To live among like-minded others:

Exploring the links between person-city personality fit and self-esteem

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Abstract

Does it matter if your personality fits in with the personalities of the people where you live? The present study explored the links between personality-city fit (P-C fit) and self-esteem. Using data from 543,934 residents of 860 U.S. cities, we examined the extent to which the fit between person and city Big Five personality traits predicts individuals' self-esteem. To provide a benchmark for these effects, we also estimated the degree to which the fit between person and city religiosity predicts self-esteem. The results provided a nuanced picture of P-C fit effects on self-esteem: Rather than a general fit pattern for all Big Five traits, we found significant but small P-C fit effects on self-esteem only for openness, agreeableness, and conscientiousness. Similar results and effect sizes were observed for religiosity. Discussion focuses on the relevance and consequences of P-C fit.

Keywords: Personality, Person-Environment Fit, Big Five, Self-Esteem, Religiosity

The choice of where to live is one of the most important decisions people face in life, perhaps as important as choosing a partner or a career. When picking a place to live, there are a variety of factors to consider, from proximity to work to cost of living. Some investigators (Florida, 2008) have also argued for the importance of yet another factor—the personality of the city—that is, the prevalent traits of the people who live there.

There are two ways a city's personality could be beneficial. First, some cities could generally be nice places to live; for example, cities populated by more agreeable, responsible, sociable people might be more pleasant and efficient than those populated by more hostile, reckless, unfriendly people. Second, some people may be suited to cities that would not suit other people—that is, benefits might also result from a particular fit between a person and the personality of the city, over and above the city's general tendency to offer benefits to its occupants (Jokela, Bleidorn, Lamb, Gosling, & Rentfrow, 2015).

Previous research has shown that the match between the characteristics of a person and the characteristics of the environment predicts a variety of positive outcomes including satisfaction, performance, and self-esteem (French, Rodgers, & Cobb, 1974; Higgins, 2005; Roberts & Robins, 2004). For example, Fulmer et al. (2010) showed that the relationship between extraversion and self-esteem is stronger in societies with high (vs. low) levels of extraversion; the authors concluded that being around others who share one's personality characteristics has self-validating effects, suggesting that one is "all right" as evidenced by one's similarity to the majority of other people in that social context.

Based on these findings, we predicted that people will have higher self-esteem in cities where their personalities fit the prevalent personalities of other people in that city. This prediction is consistent with theories that stress the importance of interpersonal belonging for self-esteem (Leary & Baumeister, 2000). Specifically, people who live around

others with similar personalities should experience less uncertainty and more social validation, which then enhances feelings of belonging and self-esteem (Fulmer et al., 2010; Leary, 1999; Swann, 1983).

To examine the links between person-city personality fit (P-C fit) and self-esteem, we used data from 543,934 residents across 860 U.S. cities. We concurrently also evaluated the main effects of individual-level and city-level personality on self-esteem. Our primary analyses focused on the Big Five personality traits.

No previous research has examined the impact of personality P-C fit on self-esteem. So, to establish an effect-size benchmark for contextualizing our results, we also examined the impact of P-C fit on self-esteem, but using religiosity instead of personality. That is, we ran the same fit analyses using a variable that is distinct from personality, but that is also linked to self-esteem (Gebauer et al., 2015a) and that has been shown to vary geographically (Motyl et al., 2014).

Method

Participants

We used data from a large sample of U.S. residents who provided personality and demographic information over the World Wide Web as part of the Gosling-Potter Internet Personality Project (http://www.outofservice.com). Potential respondents could find out about this noncommercial, advertisement-free web-site through several channels, including search engines or unsolicited links on other websites. After submitting their responses, participants received a customized personality evaluation (Gosling, Vazire, Srivastava, & John, 2004). The research project, including a waiver of parental consent, was approved by University of California and University of Texas Institutional Review Boards (for details, see Soto, John, Gosling, & Potter, 2008).

