Regional Differences in Intelligence and Personality in the Russian Federation and their Social and Demographic Correlates

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The purpose of the present study was to estimate the geographical distribution of the scores of intelligence and personality traits and their relations with some sociodemographic variables at a regional level of Russia. The analyses were based on responses from 193,361 Internet respondents from 83 provinces of the Russian Federation, who voluntarily completed two (cognitive and personality) screening tests. A number of statistically significant correlations of intelligence and personality traits with sociodemographic variables were established, some of which are consistent with the results of other authors, but some were new.
Key Words: Russia, intelligence, personality, regional differences, sociodemographic indicators, online testing

The validity of individual and national intelligence scores and their relations—hypothesized to be causal—with many social and economic outcomes is well established (Lynn & Vanhanen, 2002, 2012). Comparable researches at the regional level, reviewed by Lynn, Fuerst & Kirkegaard (2018), have shown similar associations. Studies of regional differences in personality traits have also been carried out (Allik & McCrae, 2004; Allik et al., 2017; Schmitt et al., 2007), but their results were less convincing (Heine, Buchtel & Norenzayan, 2008; Meisenberg, 2015).

One of the first studies of this kind has been made by Krug and Kulhavy (1973). Their analysis revealed differences between six multistate regions of the USA on such variables as energy, work ethic and creativity. Rentfrow (2010) summarized the results of three independent studies conducted in the United States that showed consistency in the geographical distribution of Neuroticism and Openness. Later, Rentfrow et al. (2013) summarized data of five independent samples on about 1.6 million individuals in the United States. This confirmed that regional differences exist and showed three geographically clustered psychological profiles with unique patterns of associations with some political, economic, social and health indicators. Recently Elleman et al. (2018) added two samples to these data and showed a high degree of personality trait scores agreement across a total of seven samples, rank order stability of U.S. states over a sixteen-year period, and consistent patterns of state personality correlations with sociodemographic variables for the three traits of Conscientiousness, Neuroticism and Openness.

In addition, Rentfrow, Jokela & Lamb (2015) have published a study of regional variations in the Big Five personality traits in Great Britain and Greaves et al. (2015) used the Big Six personality inventory to examine differences and similarities in mean levels of personality traits in 63 regions of New Zealand. Regional differences in personality traits in Russia have been reported by Allik et al. (2009), who give data for 33 administrative units based on observer ratings of the Big Five personality inventory (NEO-PI-R). The only significant correlation was found between Openness and the region's ranking on the Human Development Index of -.44 showing that people in the more developed regions of the country are more open minded.

Rentfrow (2010, p. 551) proposes three hypotheses to explain these regional differences. These are, first, the selective migration hypothesis that "people migrate to places that satisfy and reinforce their basic psychological needs. For example, people who are open and enjoy new experiences may decide to move away from their humdrum hometowns to places where their interests in diversity and their desire for varied experiences can be satisfied".

The second hypothesis is that "regional personality differences emerge as a result of social influence — individuals' thoughts, feelings, and behaviors are affected by the people around them. The basic idea is that the traditions, customs, lifestyles, and daily practices common to an area affect social norms, which in turn affect people's attitudes and behaviors. Through socialization, such influence could lead people to acquire the personality traits that are valued in the region, which would result in disproportionately large numbers of people possessing those traits".

The third hypothesis is that "regional personality differences are a result of ecological influence – aspects of the physical environment affect how people interact as well as the types of activities in which they can engage". For example, Schaller and Murray (2008) propose that in regions where there are high rates of infectious diseases, people have acquired low extraversion and openness so that their social contacts and hence exposure to diseases are reduced. Another example is the hypothesis advanced by Kasper et al. (1989) that there are high rates of depression in regions where there is little sunlight in winter. Yet another example is the hypothesis advanced by Anderson (1989) that there are high rates of violence in hot regions.

The objective of the present article is to publish estimates reflecting regional differences of cognitive and personality characteristics in Russia and their relations with a number of geographical, demographic, social and economic phenomena.

Method

Data were obtained in the course of anonymous voluntary Internet testing of persons who visited the site of the Ministry of Defense of the Russian Federation (www.mil.ru) from September 2012 to August 2018. This site affords an opportunity for males aged 18-40 with at least secondary education to take intelligence and personality tests to assess general eligibility for voluntary military service in the Russian Armed Forces. The intelligence test was administered first. The personality test was administered only if a test taker reached a threshold level on the intelligence test (raw score more than 10).

The data of non-residents of the Russian Federation, persons who did not report their region, and the cases of repeated test taking and protocols with implausibly invariable responses were excluded. In two regions of the Russian Federation, the Nenets autonomous district and Chukotka autonomous district, the numbers of test takers were fewer than 100. The data for these regions were also excluded. The number of persons who passed both the intelligence and personality tests on whom the data are based was 193,361 (mean age 26.55 ± 4.99 years) and represented 83 regions of the Russian Federation.

