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Brexit and the relevance of regional personality traits: more psychological Openness could have swung the regional vote

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This article adds a psychological perspective to help explain the regional Brexit vote. Based on an extensive dataset with personality traits, combined with socio-economic data, our findings suggest that the regional clustering of these personality traits contribute to an understanding of the regional dispersion of the Brexit vote. We find evidence that psychological ‘Openness’ is the personality trait that matters most and that modest changes in this trait could actually have swung the vote across UK districts. Moreover, the relevance of psychological Openness solves the puzzle that UK districts that are relatively dependent on trade with the EU predominantly voted for Leave. By including psychological factors, our results show how we can arrive at a better understanding of the geography of the discontent with globalisation.

Keywords: Brexit, Big Five personality traits, economic integration, globalisation

JEL Classification: R10, R12

Introduction

In the referendum held in June 2016, the UK population voted to leave the European Union, after some 44 years of membership. Ironically, just as it was a Conservative Government (under the leadership of Edward Heath), that took the UK into the European Union (then called the European Economic Community) in 1972, so it was another Conservative Government, under the leadership of David Cameron, that—perhaps contrary to the latter’s expectation—initiated the process of the nation’s withdrawal

from that Union. Backed by predictions as to the alleged negative political and economic consequences for the UK of leaving the EU (Dhingra et al., 2016; HM Treasury, 2016), the outcome of the Brexit referendum came as a shock to the political establishment in and outside the UK, as well as to many academic and policy experts who predominantly had warned of dire consequences of Brexit, as documented in Becker et al. (2017) and Los et al. (2017). Various analyses have been conducted to identify the factors—economic, demographic and

social—behind the Brexit vote. It has been found that the fault line between voting ‘Leave’ or ‘Remain’ can be attributed to various individual characteristics, such as, income, education, employment status and age (Clarke et al., 2017; Curtice, 2017). In broad terms, individuals with higher incomes, higher levels of education, working in higher skilled and professional jobs, and in younger age bands tended to vote to Remain, and vice versa to Leave.

But intersecting with these personal attributes, a very prominent fault line is also present in a spatial or geographical sense (see Figure 1), which is the focus of our article. As opposed to urban districts in Southern England such as (large parts of) London, Cambridge, Oxford and Bristol, the

vast majority of English districts, and notably rural and Northern urban ones, voted for Leave. In a comprehensive study of the Brexit vote for the 380 local authority districts (LAD) in the UK, researchers (Becker et al., 2017) conclude that a LAD’s vote share can be well understood by a region’s profile in terms of its age, education or (former) dependence on manufacturing. In addition to these fundamental demographic and economic determinants, regional differences in immigration and the impact of policy measures by the Cameron government also appeared to play a significant role.

Many districts of the UK that are relatively strongly intertwined with the EU voted for Leave. It has been shown (Los et al., 2017) that, in particular, Northern UK districts that are

Figure 1. *The Brexit vote across the UK local authority districts (LADs).*

Note: Blue (dark) = LAD districts with Leave majority; orange (light) = LAD districts with Remain majority.

Source: <http://www.bbc.com/news/uk-politics-36616028>.

relatively dependent for their employment on trade with the rest of the EU, predominantly voted for Leave. The outcome of this referendum seems exemplary of a more general backlash against economic integration or globalisation and specifically indicates that this backlash is spatially clustered. The explanations for this so-called ‘geography of discontent’ (Los et al., 2017) up till now have been mainly attributed to regional differences in demographic, economic or political circumstances.

In order to explain the paradoxical result where regions seem to vote against their (own) interest, and while not discarding any of the demographic, economic or policy drivers of the Brexit vote, we argue that what is lacking in the analysis of the regional differences of the Brexit vote is a psychological perspective (Kaufmann, 2016). Following the recent research on ‘geographical psychology’ (Rentfrow et al., 2008, 2015) in which it is shown that there are robust regional differences in personality traits that are associated with a range of regional social–economic indicators (Rentfrow, 2010, 2013; Rentfrow et al., 2008, 2015), we will investigate the relevance of regional personality traits for the Brexit vote.

