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The connection between social cohesion and personality: A multilevel study in the Kyrgyz Republic

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As the discourse around societal cohesion grows and policy makers increasingly turn their attention towards improving cohesion, understanding its role for the lives of individuals becomes ever more important. Our study examines whether the social cohesion of the immediate living context is related to the strength of Big Five personality traits among individuals. Using data from a community survey of 6252 adults living in 30 rural sub-districts in the Kyrgyz Republic, where social cohesion is a sizable policy concern, we conduct a multilevel analysis of the relationship between sub-district cohesion and individual personality. Results indicate that higher levels of cohesion are significantly related to higher individual levels of agreeableness, conscientiousness and openness. However, no relationship is found with extraversion or neuroticism. Thus, where a social entity has higher cohesion, this entity will also have inhabitants with a greater prosocial and communal orientation towards others, greater conscientiousness and more openness to experience. These findings imply that social cohesion may be one geographical social indicator related to variation in personality traits. Moreover, the findings suggest that understanding social cohesion requires both macro- and micro-perspectives and that its connection to these particular personality traits should be taken into consideration.

Keywords: Social cohesion; Personality traits; Big Five; Kyrgyz Republic.

Social cohesion, often thought of as the glue that holds society together, is attracting increasing attention in academic and political circles, with a desire to understand how to strengthen it, as well as to understand its impact on societies and individuals. Yet there is little agreement regarding the definition of social cohesion. In their systematic review, however, Schiefer and van der Noll (2017) identified several areas of consensus. First, while social cohesion is essentially forged by the behaviours and attitudes of individuals, it is an independent quality of social entities, *not* of individual citizens. Second, there is agreement that cohesion functions along a continuum: Social entities can be more or less cohesive. Third, social cohesion can be measured at multiple levels (like residential areas, regions or federal states, as well as nation states) and has multiple dimensions.

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Specifically, Dragolov et al. (2016) developed a comprehensive conceptualisation of social cohesion lending itself to empirical research, proposing three domains characterising a cohesive society: "resilient social relations, positive emotional connectedness between its members and the community, and a pronounced focus on the common good" (p. 6). These three domains overlap and unfold into nine dimensions: *Social relations* emphasises the horizontal relationships of individuals, and comprises intact social networks, trust in people and acceptance of diversity. *Connectedness* emphasises the vertical relations between individuals and institutions, and consists of identification, trust in institutions and a perception of fairness. Finally, a *focus on the common good* addresses solidarity and helpfulness, respect for social rules and civic participation.

Even when applying this conceptualisation, much of the existing literature focuses on what factors increase social cohesion or whether cohesive societies are even better off in the first place. A time-lagged comparison of European Union and Organisation for Economic Co-operation and Development (OECD) countries found that social cohesion is positively impacted by greater levels of societal wealth, human development, modernisation and income equality, and at the same time, greater levels of social cohesion seem to support greater average country-level life satisfaction (Dragolov et al., 2016). While some relationships in Asian countries appear to mirror those found in the West (e.g. societal wealth), others (e.g. income equality and political freedom) prove to function differently (Delhey et al., 2018). Thus, while the concept of social cohesion may be applied across cultures, there are no one-size-fits-all interpretations of its relationship with other socio-economic indicators.

Likewise, questions regarding the relationship between social cohesion and the lives of individuals are central in the discourse. Evidence from a multilevel study of EU countries suggests that individuals are happier and psychologically healthier if they live in more cohesive societies (Delhey & Dragolov, 2016), whereas a multilevel examination of high-income countries found support for the association between cohesion and better individual self-rated health (Chuang, Chuang, & Yang, 2013). This research raises the question of whether the social cohesion in geopolitical units is connected to other, more fundamental individual factors, such as personality.

With this question in mind, the present paper investigates whether the level of cohesion in a social entity is related to the personality of individuals living within that entity. We find a significant connection between greater social cohesion and the strength of the personality traits of openness, conscientiousness and agreeableness. In doing so, we provide evidence for the link between social cohesion and variation in personality, and highlight the special role of personality in understanding social cohesion.