Data were collected online from December 1998 to December 2009. Typical for online surveys, there were relatively few participants older than age 60 who completed the online personality measure between 1998 and 2009. Therefore, we used data only from participants who were between 16 and 60 years old (our concerns with older age groups were that older participants were especially prone to selection effects and probably not representative of the general population of their age group). Also, we only included those participants who reported living in the United States and provided their zip-codes. Using participants' zip-codes and the United States Zip Codes database (http://www.unitedstateszipcodes.org/), we then determined the primary city in which participants lived. To ensure sufficiently large samples in a large number of cities, we included participants only from cities with at least 200 respondents. As a result of these selection criteria, the total pool of participants was reduced to 543,934 U.S. residents from 860 cities across the 50 U.S. states (6,999 zip-code areas; 63% females; mean age = 26.11 years; *SD* = 9.93). The city sample sizes ranged between 200 participants from Castle Rock, Colorado to 9,031 participants from Chicago, Illinois (mean city sample size = 632; median = 352).

Measures

Personality. Individual-level personality was assessed by means of the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991). The BFI consists of 44 items designed to assess the prototypical traits defining the Big Five dimensions: Emotional stability, extraversion, openness, agreeableness, and conscientiousness. Participants provided self-ratings on the items using a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). All scales showed satisfactory Cronbach's α-reliabilities, ranging between α = .75 for agreeableness to α = .83 for extraversion.

City-level personality was assessed by averaging each of the five z-standardized BFI scores within each of the 860 cities.[1] Hence, cities in which the majority of participants reported to be average on a given Big Five trait have a z-score of zero, a negative deviation from zero marks cities in which participants have a lower trait-level than the sample average, and a positive deviation marks cities in which participants have a higher trait-level than the sample average.

Religiosity. Individual-level religiosity was assessed with a variant of the Single-Item Religiosity Scale (SIRS; Norenzayan & Hansen, 2004). Participants rated the item "I see myself as someone who is very religious" on a 5-point Likert scale ranging from 1 (*strongly disagree)* to 5 (*strongly agree*). The SIRS is a reliable and valid measure of global religiosity (Gebauer et al., 2014). City-level religiosity was assessed by averaging the z-standardized SIRS scores within each of the 860 cities (cf. Gebauer, Sedikides, & Neberich, 2012).

Self-Esteem. Self-esteem was measured using the Single-Item Self-Esteem scale (SISE; Robins, Hendin, & Trzesniewski, 2001). Participants rated the item "I see myself as someone who has high self-esteem" on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Robins et al. (2001) reported extensive evidence for the reliability and validity of the SISE. SISE raw scores were transformed to the T-score metric (standard scores with a mean of 50 and standard deviation of 10). T-scores can be used to index effect sizes. In terms of Cohen's (1988) now conventional guidelines for interpreting effect sizes, a difference of 2 T-score points represents a small effect, a difference of 5 points represents a medium effect, and a difference of 8 points represents a large effect.

Analyses

[1] Aggregating individual-level data is the standard approach used to operationalize psychological constructs at a macro level (e.g., at the level of nations). Several studies have used this approach to operationalize the personality profiles of nations (e.g., McCrae et al., 2005), U.S. states (Rentfrow et al., 2008) or regions (Rentfrow et al., 2013).

We used multilevel polynomial regression and response surface plots (Edwards, 2002) to analyze the relationships between individual-level characteristics, city-level characteristics, and self-esteem. Polynomial regression yields regression coefficients for two linear terms (i.e., individual-level personality and city-level personality), their multiplicative interaction, and their quadratic terms and relates them to a dependent variable (i.e., self-esteem). Multilevel modeling was used to account for the nested data structure (participants nested within cities) by allowing random intercepts for cities. Formally, our basic model can be specified as:

$$\textit{Self-Esteem} = b_0 + b_1P + b_2C + b_3PC + b_4P^2 + b_5C^2 + \mathrm{u} + \mathrm{e}$$

where P and C represent individual-level personality and city-level personality, b_0 represents the overall intercept, u represents the random intercept for each city, and e the error term on level 1. We controlled for individual-level age and gender due to the likely relationships of these variables with both personality and self-esteem (e.g., Bleidorn, Klimstra, Denissen, Rentfrow, Potter, & Gosling, 2013; Orth & Robins, 2014). At the city level, we additionally controlled for the cities' average age and sample size.