The regional IQs from this source have been reported before (Sugonyaev, Grigoriev & Lynn, 2018). The intelligence screening test used is designed on the same principles as the Wonderlic Personnel Test. It consists of a mix of tasks addressed to verbal, numerical, spatial and perceptual speed factors of intelligence (with prevalence of the first two). Psychometric characteristics of its individual scores in the total sample were satisfactory for the purpose of its application ($M = 20.05$, $SD = 5.99$, reliability 0.86).

Personality was assessed with the Personality Questionnaire for Applicants Screening (PQAS). This consists of 74 items measuring Anxiety, Depression, Irritability, Disinhibition, Assertiveness and Social desirability. A brief description of the traits is as follows.

Anxiety is a persistent tendency to worry and feel anxiety on minor occasions.

Depression is the prevalence of low mood, feelings of isolation, low self-esteem and pessimism regarding life prospects. These two closely connected traits are facets of the core of the Neuroticism factor in the Five-Factor Model (FFM) (McCrae & Costa, 2008).

Irritability is excessive response to stressors, propensity for reactive aggression, and mood lability. It is similar to the Volatility aspect in the DeYoung, Quilty and Peterson (2007) model of personality and to the Irritability trait in the paper of Deveney et al. (2019).

Disinhibition is low self-control, impulsivity, irresponsibility, inability to resist temptation and think through the consequences of one's actions. It is similar to the negative pole of the Conscientiousness factor of FFM and to the Disinhibition factor in the DSM-5 Alternative Model of Personality Disorders (Krueger & Markon, 2014).

Assertiveness is a proactive component of extraversion and consists of a tendency to be domineering in interpersonal relations, self-confidence, activity, decisiveness, and striving for attention. It is similar to the Assertiveness aspect in the De Young et al. (2007) model of personality.

Social desirability is the tendency to choose answers that present the respondent in a socially acceptable light.

Table 1. *Psychometric characteristics of primary scales of the PQAS' scales.*

Scale	M ± SD	Cronbach's alpha	r_{iit}*
Anxiety	2.42 ± 2.43	0.87 – 0.91	0.39 – 0.49
Depression	1.01 ± 1.67	0.90 – 0.95	0.52 – 0.70
Irritability	2.29 ± 2.20	0.86 – 0.90	0.38 – 0.48
Disinhibition	3.78 ± 2.64	0.83 – 0.86	0.25 – 0.34
Assertiveness	8.13 ± 2.27	0.83 – 0.86	0.32 – 0.38
Social desirability	4.70 ± 2.93	0.88 – 0.91	0.39 – 0.47

*r_{iit} – average levels of inter-item tetrachoric correlations.

All PQAS scales have shown good reliability. Cronbach's alphas and average levels of interitem tetrachoric correlations are given in Table 1.

Cronbach's alpha and inter-item tetrachoric correlations were calculated for every year. The table gives the ranges of variation.

Results

Table 2 gives intelligence and personality scores for the 83 provinces, And Figure 1 shows the geographical distributions of intelligence and personality traits across the Russian regions. Since distributions of Anxiety, Depression and Irritability are very similar ($r = 0.73$-0.84), they were combined in a secondary scale Neuroticism for parsimony. As a reference point the average individual score in the total sample was accepted; and as a measure of distinctions, half of a standard deviation of aggregated scores.

Table 2. *Intelligence and personality scores for 83 federal subjects of the Russian Federation.*

Region	Intell.	Assert.	Social des.	Anxiety	Depression	Irritability	Disinhib.
St. Petersburg City	21.45	8.17	4.31	2.51	1.07	2.28	3.68
Yaroslavl region	21.21	8.22	4.56	2.34	0.97	2.33	3.78
Moscow City	21.15	8.10	4.46	2.52	1.18	2.35	3.64
Kirov region	21.01	8.07	4.57	2.42	0.96	2.36	3.94
Tomsk region	20.90	8.30	4.99	2.14	0.97	2.07	3.67
Chuvash R.	20.87	7.86	4.80	2.56	1.20	2.49	3.96
Perm territory	20.87	8.21	4.46	2.36	0.98	2.27	3.95
Vologda region	20.85	8.12	4.41	2.32	0.95	2.27	3.96
Udmurt R.	20.73	8.09	4.58	2.53	1.02	2.44	4.19
Ryazan region	20.69	8.23	4.62	2.32	1.00	2.32	3.63
R. of Komi	20.66	7.93	4.54	2.55	1.08	2.43	3.98
R. of Mari El	20.59	7.98	4.86	2.35	0.90	2.21	3.86
Novgorod region	20.56	8.04	4.28	2.65	1.09	2.48	4.00
R. of Karelia	20.55	7.99	4.63	2.33	0.95	2.22	3.85
Oryol region	20.54	8.13	4.87	2.30	0.97	2.14	3.61
Samara region	20.50	8.28	4.76	2.31	0.99	2.26	3.67
Kostroma region	20.47	8.03	4.75	2.40	1.00	2.39	3.93
Kaluga region	20.47	8.03	4.58	2.66	1.15	2.31	3.69
R. of Tatarstan	20.46	8.06	4.72	2.61	1.16	2.46	3.95
Penza region	20.46	8.23	4.87	2.43	1.04	2.30	3.65
Moscow region	20.37	8.11	4.64	2.46	1.04	2.26	3.61
Tyumen region	20.37	8.21	4.83	2.36	1.08	2.31	3.77