This paper begins with a brief discussion of personality and its emergence and persistence geographically, followed by an initial review of the empirical evidence linking personality and cohesion-related variables. Multilevel regression analyses are then conducted with data on social cohesion and personality traits in the Kyrgyz Republic. The final section of the paper outlines the contribution of the findings for both research and policy.

Personality

There is great diversity in conceptualisations of personality. Cloninger (2009) suggests the following common assumptions: (a) there is an inherent biological basis of personality, which is (b) shaped throughout life by culture, family and other experiences; and (c) the resulting behavioural and emotional patterns are what make up personality itself. These patterns are commonly labelled personality traits. In psychology (and beyond) a five-factor model has become the most widely accepted view of how personality traits of individuals can be understood (John, Naumann, & Soto, 2008). This five-factor model is understood by personality psychologists as encompassing the five core traits of individuals that allow for making valid distinctions between one human being and another with regard to their: (a) extraversion ("an energetic approach towards the social and material world"), (b) agreeableness ("a prosocial and communal orientation towards others"), (c) conscientiousness ("socially prescribed impulse control that facilitates tasks and goal-directed behaviors"), (d) neuroticism ("negative emotionality, such as feeling anxious, nervous, sad, and tense") and degree of (e) openness to experience ("the breadth, depth, and originality of an individual's mental and experiential life") (John et al., 2008, p. 120). Much empirical research underlines the foundations of personality traits in biology, their relative stability across the life course and their presence in a large number of cultures (Rentfrow, Gosling, & Potter, 2008).

The study of how the social environment and the human mind and behaviour define one another is key to understanding the emergence and persistence of personality traits. This becomes even more relevant when reviewing results linking geographical differences in personality to geographical social indicators (i.e. the aggregate level of individual behaviours within a geographic region). Rentfrow et al. (2008) developed a theory to explain how these variations in personality traits may arise, persist and express themselves. One proposed underlying cause involves selective migration, such that migrants seek out geographical areas that meet their physical and psychological needs, producing geographical differences in personality. Over generations, they pass on these shared genetic dispositions to certain personality traits and/or the shared social norms related to

particular traits. Selective migration may also contribute to the persistence of geographical differences in personality traits, with individuals migrating to areas where the prevalence of psychological and behavioural tendencies is most suitable for them, leading to the maintenance of geographical differences in personality.

Moreover, Rentfrow et al. (2008) propose that the link between personality and geography is due to a dynamic, cyclical set of processes. The first suggests that personality affects individual behaviour, which leads to prevalent behavioural tendencies of a region being reflected in geographical social indicators, and potentially spurring the creation of institutions that reflect these regional behavioural tendencies. Reversing direction, these institutions may also affect behavioural tendencies by influencing the life chances of individuals within geographical regions. Finally, geographical behavioural tendencies may affect the pervasiveness of personality traits through socialisation to adopt behaviours that conform to particular norms, so that individuals thereby gain adaptive personality traits.

With this theoretical framework in mind, we understand social cohesion as a geographical social indicator, and investigate whether it may be part of the dynamic process related to variation in personality traits.

Linking social cohesion and personality

Thus far, little empirical research has investigated the connection between personality and social cohesion. We therefore instead review the literature on personality and the individual-level variables that constitute social cohesion when aggregated to the level of a social entity.

Extraversion, as described above, should presumably support the quality of togetherness in a social entity. Western research at the individual level demonstrates that those with higher levels of extraversion are more likely to have larger social networks, greater levels of contact with their networks and have networks they can trust with confidential matters (e.g. Russell, Booth, Reed, & Laughlin, 1997). Some research demonstrates that extraverts more strongly identify with groups (Johnson, Morgeson, & Hekman, 2012), and extraversion has a particularly strong relationship with measures of prosocial behaviour and volunteerism (e.g. Penner, Dovidio, Piliavin, & Schroeder, 2005).

One may expect that higher levels of *agreeableness* would correlate positively with cohesiveness. High levels of agreeableness are shown to be related to greater individual levels of both seeking and providing support (e.g. Bowling, Beehr, & Swader, 2005). Likewise, those high in agreeableness seem to be more willing to engage in helping behaviours in both formal and informal contexts, and are more willing to be involved in the community (Ozer & Benet-Martínez, 2006).

