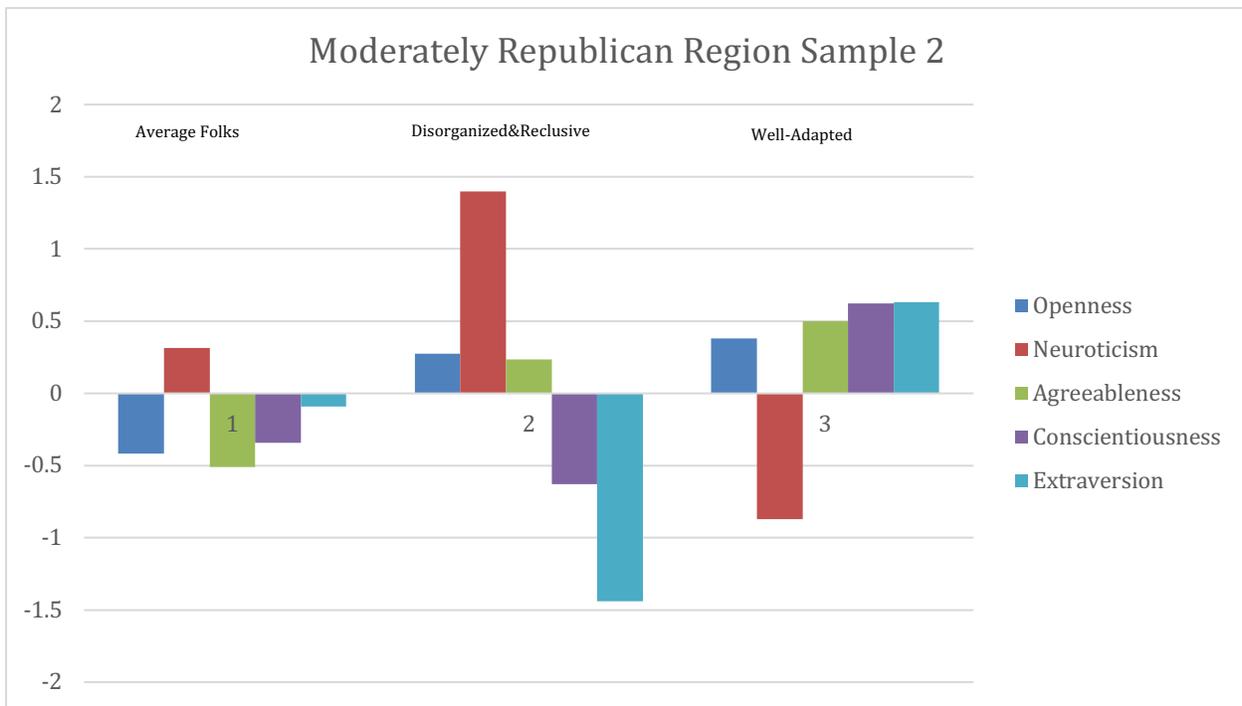
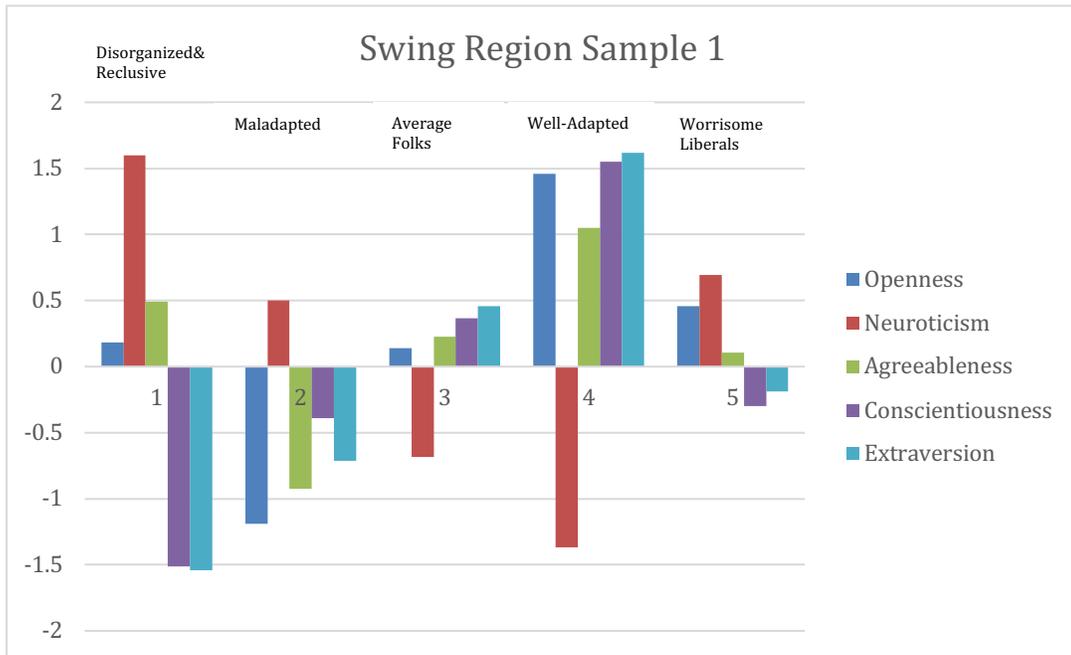*Figure 4*: Profiles of personality traits in Moderately Republican Region

Figure 5: Profiles of personality traits in Swing Region