The aim of our article is to assess the relevance of the regionally clustered personality traits against the other explanations of the regional Brexit vote that have been thus far offered by the literature. We do so by using the unique data set from Rentfrow et al. (2015), which consists of the personality scores of more than 400,000 UK residents, and combine these data with the detailed dataset used by Becker et al. (2017) in their Brexit paper.

Although the empirical analysis of our paper concerns the relevance of the regionally clustered personality traits for the regional Brexit vote in the UK, it could be argued that our findings have wider implications when it comes to the ‘geography of discontent’. This discontent regarding economic openness or more generally globalisation is also apparent in other recent elections where anti-establishment

‘populist’ voting behaviour has had a distinctive geographical pattern.¹ An obvious example is the US 2016 presidential election, where the successful candidate, Donald Trump, explicitly campaigned against globalisation. He did particularly well in US regions that are not only subject to foreign competition (Autor et al., 2016) but also display certain regionally clustered personality traits (Rentfrow et al., 2013). A second recent example seems to be the German national elections in September 2017, where the party that most strongly opposes economic integration and particularly the free movement of migrants, *Alternative für Deutschland*, did particularly well in those regions and states (Eiermann, 2017) that show an above-average score on certain personality traits associated with specific economic and political conditions (Obschonka et al., 2013).

In the next section, we provide a theoretical background on the relationship between personality traits and voting behaviour. Building on this conceptual basis, we then turn to an analysis of the evidence relating to the role of psychological factors in shaping the Brexit vote and its geographies.

A regional psychological perspective

The assumption that economic self-interest would be the main driver for voting behaviour ignores the possibility that such behaviour is explained by a wide range of attitudes, feelings and perceptions, as is shown in the psychological literature (Gerber et al., 2011). Research shows that an individual’s personality traits are a strong predictor of individual political preferences. In the psychological literature, these traits are commonly referred to as the ‘Big Five’: Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism (John and Srivastava, 1999). The ‘Big Five’ is a widely accepted framework for understanding personality traits, which are broad dispositions expected to influence all kinds of behaviour across a range of contexts (John et al., 2008).

More specifically, when it comes to voting outcomes, there is clear evidence indicating that personality traits matter for individual political attitudes and outcomes (Gerber et al., 2011). It has been found that the trait Openness is strongly positively associated with liberal attitudes and corresponding voting patterns, whereas the trait Conscientiousness is associated with conservative attitudes and voting outcomes. More recently, using a panel of 4000 US citizens, it has been found that higher degrees of Neuroticism and Openness were associated with voting for Hillary Clinton in the 2016 US presidential elections (Samek, 2017). Similarly, higher scores on Extraversion and Conscientiousness tended to be correlated with voting for Donald Trump. These findings are in line with more general findings in the political science literature (Gerber et al., 2011, 2012). Also with respect to the issues that played a prominent role in the run up to the Brexit referendum, such as the individual attitudes towards immigrants, it has been found that the Big Five personality traits help to explain the individual variation in these attitudes, with Openness and Conscientiousness scores being positively and negatively related respectively to attitudes towards immigrants (Dinesen et al., 2016). In addition, research also shows that the Big Five personality traits are correlated with different attitudes with respect to the European Union (Bakker and De Vreese, 2016) or foreign policies more generally (Schoen, 2007).

Crucially, personality traits not only explain individual voting behaviour, but research shows that individual personality traits tend to be *regionally* clustered (Rentfrow et al., 2015). This potentially offers an explanation for the above-mentioned regional differences in the Brexit referendum (see Figure 1). As to the reasons why these personality traits are found to be regionally clustered, three mechanisms have been put forward (Rentfrow et al., 2015). The mechanism that is of particular relevance to understanding regional voting behaviour is the role of social influence, which implies

that a region's long-standing social traditions and social practices gradually shape social norms, which in turn affect people's attitudes and personality traits (Rentfrow et al., 2015). There is strong evidence that variations in these personality traits across regions are associated with a wide array of regional economic indicators (Rentfrow et al., 2013). For UK cities it is, for instance, shown that regionally clustered Big Five personality traits matter for regional economic growth (Garretsen et al., 2017).