One could also speculate that being highly *conscientious* could positively relate to overall cohesion, particularly in the feelings of responsibility towards social relationships and the common good. While those high in conscientiousness report having access to sufficient levels of social support, perhaps due to their own sense of capability, they report requiring less social support then others, but are satisfied with what they receive (e.g. Dehle & Landers, 2005). Likewise, results are mixed for the connection between conscientiousness and political engagement, suggesting that those high in conscientiousness may prioritise their feelings of responsibility towards family and work (Mondak, Hibbing, Canache, Seligson, & Anderson, 2010).

One may further assume that *neuroticism* would be negatively related to an overall sense of togetherness. Those high in neuroticism tend to be less satisfied with their support networks and less likely to see those in their networks as being supportive (Dehle & Landers, 2005; Russell et al., 1997). However, some research does seem to demonstrate that individuals with higher levels of neuroticism more greatly identify with groups, perhaps because group identification serves the purpose of reducing uncertainty (Johnson et al., 2012).

Finally, one may expect that higher levels of *openness* could be positively related to feelings of togetherness. The few studies that exist seem to indicate a positive relationship, with greater openness being related to having a broader social network (Tong et al., 2004). Those high in openness also seem to demonstrate greater levels of political participation and civic engagement, most likely due to information seeking and engagement (Mondak et al., 2010).

Thus, although social cohesion is a quality of social entities and *not* of individuals, based on the available evidence, we do expect there to be a relationship between regional levels of social cohesion and individual-level personality traits. Namely, one may expect positive relationships between social cohesion and extraversion and agreeableness, as well as a negative relationship between social cohesion and neuroticism, although the empirical evidence on conscientiousness and openness is either mixed or rather limited.

Partially in line with these expectations, an earlier examination of cohesion in 30 sub-districts in the Kyrgyz Republic by Larsen and Boehnke (2016) found significant moderate to strong correlations between aggregate sub-district personality traits and social cohesion: namely, higher levels of agreeableness, conscientiousness and openness were positively associated with social cohesion, while higher levels of extraversion and neuroticism were negatively associated with social cohesion. Particularly surprising is the negative relationship between extraversion and social cohesion, which moves in the opposite direction than expected given prior empirical evidence.

Given these findings, we aim to explore relationships between social cohesion and personality traits further, using multilevel analyses that are capable of focusing on nested sources of variability, accounting for the fact that individuals are located within sub-districts which have specific characteristics. Our first hypothesis (H1) is that the relationships found on the aggregate level will remain after accounting for the nested variability of individuals in sub-districts: Greater levels of social cohesion will be connected to greater levels of agreeableness, conscientiousness and openness, while also being connected to lower levels of extraversion and neuroticism. Our second hypothesis (H2) states that these contextual relationships will remain after accounting for the individual compositional differences related to social cohesion within each sub-district. Finally, our third hypothesis (H3) states that these relationships will continue to hold up after including relevant individual (e.g. gender, education and ethnicity) and community factors (e.g. economic situation, modernisation and demography) related to both personality and social cohesion.

METHOD

The dataset

Data used for this analysis originate from the "Social Cohesion through Community-Based Development" project in the Kyrgyz Republic, which collected individual, household and community data from 30 rural sub-districts (*ayil aimak*s).[1] The sub-districts were chosen from the Naryn and Osh regions as part of a community driven development project aiming to foster social cohesion (see Esenaliev et al., 2016). Cluster sampling was applied within the sub-districts in order to enable a random selection of 2000 households in total. In these households, the survey data were collected in 2014 using face-to-face interviews (in Russian, Kyrgyz or Uzbek) with 6356 adults age 18 and above. Listwise deletion was applied to the individual-level variables, leaving an individual-level sample size of $N_1 = 6252$ cases. Accordingly, the working sample sizes of sub-districts ($N_2 = 30$) ranged from 34 to 662 individuals.

Macro-level predictor

The first step in building an empirical measure of social cohesion began with exploratory factor analysis to select indicators for each of the nine dimensions of social cohesion proposed by Dragolov et al. (2016): social networks, trust in people, acceptance of diversity, identification, trust in institutions, perception of fairness, solidarity and helpfulness, respect for social rules and civic participation. For an indicator to be selected for a particular dimension, it had to meet an absolute factor loading of 0.40 or greater, but a cut-off of 0.25 was considered in extreme cases. One-factor solutions were forced in order to extract the factor that explained most of the variance of the indicators, and those indicators which did not load above the threshold were removed. This resulted in the selection of three to eight indicators per dimension, with Cronbach's alpha indicating sufficient quality of the constructed dimensions of social cohesion.[2] Example indicators for the nine dimensions can be found in Table A1 of the Appendix A.