Region	Intell.	Assert.	Social des.	Anxiety	Depression	Irritability	Disinhib.
Tula region	20.35	8.22	4.73	2.44	1.06	2.46	3.68
Tver region	20.34	8.05	4.56	2.42	1.00	2.34	3.82
Sevastopol City	20.31	7.94	4.47	2.59	1.04	2.29	3.62
Arkhangelsk region	20.31	8.17	4.45	2.28	0.92	2.19	3.92
Nizhniy Novgorod region	20.30	8.14	4.52	2.50	1.06	2.34	3.78
Sverdlovsk region	20.29	8.17	4.59	2.31	0.98	2.29	3.87
Kursk region	20.27	8.21	4.99	2.34	0.98	2.33	3.57
Novosibirsk region	20.25	8.20	4.74	2.40	0.99	2.26	3.76
Ulyanovsk region	20.22	8.12	4.79	2.41	1.05	2.34	3.82
Voronezh region	20.21	8.08	4.70	2.39	1.00	2.20	3.52
Krasnoyarsk territory	20.15	8.15	4.62	2.31	0.98	2.21	3.88
Vladimir region	20.15	8.08	4.65	2.52	1.13	2.39	3.77
Lipetsk region	20.14	8.11	4.72	2.54	1.17	2.54	3.74
Smolensk region	20.14	8.14	4.77	2.47	1.03	2.30	3.73
R. of Mordovia	20.13	8.08	4.58	2.69	1.13	2.59	4.06
Belgorod region	20.12	8.10	4.65	2.43	0.99	2.32	3.70
Rostov region	20.11	8.22	4.57	2.46	1.01	2.33	3.72
Chelyabinsk region	20.10	8.16	4.75	2.37	0.97	2.30	3.90
Ivanovo region	20.10	8.14	4.76	2.29	0.87	2.15	3.72
Murmansk region	20.09	7.91	4.41	2.43	0.99	2.18	3.69
Kaliningrad region	20.08	8.05	4.46	2.53	0.97	2.24	3.71
R. of Bashkortostan	20.07	8.23	4.92	2.42	1.09	2.41	3.99
Kurgan region	20.05	8.17	4.81	2.24	0.96	2.23	3.88
Saratov region	20.05	8.29	4.90	2.31	0.91	2.21	3.65
Leningrad region	20.03	8.01	4.45	2.64	1.08	2.36	3.82
Tambov region	19.99	8.01	4.89	2.47	1.03	2.21	3.61
Bryansk region	19.98	8.12	4.88	2.41	1.01	2.28	3.63
Krasnodar territory	19.91	8.34	4.65	2.32	0.93	2.25	3.65
Pskov region	19.89	7.91	4.68	2.46	0.96	2.40	3.84
Khabarovsk territory	19.86	8.09	4.67	2.40	0.92	2.26	3.84
R. of Crimea	19.86	7.98	4.54	2.65	1.04	2.30	3.64
Magadan region	19.85	8.34	4.79	2.24	1.01	2.25	3.58
Volgograd region	19.83	8.20	4.73	2.45	1.03	2.37	3.75
Yamalo-Nenets AD	19.79	8.21	4.75	2.44	1.07	2.41	4.17