More specifically, results from studies in the USA, UK and Germany suggest that regionally clustered Openness is a relevant trait in explaining economic outcomes. The Openness trait captures intellectual curiosity and preferences for other (or new) ideas and influences, and it is thought to differentiate between more open- and close-minded individuals. Several studies show that regions with high levels of Openness have more robust and resilient regional economies compared to areas where Openness is lower (Obschonka et al., 2015, 2016). One key aspect of this association concerns the link between Openness (and other Big Five measures such as Conscientiousness) and innovation (Lee, 2017; Obschonka et al., 2015).

We hypothesise that, in particular, Openness will be a relevant personality trait for explaining the dispersion of the regional Brexit outcomes as illustrated in Figure 1, as has been first suggested by Krueger (2016) after Bastian Jaeger. This hypothesis is first of all based on the fact that empirical studies show how regionally clustered Openness matters for regional economic outcomes in general. Moreover, the case of Brexit is in itself an example how the external environment (here EU integration) impacts on a region, and whether this is seen as an opportunity or a threat. This is precisely what is at the heart of the trait Openness, which measures how conventional and traditional people are in their outlook. Low scores on Openness indicate a more inward-looking attitude and a preference for familiar routines instead of new

experiences. Regions whose populations score higher on Openness can thus be hypothesized to view EU membership as an opportunity, whereas low scoring regions might see the same membership more as a threat. This line of reasoning may explain the apparent paradoxical outcome that those regions with a higher degree of exposure to EU trade returned a higher percentage of Leave vote. The tendency for regions with higher exposure to EU trade to vote for Brexit may have reflected an inherent lack of Openness (or a higher degree of economic self-interest) on the part of their populations, perhaps itself born of a fear of the economic threat posed by European competition, a distrust of European institutions and a feeling of lack of self-determination ('sovereignty').

To sum up our contribution, this study crucially differs from existing work on the relationship between personality traits and voting behaviour in that we use the regional clustering of personality traits to help understand the Brexit vote at a higher, that is regional, level of aggregation. In addition, by using the clustered values of the Big Five personality traits at a regional level, we are able to confront psychological factors with the most important economic and demographic factors that have thus far been suggested to be relevant for the regional Brexit vote.

It should be stressed that our analysis focuses only on the relationship between regionally clustered personality traits on the one hand and the regional Brexit vote on the other hand, while controlling for other regional level determinants of that vote. The idea to analyse the outcomes of the Brexit referendum at a regional level, while using regional data or predictors that are compiled of individual data, is in line with other studies into the topic of the Brexit vote (Becker et al., 2017), and more generally in line with research in both economic geography (Garretsen et al., 2017) and geographical psychology (Rentfrow et al., 2015). In doing so, we cannot make claims or inferences about the link between an individual's personality traits

and that individual's Brexit vote because this would call for a different research design, like the one used by Gerber et al. (2011). Since the aim of our article is to explain the *regional* dispersion in the Brexit vote, and the possible relevance of *regionally clustered* personality traits, we deliberately refrain from an analysis of the relevance of personality traits at the level of the individual voter. This also implies that our study is not subject to the well-known ecological fallacy, whereby erroneously a correlation between variables at the aggregate group-level is also thought to apply at the relationship between these variables at the individual level.