In order to enable meaningful absolute comparisons, a process of scale standardisation was then carried out on the 42 selected indicators to bring them to a common scale ranging from 0 to 10. The score for each dimension was calculated as an average of the selected indicators for that dimension. In calculating the overall social cohesion score, the formative index building approach was adhered to, with each dimension theoretically understood as a building block of cohesion, contributing a unique aspect to its measurement. Thus, an overall social cohesion score (on a scale from 0 to 10) was calculated for each of the 30 sub-districts as an average of the nine dimension scores.

Individual-level dependent variables

In order to assess personality traits, the 10-item Big Five Inventory (BFI-10; Rammstedt & John, 2007) was used, which is a shortened version of the well-established Big Five Inventory (BFI-44; John, Donahue, & Kentle, 1991). The creators of the BFI-10 selected two items from the BFI-44 per Big Five dimension, representing both poles and covering central facets with as little redundancy as possible. Each of the personality traits is measured by two items: one coded in the positive direction of the scale and one coded in the negative direction. For example, conscientiousness is measured by the following items: "I see myself as someone who does a thorough job" and "I see myself as someone who tends to be lazy". These are answered using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Scores for each of the five traits are calculated by reverse coding the

[1] In the rural areas of the Kyrgyz Republic, the *ayil aimak* is the smallest administrative level, and is typically composed of a several villages.

[2] Cronbach's alpha of internal consistency ranged from .419 for "solidarity and helpfulness" with three indicators, to .943 for "trust in institutions" with seven indicators. While .70 is often used as a threshold for demonstrating reliability, scale reliability is clearly sensitive to the number of items in a scale (Nunnally, 1967, pp. 223–226). Based on Nunnally's application of the Spearman-Brown formula, a relative threshold for Cronbach's alpha can be derived which takes into account the number of items, such that an alpha of .10 times the number of items is proposed as a sufficient threshold (e.g. Kotzur, Torres, Kedzior, & Boehnke, 2017). Based on this relative threshold, sufficient quality of all of the constructed dimensions of social cohesion was indicated.

negatively coded item and calculating the mean of the two relevant items for the trait.

Individual-level covariates

With our multilevel models, we aim to disentangle social cohesion's contextual relationship with personality traits from the individual compositional differences in cohesion-related indicators. Thus, taking the approach of Poortinga (2006), we control for an individual social cohesion indicator score consisting of the 42 scale-standardised indicators described above. The individual scores were calculated as an average of these indicators (on a scale from 0 to 10) for each individual.

Personal characteristics were also controlled for in the model. These included gender as well as age (interval). Likewise, marital status was included, with married and cohabiting respondents forming the reference group in comparison to the separated, widowed and divorced, and to singles. Education was measured on a scale from 0 for pre-primary education to 5 for tertiary education (OECD, European Union, & UNESCO Institute for Statistics, 2011). Respondents were categorised as being employed rather than non-employed if the respondent indicated in the past week: (a) working for someone else, (b) farming, fishing, hunting or gathering or (c) doing any sort of work to which they will return. Due to a high amount of missing data on income, satisfaction with the economic situation of the household was used as a proxy, ranging on a scale from 0 (*completely dissatisfied*) to 10 (*completely satisfied*). Ethnic group was also included, with the Kyrgyz forming the reference group in comparison to the Uzbek, and to other ethnic groups. The number of languages spoken by the respondents was also incorporated into the model.

Finally, we follow the recommendations of Kreft, de Leeuw, and Aiken (1995) as well as Enders and Tofighi (2007) in centring the interval individual-level covariates on their sub-district means for the analyses, which provides us with parameter estimates better suited for addressing our research aim.