Region	Intell.	Assert.	Social des.	Anxiety	Depression	Irritability	Disinhib.
R. of Sakha (Yakutia)	19.79	8.08	4.51	2.66	1.27	2.74	4.46
Omsk region	19.72	8.29	5.04	2.25	0.88	2.17	3.84
Kemerovo region	19.70	8.20	4.73	2.37	1.05	2.46	4.14
Irkutsk region	19.65	8.23	4.74	2.34	0.96	2.24	3.98
R. of Adygeya	19.65	8.12	4.79	2.30	1.03	2.22	3.64
Kamchatka territory	19.64	7.86	4.46	2.42	0.97	2.30	3.76
Altai territory	19.58	8.24	4.79	2.22	0.87	2.19	3.80
Orenburg region	19.48	8.22	5.02	2.33	0.92	2.17	3.82
Khanty-Mansiysk AD	19.47	8.16	4.83	2.49	1.22	2.47	3.97
Jewish AR	19.42	8.01	5.05	2.45	1.03	2.24	3.63
Astrakhan region	19.41	8.11	5.06	2.31	0.95	2.19	3.68
Amur region	19.23	8.08	4.87	2.40	1.01	2.19	3.86
R. of Khakassia	19.20	8.27	5.23	2.22	0.87	2.01	3.79
Primorsky territory	19.19	8.04	4.73	2.43	0.96	2.16	3.85
Stavropol territory	19.19	8.18	4.91	2.46	1.01	2.38	3.61
R. of Altai	18.99	7.99	4.72	2.51	1.08	2.29	4.04
R. of Kalmykia	18.98	7.92	4.84	2.78	1.41	2.73	4.35
Sakhalin region	18.87	7.96	4.55	2.75	1.12	2.42	4.08
Zabaykalsky territory	18.70	8.15	5.14	2.29	0.94	2.17	3.89
R. of Buryatiya	18.56	8.06	4.85	2.38	0.91	2.21	4.26
R. of N. Ossetia-Alania	18.40	7.97	5.13	2.60	1.03	2.39	3.35
Kabardino-Balkaria R.	18.21	8.05	5.19	2.51	1.06	2.41	3.64
Karachay-Cherkessia R.	18.20	7.95	4.98	2.64	1.11	2.57	3.72
R. of Dagestan	16.70	7.91	5.45	2.61	1.18	2.46	3.71
Chechen R.	16.37	7.81	5.39	2.78	1.37	2.81	3.71
R. of Tyva	16.01	7.80	5.72	2.55	1.02	2.18	4.89
R. of Ingushetia	15.87	7.38	5.46	2.86	1.06	2.37	3.28
Total: M*	19.82	8.09	4.76	2.44	1.03	2.32	3.82
SD*	1.04	0.14	0.26	0.14	0.10	0.14	0.23

Intell., intelligence; Assert., assertiveness; Social des., social desirability; Disinhib., disinhibition; AD, Autonomous District, AR, Autonomous Region, R., Republic.
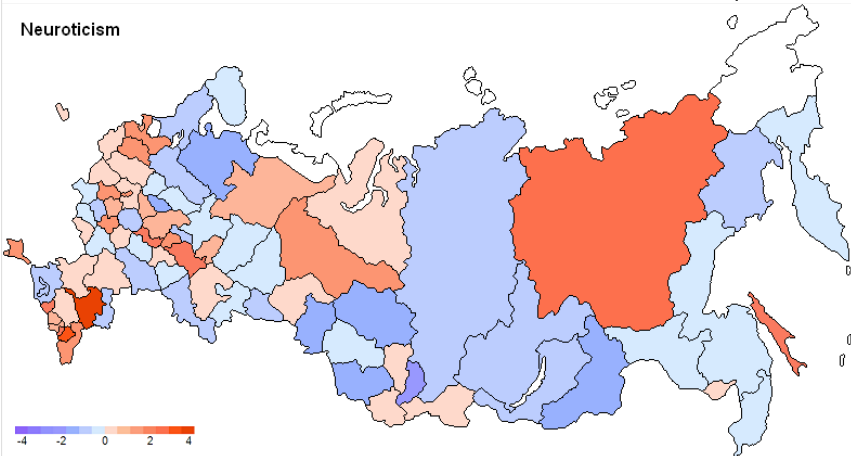
* Means and standard deviations of the total are for the regional aggregates, not the individual-level results
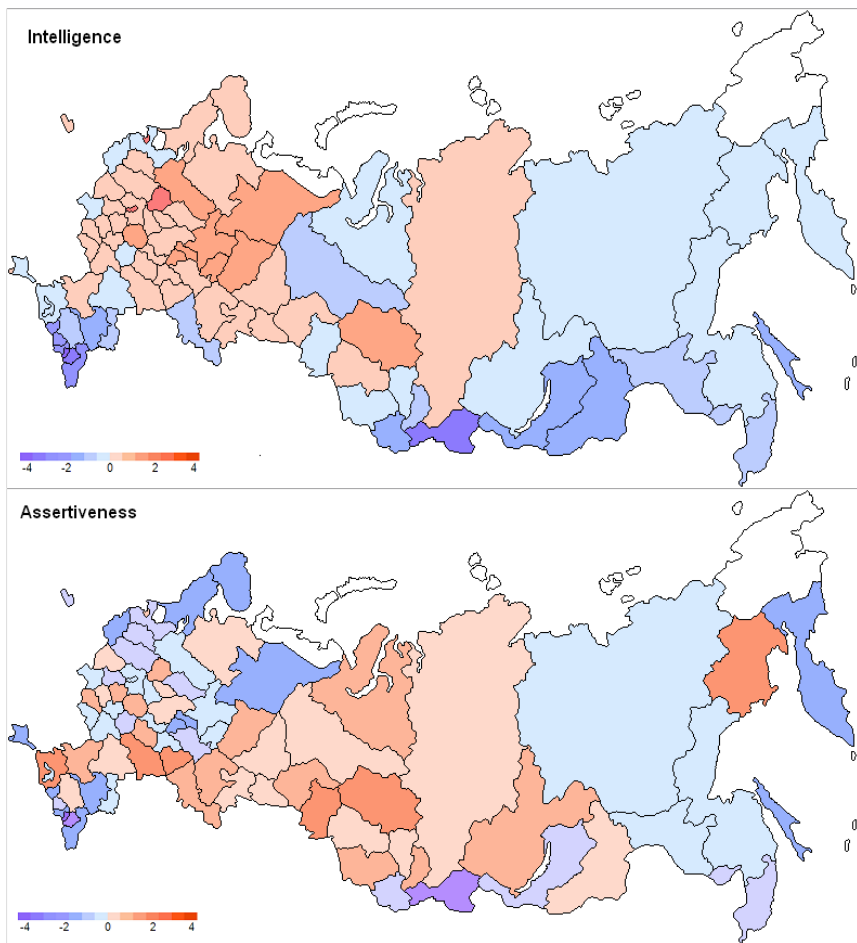
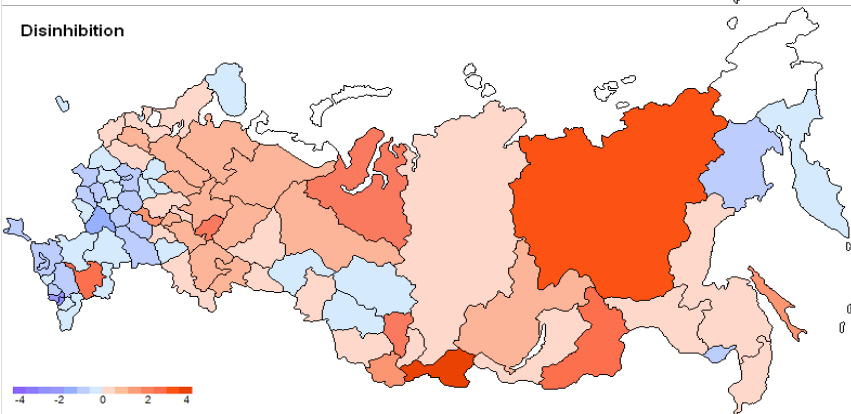**Social Desirability**
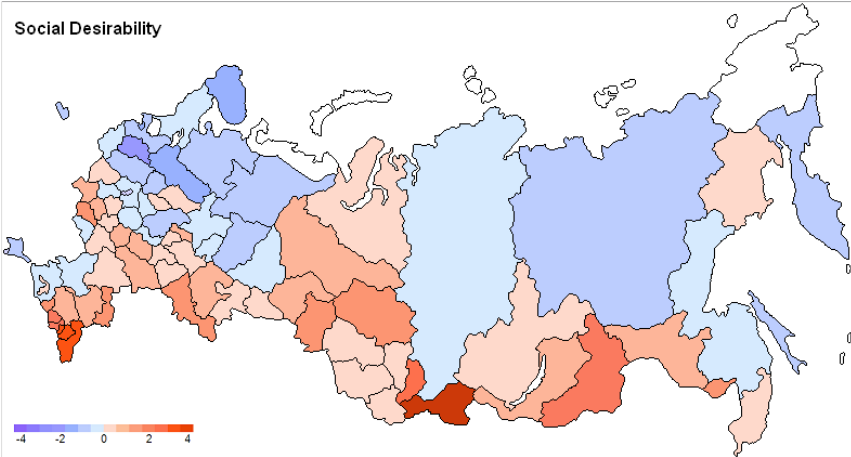
Neuroticism