The empirical analysis

Our geographical units of analysis are the 380 UK LADs, which are also the units of observation in the regional analysis of the Brexit vote in the comprehensive Brexit analysis by Becker et al. (2017). For each LAD, we utilise unique data on the Big Five personality traits (Rentfrow et al., 2015). Based on a survey of more than 400,000 residents, this data set provides information on individual personality attributes across all 380 LADs (Jokela et al., 2015). Answers to 44 Likert-type short statements were recorded for each participant, and a principal component analysis was performed to extract the five underlying factors of Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. Analyses of the five scales revealed satisfactory internal reliability (Cronbach's $\alpha = 0.86, 0.77, 0.83, 0.83$ and 0.79 for Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness, respectively) (Rentfrow et al., 2015).² To arrive at a district score for each of the Big Five personality traits, we took the average score for each trait for the respondents within a LAD district. This is exactly the same as was done by previous studies with clustered Big Five personality traits for the UK (Rentfrow et al., 2015).

In addition to the regionally clustered Big Five personality traits and the regional Brexit vote, we include a number of relevant control variables at the regional level, taken from other studies into the regional Brexit outcome, notably Becker et al. (2017). These are as follows: proportion of employment in manufacturing, unemployment rate, average age of the adult population, population size, level of higher educated people, number of educational qualifications, immigration and a dummy for Scotland (for exact definitions, see Becker et al., 2017; for data source, see <https://www.ons.gov.uk/>). Additionally, we also make use of control variables for the respondents of the Big Five questionnaire, where the individual respondents' data are aggregated to the LAD level by taking averages per district. See Table A1 in the Appendix for definitions of these data (Rentfrow et al., 2015).

Our findings are given in Table 1, using the Remain vote (as % of the total vote per district) as the dependent variable to be explained. As a benchmark, following earlier studies on Brexit results (Becker et al., 2017; Los et al., 2017), column (1) in Table 1 shows the estimation results when we focus on some of the most important economic and demographic determinants that have been found to date (Becker et al., 2017). In line with the findings of Becker et al. (2017), Table 1 shows that the Remain vote was significantly higher in LAD districts that are Scottish, larger, with a population that is younger, better educated and/or with a lower proportion of immigrants. In economic terms, we find that districts with more manufacturing employment or a higher unemployment rate show a lower Remain vote.

Column (2) shows much of the variance in the Remain vote share can be explained by the regionally clustered Big Five personality traits for the 380 LAD districts. First, note that all Big Five measures on their own have a significant impact and their combined impact is substantial. Note too that the estimation results in column (2) are based on a specification that not

only includes the Big Five personality traits but also the controls gender, age, ethnicity, income and unemployment status of the respondents that took part of the survey (these controls contribute 0.138 of total 0.643 in the adjusted R^2); see the Appendix. By far the strongest impact comes from Openness. Note that, on the basis of the model used here, a 1 SD change on the LAD level in Openness would imply a 5.87% increase in the Remain vote (more than enough to have swung the actual vote). In a univariate regression with Openness as the explanatory variable for the Remain vote share, the adjusted R^2 is 0.453.

Confronting the Big Five variables with the socio-economic and demographic variables, (see column (3) of Table 1), we find that three of the five Big Five variables are still significant, with Openness again being a very relevant trait. Similarly, when compared to column (1), the coefficients for the share of manufacturing employment and the unemployment rate are now smaller or even insignificant, respectively. Also, the size of the higher education variable drops markedly. This points to the fact that, as previous research for the UK regions has shown, regional economic variables and the regionally clustered Big Five variables are related (Garretsen et al., 2017). This finding would raise endogeneity issues, if regional economic variables are to be explained by regional clustered Big Five variables (see for example Lee, 2017; Stuetzer et al., 2016). However, for our present analysis, the dependent variable (the regional Brexit vote) is clearly not a determinant of regional Big Five scores, and in that sense, causality will not run from the Brexit vote to our regionally clustered personality scores. Looking again at column (3) of Table 1, the effect sizes of the three significant Big Five variables remain significant, in particular for Openness: a change of 1 SD of regional Agreeableness = 0.82% higher Remain share, and similarly for such a change of regional Conscientiousness = -0.80% lower Remain, and of Openness = 1.61% higher Remain vote share. These effects are lower than in column (2) but still very relevant in understanding the regional dispersion of the Brexit vote. To see this for