Macro-level covariates

Community characteristics at the sub-district level suspected to influence individuals in rural areas of the Kyrgyz Republic were controlled for in the model. As an indicator of the economic situation of the sub-districts, the aggregate rating of household quality of drinking water on a scale of 1 (*very bad*) to 5 (*excellent*) was included. One indicator of modernisation was the aggregate rating of the frequency of disruption to the power supply on a scale of 1 (*never*) to 6 (*every day*) and 7 (*no power supply at all*). A second such indicator was the proportion of communities with mobile phone service in the sub-district. Finally, as measures of demography, the average household size in the sub-district as well as the population size of the sub-district (in thousands) were used.

Descriptive information for all included variables is provided in Table 1.

Analyses

A series of three multilevel linear regression models were fit for each personality trait using the *xtmixed* command of Stata 12 (StataCorp, 2011). In the first model, the sub-district scores on social cohesion were entered to test whether the relationships between social cohesion and personality traits remain after the nested variability of individuals in sub-districts is accounted for. In order to assess whether the contextual relationship will remain after accounting for individual compositional differences related to social cohesion, an individual social cohesion indicator score was added to the second model. Finally, the sub-district and individual control variables (including the remaining four individual-level personality traits, due to lack of orthogonality in the five-factor model) were entered into the third model in order to test whether relationships between personality traits and social cohesion remain also after accounting for relevant individual and community factors. Where significant relationships between social cohesion and personality traits were found, adjusted predictions were calculated to compute the probability of certain scores on a personality trait for various scores of social cohesion, while holding all other variables in the model at their mean.

RESULTS

The "empty" model for each personality trait is an intercepts-only model, offering information on the percentage of total variation in the personality traits that has to do with the sub-district context (i.e. the intra-class correlation ρ). As this increases, the assumption that the sub-districts are similar with regards to the respective personality trait decreases. We find small to medium context effects across the personality traits: it is smallest for extraversion ($\rho = .08$), neuroticism ($\rho = .09$) and openness ($\rho = .09$), and larger for conscientiousness ($\rho = .12$) and agreeableness ($\rho = .17$). In other words, for example, 12% of the variation in conscientiousness and 17% of the variation in agreeableness stem from differences at the sub-district level.

In the next step, only sub-district social cohesion scores were entered into the model (Model 1) (see Table 2 for results for each of the personality traits), revealing that significant effects of social cohesion for each of the traits remain even after accounting for nested variability. Namely, increased levels of social cohesion are positively related to greater agreeableness, conscientiousness and

TABLE 1
Descriptive information on variables used

	Mean	*SD*	*Min*	*Max*
Level: Sub-district ($N_2 = 30$)				
Social cohesion	6.38	.45	5.33	7.09
Quality of drinking water	3.39	.54	1.89	4.33
Frequency of power disruption	3.02	.88	1.80	5.03
Average household size	4.78	.80	3.06	6.45
Proportion of communities with mobile service	.90	.22	0	1
Sub-district population (in thousands)	11.27	7.84	.97	27.62
Level: Individual ($N_1 = 6252$)				
Social cohesion indicator score	6.55	.81	2.19	9.02
Big Five: Openness	3.42	.74	1	5
Big Five: Conscientiousness	3.65	.73	1	5
Big Five: Agreeableness	3.42	.84	1	5
Big Five: Extraversion	2.96	.63	1	5
Big Five: Neuroticism	2.78	.75	1	5
Number of languages spoken	1.64	.81	1	5
Employed	.49	.50	0	1
Satisfaction with economic situation	6.51	1.62	1	10
Age (years)	40.48	16.34	18	92
Age (quadratic effect)	1905.52	1502.56	324	8464
Ethnic group: Kyrgyz	.72	.45	0	1
Ethnic group: Uzbek	.26	.44	0	1
Ethnic group: Other	.02	.15	0	1
Marital status: Married/cohabiting	.75	.43	0	1
Marital status: Separated/widowed/divorced	.09	.29	0	1
Marital status: Single	.16	.36	0	1
Education level	3.25	.86	0	5
Female	.51	.49	0	1