Disinhibition

Figure 1. *The geographical distributions of intelligence, assertiveness, social desirability, neuroticism and disinhibition across the Russian regions. For each attribute, the areas in blue designate low values and the areas in red designate high values.*

The maps displayed in Fig. 1 indicate that each of the psychological variables shows unique geographical patterns. Higher levels of intelligence were concentrated in the European part of Russia and in the South of West Siberia, while the level of intelligence is relatively low along the southern border of Russia. High levels of assertiveness are typical for much of Siberia, Ural and the southern regions of the European part of Russia, while the majority of the Far East, North-West and North Caucasus regions are characterized by lower levels of this trait. High social desirability forms a belt stretched along the southern border of Russia from the West to the East. Neuroticism shows a more varied picture, but much of East Siberia, the Far East and the North of European Russia are characterized by high levels of emotional stability, which is the opposite pole of neuroticism. Almost the entire South of European Russia shows low levels of disinhibition, while high levels of this trait were revealed in republics in which a considerable part of the population professes Buddhism or shamanism.

Table 3 gives the correlations of intelligence and personality traits with latitude and longitude and a number of social and demographic variables for the 83 regions. The demographic variables are defined as follows.

Ethnic Russians: Percentage of ethnic Russians in a region

Fertility: Birth rate (number of live births per 100)

Infant mortality: Number of infants dying before reaching one year of age per 100 live births

Life expectancy: Number of years an individual would live if the patterns of age-specific mortality at the time of his or her birth were to remain

Migration: Net immigration (difference between the number of persons who migrated to a region and the number of persons who migrated from this region during the year per 100)

Tertiary education: Number of students in tertiary education per 100

Abortions: Number of abortions per 100 women

Morbidity: Number of registered diseases with a diagnosis established for the first time per 100

Injuries and Poisonings: Number of accidental injuries and poisonings per 100

Crime: Number of registered crimes per 100

Murders: Number of registered murders and attempted murders per 100 of the working age population

Computer: Percentage of households having a personal computer.