Table 1. *The Remain vote share explained for the UK local authority districts.*

	Dependent variable		
	Remain vote (% of total district vote)		
	(1)	(2)	(3)
Extraversion		-16.701* (9.174)	-2.682 (5.099)
Agreeableness		49.183*** (13.564)	31.696*** (7.658)
Neuroticism		-38.104*** (10.512)	4.938 (5.583)
Openness		87.654*** (6.177)	30.848*** (4.126)
Conscientiousness		-34.634*** (10.702)	-15.596*** (5.990)
Population ($\times 1.000$)	0.005** (0.002)		0.005** (0.002)
Manufacturing (% of total employment)	-0.259*** (0.083)		-0.198*** (0.068)
Unemployment (% of active population)	0.587** (0.265)		0.383 (0.257)
Age (median)	-0.477*** (0.085)		-0.453*** (0.077)
Higher Education (% of population)	1.199*** (0.095)		0.933*** (0.090)
# Educational Qualifications (% population)	0.152 (0.146)		-0.122 (0.143)
Immigration (% of population)	-0.149*** (0.045)		-0.166*** (0.037)
Scotland dummy	15.732*** (0.995)		15.596*** (1.096)
Constant	28.784*** (5.509)		-138.279*** (52.759)
Observations	380	380	380
Adjusted R^2	0.866	0.643	0.891

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, with standard errors between brackets.

Source: Big Five data based on [Rentfrow et al. \(2015\)](#), other dependent variables, except Scotland dummy, <https://www.ons.gov.uk/> for 2011; vote: <http://www.electoralcommission.org.uk/our-work/our-research/electoral-data>.

Openness, note that if the least ‘open’ LAD district (Maldon) were to increase its Openness to that of the most ‘open’ LAD (Hackney), it would have had almost a 12% higher Remain vote. In fact, if we look at standardised coefficients for all of the 13 independent variables at the LAD level, Openness is ranked the fourth most important after higher education, median age and the Scotland dummy, a result which is in line with findings reported in [Krueger \(2016\)](#).

Conclusions: making space for psychological factors

Our results add a new, psychological perspective in explaining why the UK’s Brexit vote turned out as it did. Following a recent literature ([Jokela et al., 2015](#); [Rentfrow et al., 2015](#)), which has established that regional differences in personality traits in the UK are associated with differences in regional economic conditions, our

findings imply that these regional personality traits also contribute independently to an explanation of the marked regional voting differences with the Brexit referendum. In particular, we find strong evidence that the trait Openness is the personality trait that matters most and that modest changes in this regionally clustered trait could have swung the vote at the regional level. Moreover, the relevance of *psychological* Openness solves the puzzle that UK districts with a higher *trade* openness towards the EU predominantly voted for Leave (Los et al., 2017). Apparently, UK districts that depend relatively more on trade with the EU on average have a low score on psychological Openness, and the latter would seem to have played an important part in the regional dispersion of the Brexit vote.

Our findings show that personality traits and their regional clustering can thus be seen as important determinants of regional differences in voting outcomes, even when we control for more standard economic and demographic explanations. The inclusion of psychological factors like personality traits would appear to give a better understanding of the economic and political geography of people and places (Garretsen et al., 2017; Rentfrow et al., 2015). In the case of Brexit, we believe these factors throw additional light on the ‘geography of discontent’ (Los et al., 2017) that underpinned this historic shift—indeed reversal—in the UK’s relationship with the rest of the European Union.

More generally, this type of analysis may also offer an additional explanation for the rise in resistance across the globe against economic integration and globalisation, and in particular, how this resistance has notable spatial features. In this sense, our findings also contribute to a wider literature that explains how globalisation may be driving regional differences in voting behaviour (Autor et al., 2016; Colantone and Stanig, 2016), and hence why globalisation itself is being contested by various groups in different parts of the world. As we stated in the introduction, the recent examples of the US 2016 presidential election and the 2017 German parliamentary election results

suggest that a psychological explanation for the geography of discontent with respect to globalisation is not limited to the case of Brexit, but also could apply more widely to the political backlash against globalisation.