To examine the fit patterns for each of the Big Five traits and religiosity, we ran six polynomial regression analyses and examined whether the interaction effects between individual-level characteristics and city-level characteristics were statistically significant. We then used the coefficients from the polynomial regressions to construct six response surface plots. These plots visualize the results of the polynomial regressions in a three-dimensional space and allow for a closer inspection of the meaning and magnitude of the effects. All analyses were performed using the statistical software R (R Development Core Team, 2014) and the package RSA (Schönbrodt, 2015).

Results

City-Level Differences in Personality

The maps displayed in Figure 1 show the *z*-standardized Big Five scores of the 860 cities in the present study, including the names of example cities with relatively high and low scores on each of the five trait domains. Each city is represented by a blob, the size of which is weighted by the city's sample size (see Supplemental Materials for a complete list of all cities in the present study, including their z-standardized scores on the Big Five, SISE, and religiosity).

Notably, due to the within-city aggregation, the city-level variance was considerably smaller (ranging between -0.5 and +0.5 *z*-score points for each of the five personality traits) than the individual-level variance. Due to the smaller variance of city-level personality we did not expect to find exact numerical congruence (for all participants with a personality $|z|$-score > 0.50 it would be impossible to find a match with an equal city *z*-score). Therefore we did not compute formal surface parameters along the numerical lines of congruence (Edwards, 2002), but interpreted the joint impact of the predictor variables on the response surface.

P-C fit Analyses

The upper part of Table 1 shows the results of the polynomial regressions. Based on the polynomial regression coefficients, we constructed response surface plots for each of the Big Five traits and our benchmark measure of religiosity. The proportion of the total outcome variance explained by the full models ($P + P^2 + C + C^2 + PC$) ranged between 2.92% for openness to 26.89% for emotional stability (marginal R^2 indicating the proportion of variance that is explained by the fixed effects, see Nakagawa & Schielzeth, 2013).

Table 1 also shows the results of two model-comparison tests (Akaike Information Criterion – AIC; negative values indicate an improvement in model fit). For each of the five

traits and religiosity, we first compared a model with only the control variables with a model including the individual-level terms ($P + P^2$). We then compared the latter model with a model that also included the city-level main and interaction effects ($P + P^2 + C + C^2 + PC$).

Emotional Stability. We found a significant linear and a smaller quadratic effect of individual-level emotional stability on self-esteem, suggesting that higher individual-level emotional stability was associated with higher self-esteem (Figure 2.1). Additionally, there were significant positive linear and quadratic effects of city-level emotional stability on self-esteem. The interaction term was not significant, suggesting no P-C fit effects for emotional stability. The model-comparison tests indicated a significantly better fit for the model including the city-level effects. However, the absolute gain of explained variance after adding the city-level effects was 0.09% (which is a relative gain of less than 1% compared to the individual effects).

Extraversion. As can be seen in Table 1 and Figure 2.2, there were significant linear and quadratic effects of individual-level extraversion on self-esteem but no significant city-level effects. That is, individuals high on extraversion scored higher on self-esteem, regardless of the city in which they lived. Model-comparison tests suggested no improvement in model fit after including the city effects and again, the absolute gain of explained variance after adding the city-level effects was 0.01% (which is a relative gain of less than 1% compared to the individual effects).

Openness. There were significant but small linear and quadratic individual-level effects of openness on self-esteem suggesting that open individuals tended to have higher self-esteem compared to people low in openness. We also found a negative linear city-level effect and a significant positive interaction between individual-level and city-level openness. An inspection of the response surface in Figure 2.3 showed that individuals low in openness

had higher self-esteem in less open cities; their self-esteem decreased in open cities. Here, both model-comparison tests showed an improvement in model fit after adding the individual-level and city-level terms, respectively. Yet, the absolute gain of explained variance after adding the city-level effects was 0.01% (which is a relative gain of less than 1% compared to the individual effects).