The demographic data were averaged for 2012-2017, except tertiary education, which was averaged for 2013-2017 and the percentage of households with computers which was averaged for 2014-2017.

Discussion

The aim of the present study was to report the geographical distribution of intelligence and personality in Russia at the regional level and their associations with some social, economic and demographic variables. The distributions of the psychological characteristics showed certain clustering — more pronounced in the case of intelligence and fuzzier in the case of personality traits.

As expected, the variability of the scores was lower at the aggregated regional level than at the individual level (Allik et al., 2017; Kajonius & Giolla, 2017): the standard deviation of IQ scores decreased by a factor of 5.74, while standard deviations of personality scale scores decreased 11.2 – 17.0 times. The last result is consistent with Greaves et al. (2015), who showed that differences between regions of New Zealand explained only small proportions of variance in Big Six personality traits.

From the point of future studies of cross-cultural psychological differences, the question of which of the Russian regions represents the country as a whole most precisely can be of interest. In such regions all psychological variables must have average ranks with the minimum deviation. According to our data, the Smolensk and Chelyabinsk regions are the most appropriate candidates for this role.

There are a very large number of statistically significant correlations given in Table 3 and it is not possible to comment on all of them. We regard the following as some of the more interesting.

First, as noted in the introduction, Kasper et al. (1989) advanced the hypothesis that there are high rates of depression in regions where there is little sunlight in winter. Our results show that the correlation of latitude with depression is negative but not statistically significant (-.13). Therefore there is no significant tendency for depression rates to be higher in more northerly provinces where there is less sunlight in winter. This result does not support the hypothesis.

Table 3. *The correlation matrix*

	Int	Ass	SocDes	Anx	Depr	Irr	DI	Lat	Long	EthRus	Fert	IM	LE	Div	Migr	Inc	TE	Ab	Morb	I&P	Crime	Murd
Ass	.55**																					
SocDes	-.77**	-.23*																				
Anx	-.40**	-.71**	.02																			
Depr	-.22*	-.37**	.04	.76**																		
Irr	-.19	-.33**	-.04	.73**	.84**																	
DI	-.11	-.06	-.02	.13	.21	.25*																
Lat	.50*	.19	-.50**	-.28*	-.13	-.14	.28*															
Long	-.25*	.05	.14	-.16	-.11	-.16	.33**	.08														
EthRus	.67**	.59**	-.56**	-.57**	-.52**	-.50**	-.20	.34**	.03													
Fert	-.71**	-.38**	.59**	.24*	.25*	.17	.41**	-.18	.33*	-.68**												
IM	-.71**	-.38**	.60**	.20	.11	.09	.13	-.37**	.30**	-.40**	.61**											
LE	-.13	-.22*	.10	.37**	.33**	.36**	-.51**	-.31*	-.52**	-.40**	-.02	-.13										
Div	.57**	.52**	-.47**	-.48**	-.33**	-.28*	.45**	-.31*	.70**	-.63**	-.42**	-.46**	-.46**									
Migr	.27*	.04	-.30**	.09	-.04	-.11	.05	-.19	.21	-.21	-.37**	-.42**	.31**	-.19								
Inc	.24*	.20	-.37**	-.03	.14	.02	.02	.46**	.19	-.04	-.22*	.06	.06	.21	-.21							
TE	.34**	.30**	-.07	-.21	-.05	-.12	-.25*	-.08	.11	-.17	-.28*	.27*	-.08	.21	.26*	-.21						
Ab	.14	.16	-.12	-.32**	.29**	-.26*	-.26*	.42**	.59**	.29**	.09	-.80**	.40**	-.34**	.26*	-.21	.69**					
Morb	.28*	.13	-.27*	-.20	-.11	-.06	.32**	.54**	.11	.09	-.17	.09	.23*	.22*	.11	-.15	.28*	.71**				
I&P	.37**	.31**	-.24*	-.42**	-.29**	-.23*	.28*	.48**	.19	.27*	-.08	-.08	-.33**	-.35**	-.27*	.24*	.00	.40**	.69**			
Crime	.12	.21	-.14	-.40**	-.39**	-.47**	.46**	.36**	.59**	.38**	.13	.01	-.73**	.24*	-.41**	.03	.16	.00	.28*	.74**		
Murd	-.33**	-.05	.24*	-.12	-.15	-.23*	.64**	.15	.68**	-.04	.46**	.37**	-.76**	.22*	-.25*	-.29**	-.11	.74**	.21	.20	-.04	
Comp	.43**	.21	-.51**	-.04	-.07	-.17	.01	.47**	-.02	.27*	-.24	-.48**	.03	.28*	-.01	.28*	-.15	.09	.05	.22*	.23*	.20

Int, Intelligence; Ass, Assertiveness; SocDes, Social Desirability; Anx, Anxiety; Depr, Depression; Irr, Irritability; DI, Disinhibition; Lat, Latitude; Long, Longitude; EthRus, Ethnic Russians; Fert, Fertility; IM, Infant Mortality; LE, Life Expectancy; Div, Divorces; Migr, Migration; Inc, Income; TE, Tertiary Education; Ab, Abortions; Morb, Morbidity; I&P, Injuries and Poisonings; Murd, Murder; Comp, Computer.
* and ** denote statistical significance at p<.05 and p<.01 respectively.