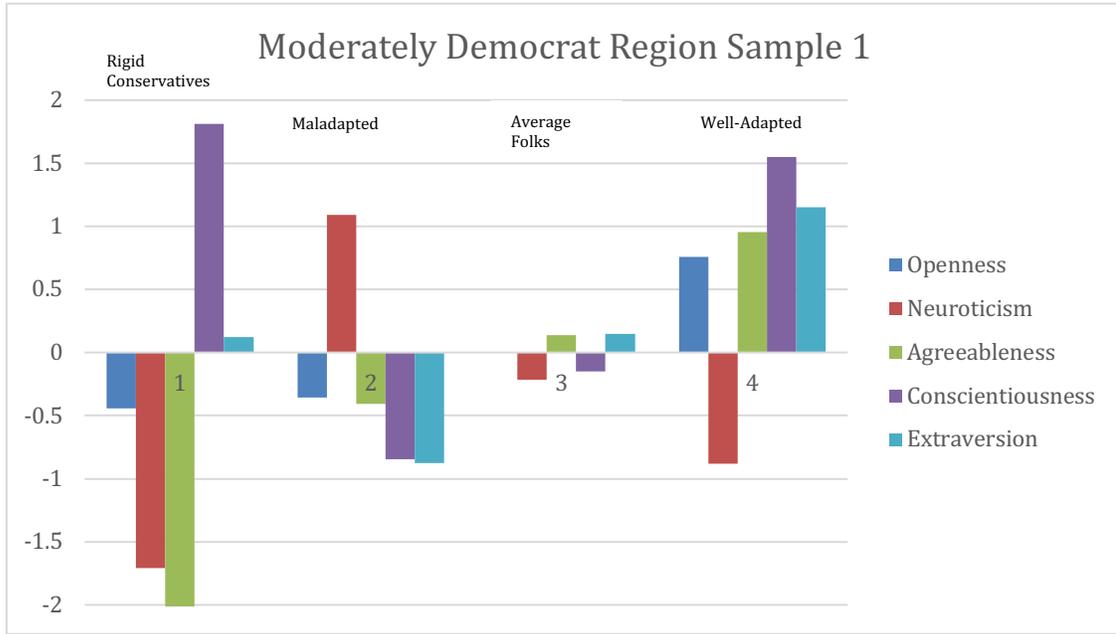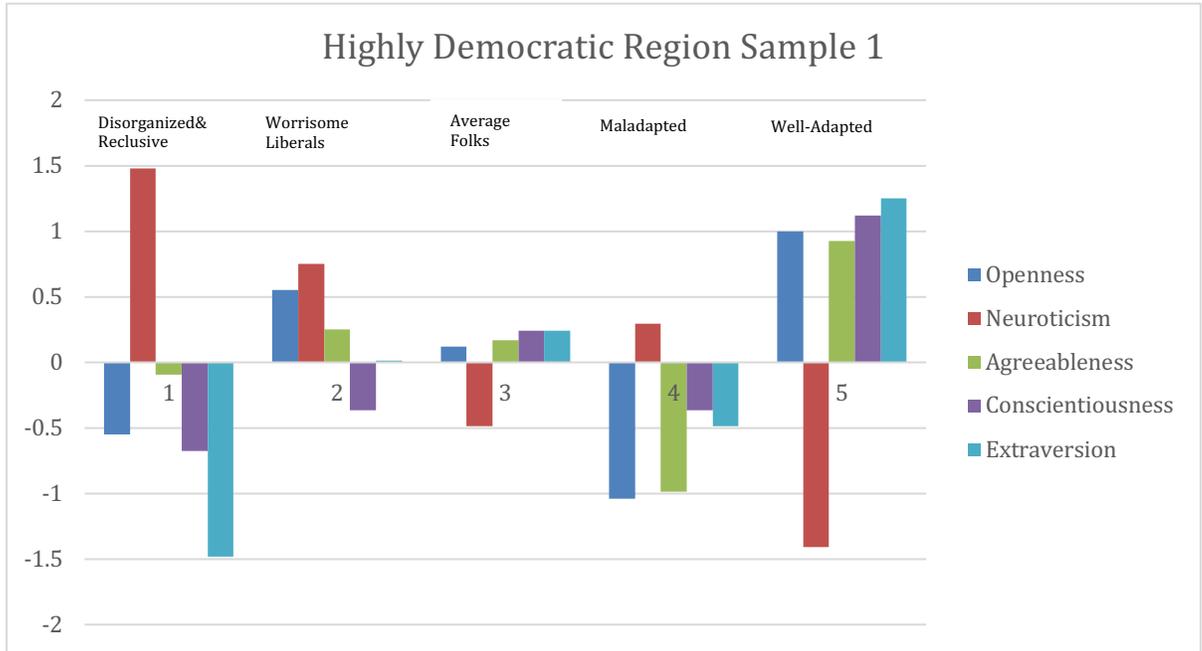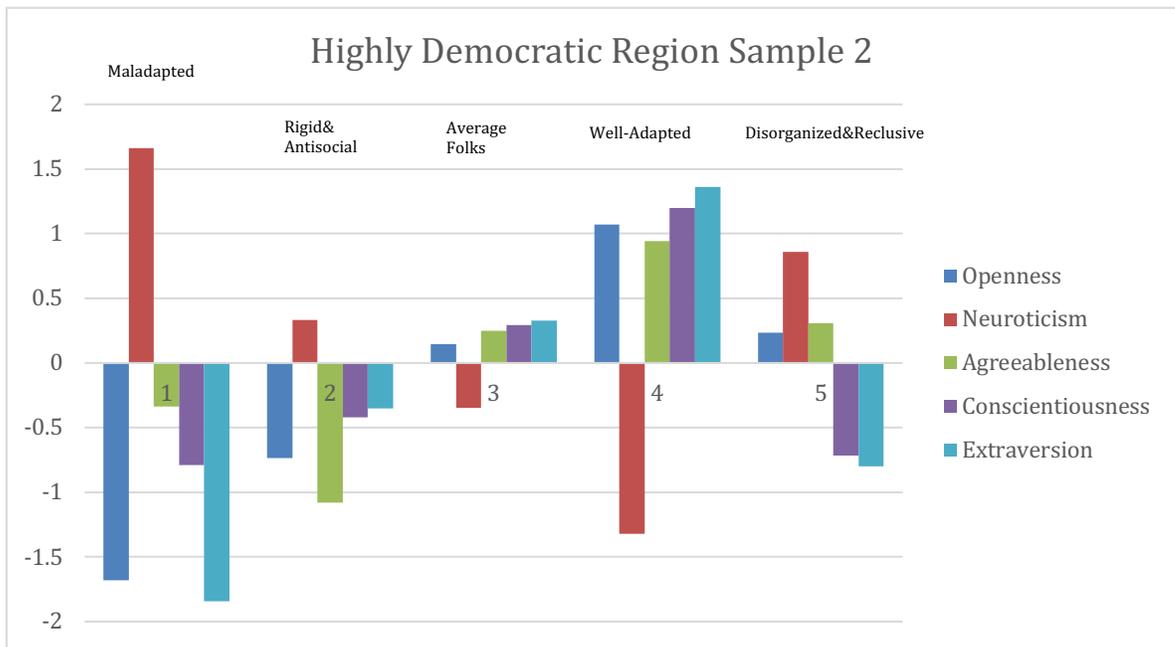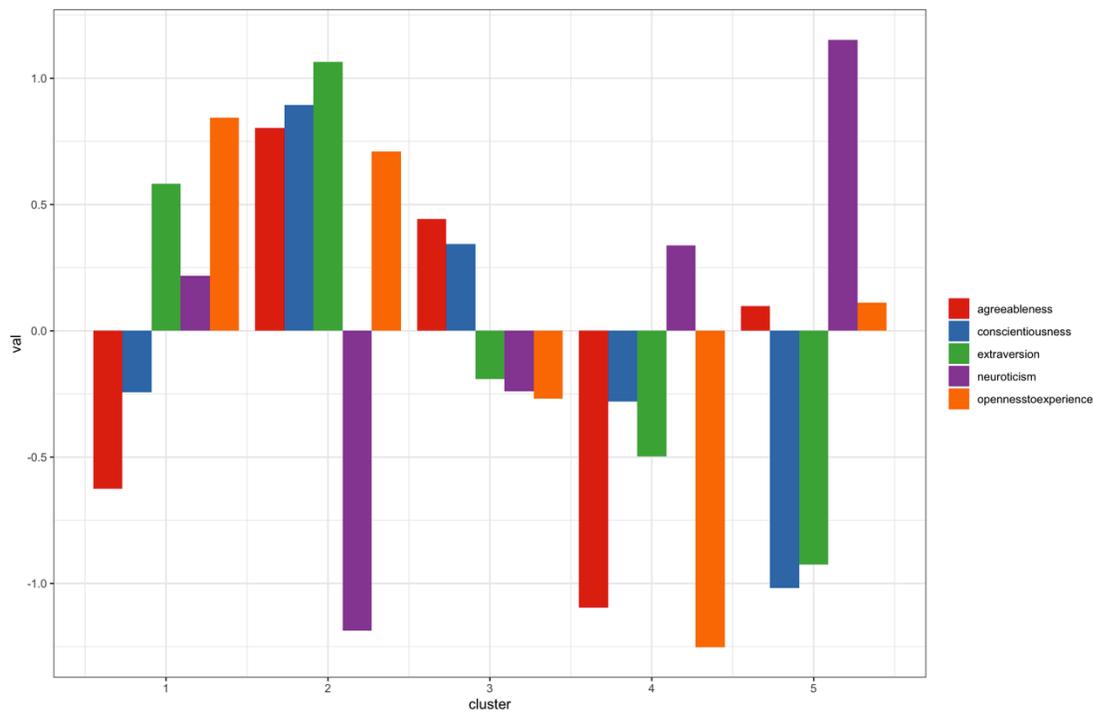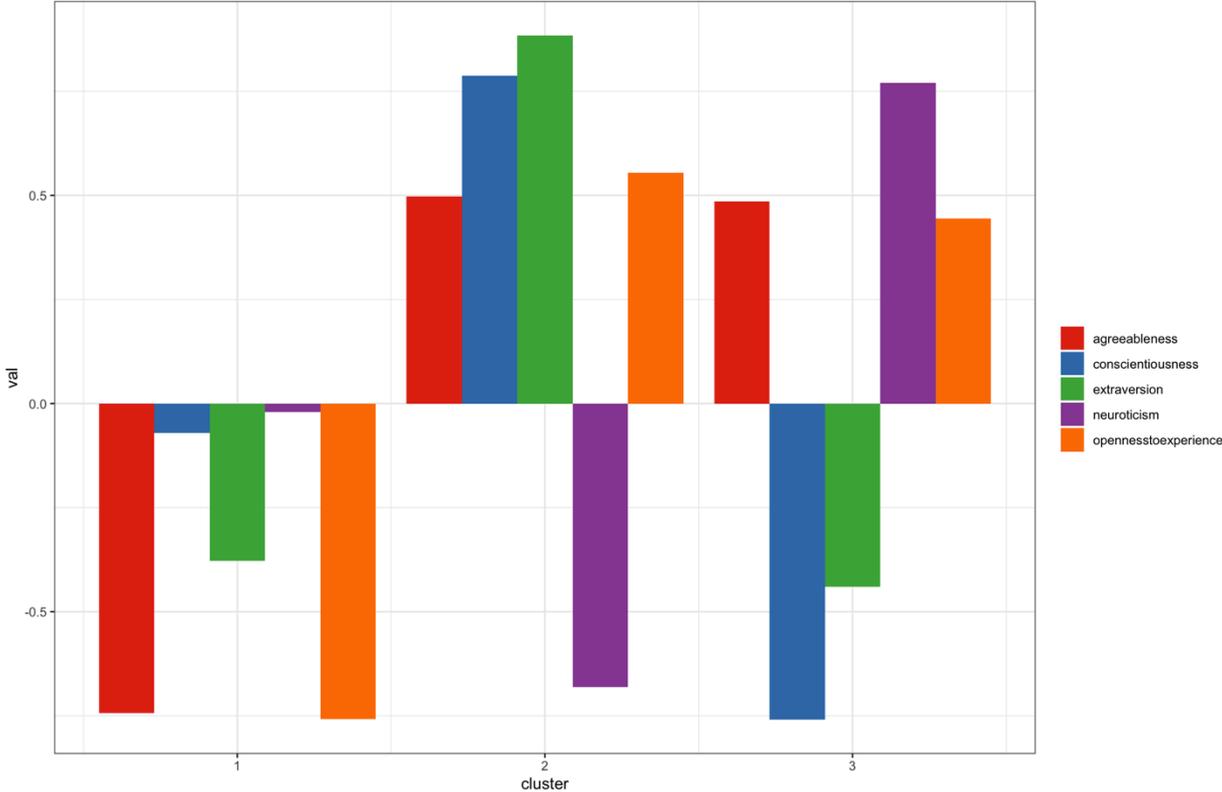*Figure 