TABLE 2
Multilevel regressions of the Big Five: Model 1

Predictor	*E*	*A*	*C*	*N*	*O*
Level: Sub-district ($N_2 = 30$)					
Social cohesion	$-.20^{**}$	$.38^{**}$	$.35^{***}$	$-.22^{*}$	$.18^{*}$
Intercept	4.23^{***}	.90	1.41^{**}	4.20^{***}	2.24
Sub-district variance	.02	.10	.04	.04	.05
Individual variance	.37	.62	.48	.52	.51
R^2 (sub-district)	.26	.22	.39	.19	.13
R^2 (individual)	.00	.00	.00	.00	.00

Notes. All regression coefficients are unstandardised. A = agreeableness; C = conscientiousness; E = extraversion; N = neuroticism; O = openness.
$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

openness. Likewise, greater levels of social cohesion are related to lower levels of extraversion and neuroticism. These results confirm Hypothesis 1.

Model 2 adds an individual social cohesion indicator score as a covariate. Significant results remain for all personality traits (see Table 3), which confirms our expectation of contextual effects of social cohesion on individual personality traits (H2). In other words, social cohesion at the sub-district level is related to personality beyond what is due to individual compositional differences in social cohesion indicators.

In Model 3, additional individual and sub-district covariates were added to the analysis for each of the personality traits. Once they are accounted for, only the relationships between social cohesion in sub-districts and individual agreeableness, conscientiousness and openness remain (see Table 4). In other words, residents of more cohesive sub-districts have greater levels of the agreeableness, conscientiousness and openness personality traits. These results are partially in line with Hypothesis 3, but do not match our expectations regarding significant negative relationships with extraversion and neuroticism.

Adjusted predictions help to illustrate these relationships. To begin, when holding all other variables at their means, it is predicted that those individuals

TABLE 3
Multilevel regressions of the Big Five: Model 2

Predictors	*E*	*A*	*C*	*N*	*O*
Level: Sub-district ($N_2 = 30$)					
Social cohesion	−.20**	.38**	.35***	−.22*	.18*
Level: Individual ($N_1 = 6252$)					
Social cohesion indicator score	.05***	.16***	.06***	−.08***	.06***
Intercept	4.22***	.89	1.41**	4.20***	2.24***
Sub-district variance	.02	.10	.04	.04	.05
Individual variance	.37	.61	.47	.52	.51
R^2 (sub-district)	.26	.22	.39	.19	.14
R^2 (individual)	.00	.01	.00	.01	.00

Notes. All regression coefficients are unstandardised. A = agreeableness; C = conscientiousness; E = extraversion; N = neuroticism; O = openness.
*$p < .05$, **$p < .01$, ***$p < .001$.

TABLE 4
Multilevel regressions of the Big Five: Model 3

Predictors	*E*	*A*	*C*	*N*	*O*
Level: Sub-district ($N_2 = 30$)					
Social cohesion	.08	.22*	.34**	−.07	.27*
Quality of drinking water	.05	−.13	.06	.06	−.10
Frequency of power disruption	.11**	−.10	.07	.13*	.05
Average household size	−.04	.03	−.10	−.11*	−.02
Proportion of communities with mobile service	.00	−.25	.23	.22	−.22
Sub-district population (in thousands)	−.01	.01*	.00	.00	.00
Level: Individual ($N_1 = 6252$)					
Social cohesion indicator score	.03**	.11***	.00	−.04**	−.02
Big Five: Extraversion	--	−.02	.03	.04	.16***
Big Five: Agreeableness	−.02	--	.11**	−.16***	.12***
Big Five: Conscientiousness	.04	.13***	--	−.03	.19***
Big Five: Neuroticism	.03	−.17***	−.02	--	−.12***
Big Five: Openness	.13***	.13***	.20***	−.13***	--
Number of languages spoken	−.03*	.01	.01	−.03**	.08***
Employed	.01	.02	.09***	−.02	.01
Satisfaction with economic situation	.01	.00	.01**	−.00	.03***
Age (years)	−.00***	.00*	−.00	.00	−.00
Ethnic group: Kyrgyz	Ref	Ref	Ref	Ref	Ref
Ethnic group: Uzbek	−.02	−.06*	−.02	.08**	−.03
Ethnic group: Other	.09	.17**	−.11	.04	.01
Marital status: Married/cohabitating	Ref	Ref	Ref	Ref	Ref
Marital status: Separated/widowed/ divorced	−.01	.01	−.00	.03	.02
Marital status: Single	.02	−.02	−.07**	.01	.04
Education level	−.02**	−.05***	.03**	.01	.00
Female	−.01	.01	.03	−.02	.02
Intercept	3.22***	2.59**	1.26	2.81***	2.15*
Sub-district variance	.02	.08	.03	.04	.04
Individual variance	.34	.48	.39	.42	.39
R^2 (sub-district)	.46	.37	.45	.26	.30
R^2 (individual)	.09	.22	.18	.19	.23