Second, as also noted in the introduction, Anderson (1989) advanced the hypothesis that there are high rates of violence in hot regions. Our results show that the correlation of latitude with the rate of murder is positive but not statistically significant (.15). Therefore there is no significant tendency for murder rates to be higher in more southerly and hotter provinces. This result does not support the hypothesis.

Third, the correlation matrix given in Table 3 shows that the personality traits predict a number of demographic variables that are not associated with intelligence. Some of the most interesting are as follows. First, life expectancy is significantly positively correlated with anxiety (.37) and depression (.33) and negatively associated with disinhibition (-.51) and assertiveness (-.22) but has no association with intelligence (-.13). The last result is inconsistent with many studies showing that life expectancy is positively associated with intelligence (Deary, Whalley & Starr, 2009, pp.122-3). Inspection of our data shows that the inconsistency is largely due to the scores of six Caucasian regions: Republic of North Ossetia-Alania, Kabardino-Balkaria Republic, Karachay-Cherkess Republic, Republic of Dagestan, Chechen Republic and Republic of Ingushetia. These regions score 77th, 78th, 79th, 80th, 81st and 83rd on intelligence, respectively, and 7th, 5th, 6th, 3rd, 8th and 1st on life expectancy, respectively. Thus, the Caucasian Republics have higher life expectancy than would be expected from their intelligence scores. When these six Caucasian regions are removed from the sample, the correlation between life expectancy and intelligence becomes positive and significant (.56). Probably, the high life expectancy in these Caucasian Republics is caused by some unknown local factors, either genetic or environmental.

Fourthly, the rate of crime is significantly positively associated with disinhibition (.46) and negatively associated with anxiety (-.40), depression (-.39) and irritability (-.47), but has no association with intelligence (.12). The positive association with disinhibition is predictable because disinhibition is defined as low self-control, impulsivity, irresponsibility, and inability to resist temptation and think through the consequences of one's actions. However, the low and non-significant positive correlation of crime with intelligence (.12) is inconsistent with many studies showing that crime is negatively associated with intelligence (e.g. Beaver

& Wright, 2011; Wilson & Herrnstein, 1985). Inconsistency in studies of the relation of crime with cognitive ability was reported in Lynn, Fuerst and Kirkegaard (2018). The low positive correlation of crime with intelligence is largely caused by the very low crime rates in three Caucasian regions, Republic of Dagestan, Republic of Ingushetia and Chechen Republic, which all have low intelligence and low crime rates. Possibly the low crime rates in these regions are attributable to poor recording of crime. Another possibility is that many criminals from these regions have gone to Moscow and other more prosperous parts of the country to organize crime there. Exclusion of these three Caucasian regions makes the correlation significantly negative (-.25, p<.05), as would be expected. Note further that the murder rate is significantly negatively correlated with intelligence (-.33).

Fifthly, there is a positive relation of regional intelligence with morbidity (the number of registered diseases) ($r = .28$). This may be partly due to regions with higher levels of intelligence being located in higher latitudes ($r = .50$) and therefore exposed to more severe climates. This is consistent with the correlation of .54 between latitude and morbidity showing that more northerly regions have higher morbidity. Another possibility is better uptake of health care services in regions with higher average intelligence, leading to more illnesses being reported.

Geographical distribution of regional intelligence in Russia is cross-validated by data on educational achievements of the regions published earlier (Grigoriev et al., 2016), but data on aggregate personality traits at the regional level are reported here for the first time. Their relationships with other variables raise more questions than they answer. Provided that studies of relations between personality characteristics and sociodemographic indicators are still at an early stage, we suggest that: a) data obtained deserve publication nevertheless; b) one-country findings may not generalize to other nations (see Greaves et al., 2015, p. 15). Further explorations are necessary to expand our conception about mechanisms connecting psychological variables with factors of the social and economic development of regions.

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References

Allik, J. & McCrae, R.R. (2004). Toward a geography of personality traits: Patterns of profiles across 36 cultures. *Journal of Cross-Cultural Psychology* 35: 13-28.

Allik, J., Realo, A., Mottus, R., Pullmann, H., Trifonova, A., McCrae, R.R. et al. (2009). Personality traits of Russians from the observer's perspective. *European Journal of Personality* 23: 567-588.

Allik, J., Church, A.T., Ortiz, F.A., Rossier, J., Hrebickova, M., de Fruyt, F., Realo, A. & McCrae R.R. (2017). Mean profiles of the NEO Personality Inventory. *Journal of Cross-Cultural Psychology* 48: 402-420.