6*: Profiles of personality traits in Swing Region

Figure 7: Profiles of personality traits in Moderately Democratic Region
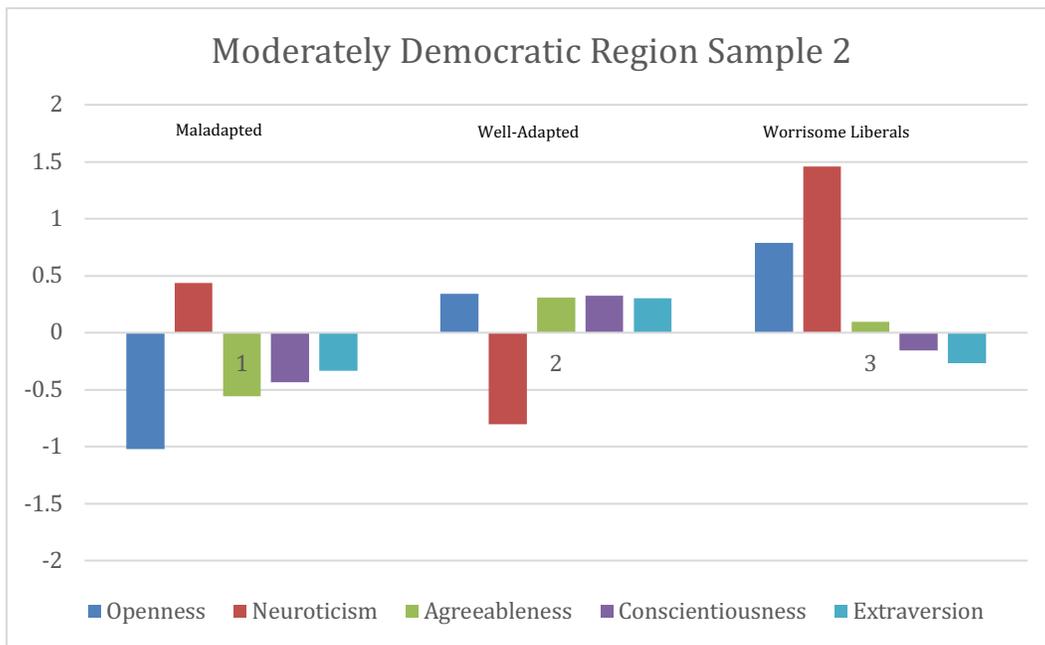
Figure 8: Profiles of personality