Notes. All regression coefficients are unstandardised. A = agreeableness, C = conscientiousness, E = extraversion, N = neuroticism, O = openness; Ref = reference category.
*$p < .05$, **$p < .01$, ***$p < .001$.

living in sub-districts with the lowest possible level of social cohesion would have a score of approximately 2.2 out of 5.0 on the trait of agreeableness, 1.8 on conscientiousness and 2.0 on openness (see Figure 1). For all three traits, the scores would increase with higher levels of cohesion. For example, those living in sub-districts with the highest possible level of social cohesion would have higher scores of approximately 4.2 on agreeableness, 4.9 on conscientiousness and 4.4 on openness.

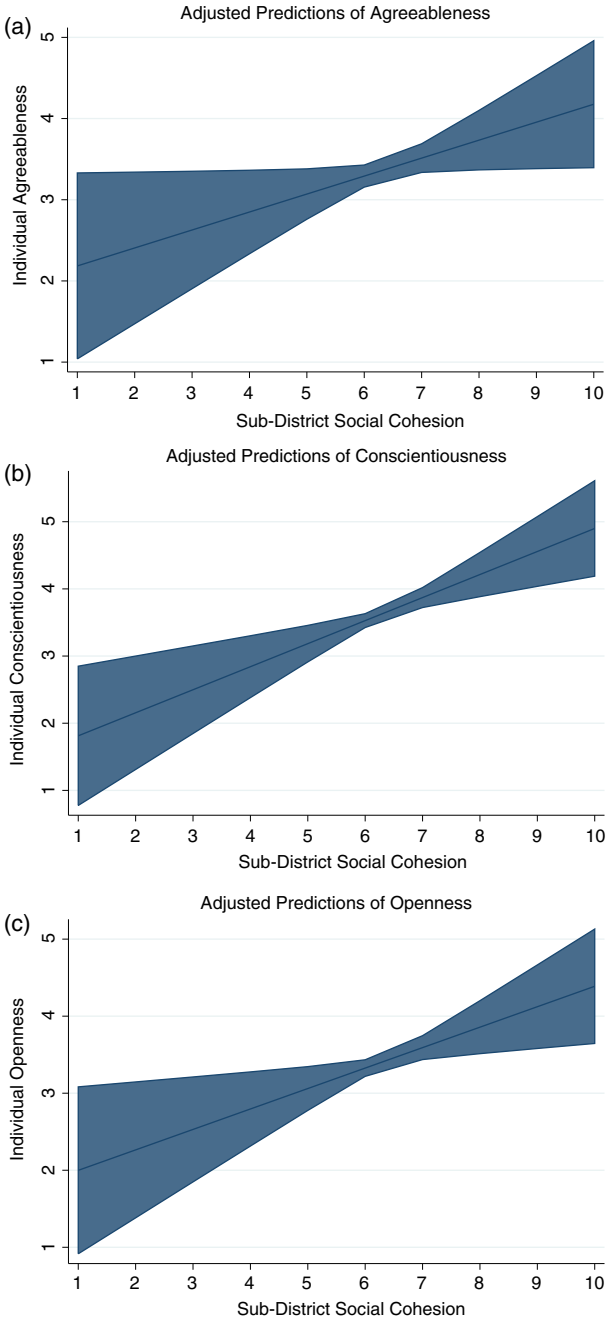

Figure 1. Adjusted predictions of individual-level (a) agreeableness, (b) conscientiousness and (c) openness (95% confidence interval) according to sub-district social cohesion scores. [Colour figure can be viewed at wileyonlinelibrary.com].