Anderson, C.A. (1989). Temperature and aggression: Ubiquitous effects of heat on occurrence of human violence. *Psychological Bulletin* 106: 74-96.

Beaver, K.M. & Wright, J.P. (2011). The association between county-level IQ and county-level crime rates. *Intelligence* 39: 22-26.

Deary, I.J., Whalley, L.J. & Starr, J.M. (2009). *A Lifetime of Intelligence.* Washington DC: American Psychological Association.

Deveney, C.M., Stoddard, J., Evans, R.L., Chavez, G., Harney, M. & Wulff, R.A. (2019). On defining irritability and its relationship to affective traits and social interpretations. *Personality and Individual Differences* 144: 61-67.

DeYoung, C.G., Quilty, L.C. & Peterson, J.B. (2007). Between facets and domains: 10 aspects of the Big Five. *Journal of Personality and Social Psychology* 93: 880-896.

Elleman, L.G., Condon, D.M., Russin, S.E. & Revelle, W. (2018). The personality of U.S. states: Stability from 1999 to 2015. *Journal of Research in Personality* 72: 64-72.

Greaves, L.M., Cowie, L.J., Fraser, G. et al. (2015). Regional differences and similarities in the personality of New Zealanders. *New Zealand Journal of Psychology* 44: 4-16.

Grigoriev, A., Ushakov, D., Valueva, E., Zirenko, M. & Lynn, R. (2016). Differences in educational attainment, socio-economic variables and geographical location across 79 provinces of the Russian Federation. *Intelligence* 58: 14-17.

Heine, S.J., Buchtel, E.E. & Norenzayan, A. (2008). What do cross-national comparisons of personality traits tell us? The case of conscientiousness. *Psychological Science* 19: 309-313.

Kajonius, P. & Giolla, E.M. (2017). Personality traits across countries: Support for similarities rather than differences. *PLoS ONE* 12: e0179646.

Kasper, S., Wehr, T.A., Bartko, J.J., Gaist, P.A. & Rosenthal, N.E. (1989). Epidemiological findings of seasonal changes in mood and behavior: A telephone survey of Montgomery County, Maryland. *Archives of General Psychiatry* 46: 832-833.

Krueger, R.F. & Markon, K.E. (2014). The role of the DSM-5 personality trait model in moving toward a quantitative and empirically based approach to classifying personality and psychopathology. *Annual Review of Clinical Psychology* 10: 7.1-7.25.

Krug, S.E. & Kulhavy, R.W. (1973). Personality differences across regions of the United States. *Journal of Social Psychology* 91: 73-79.

Lynn, R. & Vanhanen, T. (2002). *IQ and the Wealth of Nations*. Westport, CT: Praeger.

Lynn, R. & Vanhanen, T. (2012). *Intelligence: A Unifying Construct for the Social Sciences*. London: Ulster Institute for Social Research.

Lynn, R., Fuerst, J. & Kirkegaard, E.O.W. (2018). Regional differences in intelligence in 22 countries and their economic, social and demographic correlates: A review. *Intelligence* 69: 24-36.

McCrae, R.R. & Costa, P.T. (2008). The Five-Factor Theory of personality. In: O.P. John, R.W. Robins & L.A. Pervin (eds.), *Handbook of Personality: Theory and Research*, 3rd ed., pp. 159-81. New York: Guilford Press.

Meisenberg, G. (2015). Do we have valid country-level measures of personality? *Mankind Quarterly* 55: 360-382.

Rentfrow, P.J. (2010). Statewide differences in personality. *American Psychologist* 65: 548-558.

Rentfrow, P.J., Gosling, S.D., Jokela, M., Stillwell, D.J., Kosinski, M. & Potter, J. (2013). Divided we stand: Three psychological regions of the United States and their political, economic, social, and health correlates. *Journal of Personality and Social Psychology* 105: 996-1012.

Rentfrow, P.J., Jokela, M. & Lamb, M.E. (2015). Regional differences in personality in Great Britain. *PLoS ONE* 10: e0122245.

Schaller, M. & Murray, D.R. (2008). Pathogens, personality and culture: Disease prevalence predicts worldwide variability in sociosexuality, extraversion and openness to experience. *Journal of Personality and Social Psychology* 95: 212-221.

Schmitt, D.P., Allik, J., McCrae, R.R. & Benet-Martínez, V. (2007). The geographic distribution of Big Five personality traits: Patterns and profiles of human self-description across 56 nations. *Journal of Cross-Cultural Psychology* 38: 173-212.

Sugonyaev, K., Grigoriev, A. & Lynn, R. (2018). A new study of differences in intelligence in the provinces and regions of the Russian Federation and their demographic and geographical correlates. *Mankind Quarterly* 59: 31-37.

Wilson, J.Q. & Herrnstein, R.J. (1985). *Crime and Human Nature*. New York: Simon & Schuster.