traits in Moderately Democratic Region

Figure 9: Profiles of personality traits in Highly Democratic Region

Figure 10: Profiles of personality traits in Highly Democratic Region

Appendix I: Pilot study

We conducted our pilot analysis on the Study 1 dataset using the two-step clustering technique, which consists of an initial hierarchical clustering and a follow-up k-means clustering among participants in five different regions in Study 1. The analysis was conducted using R package "prcr" for all five regions. The result is summarized in following plots.

Figure A1: Clusters of personality traits in Highly Republican Region

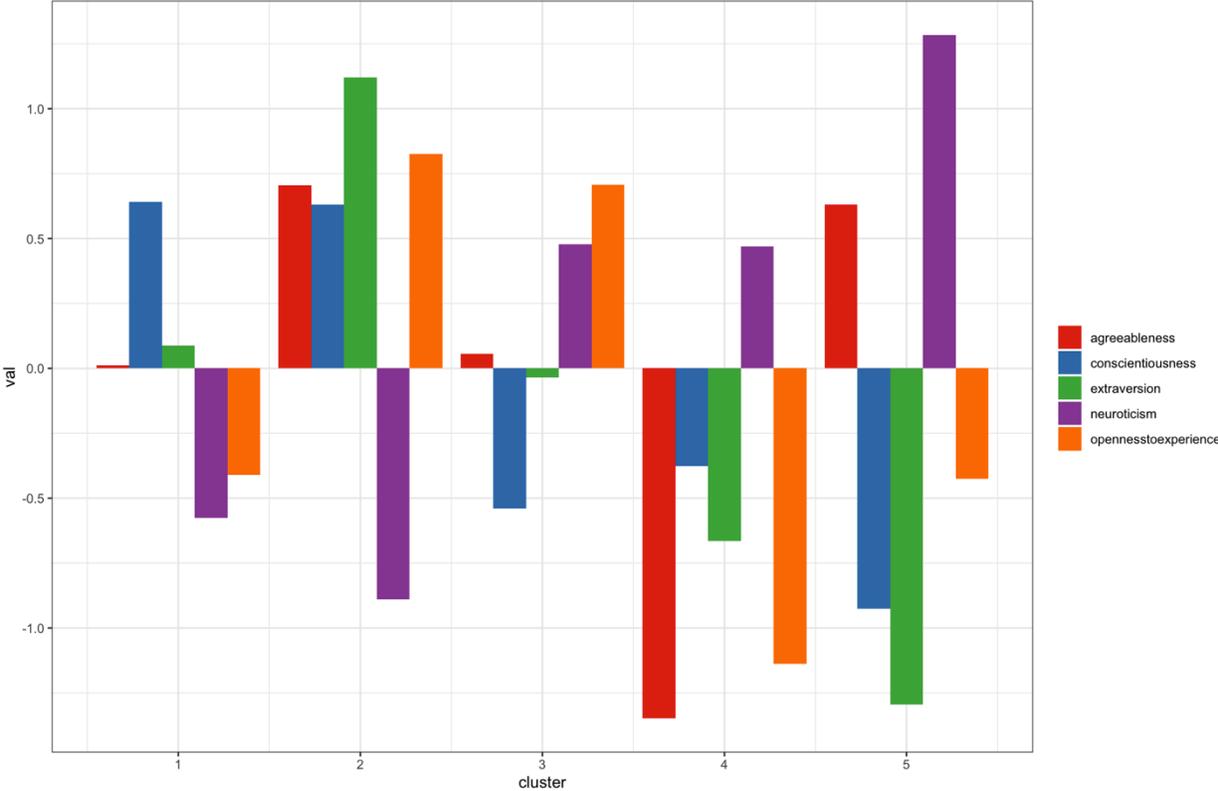*Figure A2*: Clusters of personality traits in Moderately Republican Region

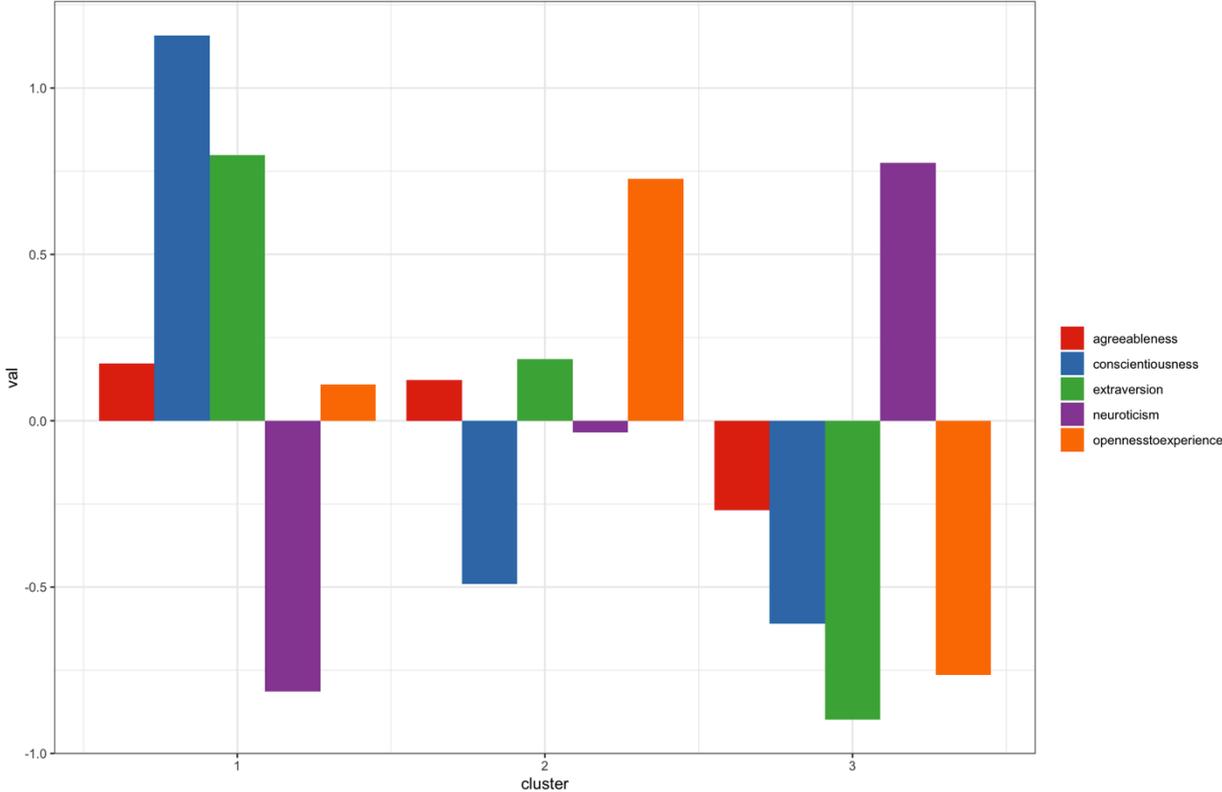*Figure A3*: Clusters of personality traits in Swing Region