Finally, the fact that Openness might have swung the regional Brexit vote has important policy implications. Like all personality traits, the Openness of voters is a rather stable individual trait and generally is not malleable by short-term activities like election or referenda campaigns. Moreover, a short-run election campaign that stresses the advantages of trade openness but ignores the deeper, underlying psychological make-up of a district, may indeed be in for a surprise. But even though personality traits are quite stable, they are obviously not fixed (see Stuetzer et al., 2016 for the UK regions) and can also be influenced by changes in the economic or political environment (Wille and De Fruyt, 2014) or policy interventions. Research shows that personality traits change throughout the lifespan, and especially at a young age, and that this change is partly attributable to social demands and experiences (Almlund et al., 2011; Specht et al., 2011). More specifically, based on this line of research (Almlund et al., 2011), it can be argued that investing in the development of personality skills can even be more effective than the more often used investments in cognitive skills of human capital. A concerted policy effort to affect a region’s personality traits can thus over time also affect a region’s growth and prosperity.

In addition, when it comes to policy implications, as the case of Brexit illustrates, regions and localities that have fared less well economically than prosperous ‘core’ regions (especially if the latter contain the nation’s main organs of economic, political and financial power) are also likely to have inculcated and reproduced over time less open and even more resentful attitudes and personality traits. Such attitudes and traits may eventually—as in the case of Brexit—find expression in major political opposition or protest. This is in part at least what happened with the surprise election of President Trump in the USA.

Regional and spatial economic policies aimed at improving economic prospects and prosperity in 'lagging' or 'left behind' regions can thus have an important side effect of securing a generational shift in the sense of inclusion experienced and felt by the populations in such areas, and hence an increase in their Openness. This would seem to be a key issue for the growing debate surrounding the uneven geographical impact and polarised social responses to the benefits and costs of globalisation.

Endnotes

¹ The term 'populist' has acquired common usage to describe (or even explain) the rise of recent counter-movements in the political realm. But although there are some common characteristics among its various manifestations, contemporary 'populism' is certainly not a singular development, and its various incidences can be traced to different admixtures of political, economic, cultural and social factors. See for example Judis (2016), Moffitt (2016) and Muller (2016).

² Generally, many quantities of interest in psychology and related fields are impossible to measure explicitly. In such cases, a series of relevant questions are asked of the individual, and the answers combined into a single numerical value or score, for example, using principal components analysis. In our use of Cronbach's α , it measures how well such a set of variables measures a single, one-dimensional latent aspect of an individual's personality.

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Appendix

Table A1. Remain vote and Big Five data on LAD level.

	Dependent variable
	Remain vote (% district vote)
Neuroticism	−38.104*** (10.512)
Agreeableness	49.183*** (13.564)
Conscientiousness	−34.634*** (10.702)
Openness	87.654*** (6.177)
Extraversion	−16.701* (9.174)
AGE_(median)	−1.243*** (0.188)
SEX_1	−48.336*** (16.962)
Asian	−26.379*** (9.569)
Black	−3.155 (22.729)
Mixed	−98.559** (46.119)
Other	44.875 (72.076)
Income	12.644*** (1.074)
Unemployment	−30.168 (35.750)
Constant	−146.031 (97.572)
Observations	380
Adjusted R^2	0.643

Note: The table shows full model specification for column (2) in Table 1 of the main text; the Big Five variables and other explanatory variables are taken from (Rentfrow et al., 2015) where the individual respondents, data are aggregated to the LAD level by taking averages per district and where AGE_(median) refers to (median) age, SEX_1 refers to male respondents, Asian, Black, Mixed, Other to self-reported ethnicity status, Income to individual income and Unemployment to unemployment status.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, with standard errors between brackets.