DISCUSSION

Our study examined the degree to which social cohesion of the immediate social environment of individuals is related to their personality traits. We investigated this using a comprehensive measurement of social cohesion and the BFI-10 collected in rural communities in the Kyrgyz Republic. Using multilevel analyses, we found a contextual effect demonstrating that residents of more cohesive communities show a more prosocial and communal orientation towards others, as well as higher levels of conscientiousness and openness to new experiences.

We are unable to parse out the direction of the relationship, but the literature demonstrates that both personality and social cohesion, despite being relatively stable, are indeed open to change over time (Dragolov et al., 2016; Rentfrow et al., 2008). Thus, following the theory of Rentfrow et al. (2008), we posit that our empirical relationship may move in both directions. For example, higher levels of conscientiousness among the residents of sub-districts encourages behavioural tendencies which support the conscious striving towards higher goals, which then influence the sub-district's level of social cohesion. Furthermore, higher social cohesion in a sub-district may encourage such behavioural tendencies, and through the process of adapting to social norms or attracting those who already fit these norms, affect the strength of conscientiousness among the residents of sub-districts. We expect this would function similarly with both openness and agreeableness.

However, it is not clear why cohesion did not maintain its negative relationship with extraversion and neuroticism. It may be that other sub-district or individual factors play a more important role for these traits than social cohesion. Delhey et al. (2018) demonstrated that correlates of social cohesion vary between Western and Asian countries, and although their work did not include Central Asia, it is likely to apply to the Kyrgyz Republic as well. Thus, it seems reasonable to assume that extraversion and neuroticism may function differently in collectivist cultures that underscore harmony and dependence on one another (e.g. the Kyrgyz Republic) (Chen, Wang, & DeSouza, 2006).

Moreover, we cannot exclude the possibility of the existence of a reference-group bias in the self-reporting of personality, meaning respondents' implicit comparison of themselves to their immediate community (Wood & Rogers, 2011). If this were the case, then social cohesion could potentially serve as reference point in biasing the "true" measurement of personality traits. One tactic for addressing this could involve additional types of personality measurement, such as observer ratings, in future research.

Finally, validation studies demonstrate that the BFI-10 preserves considerable proportions of the reliability and validity of the original BFI-44, thus making it a reasonable alternative for measuring personality traits in situations which do not allow for an extensive measurement of personality (Rammstedt & John, 2007). This was the case in our study, where data collection necessarily focused on aspects of social cohesion and community development. However, it is clear that if resources

allow, the application of the BFI-44 would offer psychometric advantages and potentially a more complete picture of the relationship between personality and social cohesion.

CONCLUSIONS

Our findings fill a gap in the literature by providing initial evidence for a significant contextual relationship between social cohesion and individual personality traits within a given social entity. In the Kyrgyz Republic, a positive contextual relationship was demonstrated between cohesion and agreeableness, conscientiousness, and openness. Our results imply that either: (a) these particular traits encourage those behavioural tendencies which contribute to social cohesion; (b) social cohesion supports the social norms of the behavioural tendencies of these traits, which then encourage the corresponding trait development; or (c) both, moving in a cyclical manner. These implications should particularly be kept in mind when developing and implementing policy aimed at strengthening social cohesion. Furthermore, future research should disentangle the causal directions of the relationship and test the external validity of this finding in other cultural settings.

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APPENDIX

TABLE A1

Example indicators used for measuring the nine dimensions of cohesion

Dimension of cohesion	*Example indicator*
Social networks	How likely is it that you will easily ask for help from your neighbours, friends or co-workers?
Trust in people	In general, you can trust people.
Acceptance of diversity	I have meaningful interactions with people from different backgrounds.
Identification	I see myself as a citizen of Kyrgyzstan.
Trust in institutions	How much do you generally trust the *rayon* administration and services?
Perception of fairness	I think the *ayil kanesh* and *aiyl okmotu* treat all types of people fairly.
Solidarity and helpfulness	Did you give any non-financial help (e.g. homework or baby care, repairing house, preparing celebrations) during the last 12 months?
Respect for social rules	I feel safe when walking alone in the neighbourhood during the night.
Civic participation	In general, how interested in politics are you?

Notes. *Ayil kenesh* = village parliament; *Ayil okmotu* = village executive body; *Rayon* = district. A complete list of the 42 indicators can be found in tables A1–A9 of Larsen and Boehnke (2016, pp. 46–48).