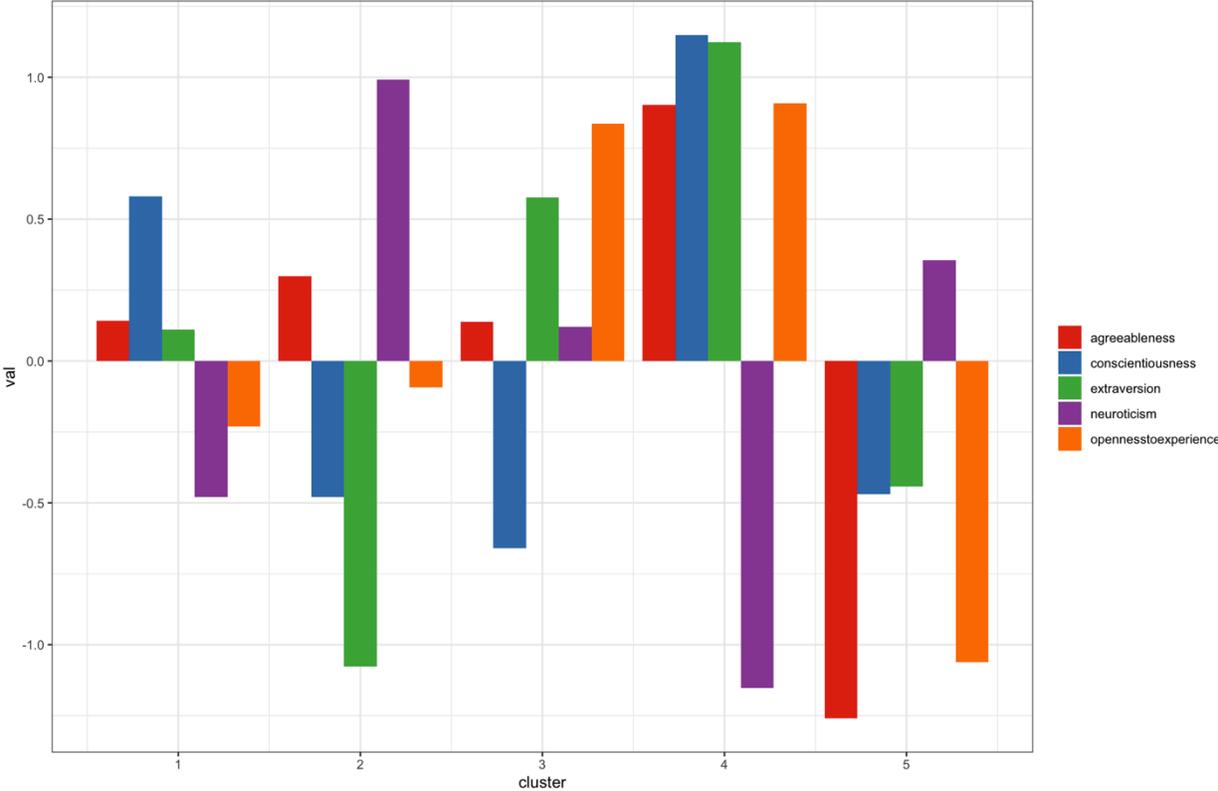*Figure A4*: Clusters of personality traits in Moderately Democratic Region

Figure A5: Clusters of personality traits in Highly Democratic Region