Agreeableness. The significant individual-level effects suggested that individuals high on agreeableness had higher self-esteem. Additionally, we found a significant linear city-level effect and a significant positive interaction between individual-level and city-level agreeableness. Examining the response surface in Figure 2.4, it becomes apparent that individuals high in agreeableness had the highest self-esteem in highly agreeable cities; whereas individuals low on agreeableness had generally lower self-esteem, regardless of the city in which they lived. Both model-comparison tests indicated an improved model fit after including the individual and city-level terms; the absolute gain of explained variance after adding the city-level effects was 0.1% (which is a relative gain of 2% compared to the individual effects).

Conscientiousness. We found significant individual-level effects of conscientiousness on self-esteem, suggesting that individuals high in conscientiousness had higher self-esteem than individuals low in conscientiousness. Additionally, there was a significant linear city-level effect and a significant interaction between individual-level and city-level conscientiousness. As can be seen in Figure 2.5, these effects were most relevant for individuals high in conscientiousness, who had higher self-esteem in highly conscientious cities. Both model-comparison tests indicated an improved model fit after including the individual and city-level terms; the absolute gain of explained variance after adding the city-level effects was 0.11% (which is a relative gain of 1% compared to the individual effects).

Summary. Polynomial regression and response surface analyses revealed significant main effects for all city-level Big Five traits, except for extraversion. Moreover, we found significant interaction effects between individual-level and city-level terms for openness, agreeableness, and conscientiousness, suggesting that some people have slightly higher self-esteem in cities in which most people share these personality characteristics with them. With an R^2 gain of < 0.11%, however, these city effects are very small compared to the effects of the individual's personality (R^2 ranged between 5% and 27%).

Notably, both the Big Five personality traits and self-esteem were measured via self-report. Thus, the individual-level effects could be inflated by shared method variance (e.g., evaluative biases). In contrast, the city-level effects were not affected by shared method variance and might therefore be more important, relative to the individual-level effects, than the present study suggests.

Benchmark Analysis

How much variance can one expect to be explained by a relatively distal predictor such as a city's personality? To provide a reasonable comparison standard and to guide the interpretation of the personality P-C fit results, we also examined the degree to which the fit between person and city religiosity predicted individuals' self-esteem.

The lower part of Table 1 shows the results of the polynomial regression for religiosity. The individual-level effects suggested that religious individuals had higher self-esteem than individuals who scored low on religiosity. Also, there was a small quadratic city-level effect and a positive interaction effect between individual-level and city-level religiosity. Figure 2.6 illustrates that personal religiosity mattered only in cities with a higher average religiosity. The model-comparison tests suggested an improvement in model fit after adding both the individual and city terms. The absolute gain of explained variance after

adding the city-level terms was 0.06% (i.e., a relative gain of 2% compared to the individual effects) and thus comparable to the results for the P-C fit effects.

Discussion

Three major findings stand out from this project. First, self-esteem was most strongly determined by individuals' own emotional stability and extraversion (Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001). These associations were not modified by the city's personality, suggesting a direct link between these traits and self-esteem that is largely independent of individuals' contextual setting and circumstances (Gebauer et al., 2015b).

Second, there were positive interaction effects between individual-level and city-level traits involving openness, agreeableness, and conscientiousness. Such P-C fit effects were theorized to be beneficial for self-esteem because a high degree of psychological fit should reduce uncertainty and increase social validation, thereby increasing feelings of self-worth (Hardin & Higgins, 1996; Leary, 1999).

Third, the statistical effect sizes for city-level personality effects were small compared to the individual-level personality effects on self-esteem. One explanation for these small effects is that the city-level variance is considerably smaller than the individual-level variance, suggesting that the personalities of cities are more similar than one might expect. Consequently, P-C fit cannot exert much of an effect over and above individual-level effects. Another explanation is that other effects (e.g., self-esteem promoted by standing out from the crowd) countervail the effects of P-C fit.

To gauge the P-C fit effect sizes for personality, we also examined the extent to which the fit between person and city religiosity predicted self-esteem. Consistent with previous research (Gebauer et al., 2015a), there was a significant interaction between individual-level and city-level religiosity on self-esteem. The effect size was similar to those observed for

personality traits, suggesting that both personality and religiosity fit are approximately of equal importance.

Limitations

The strengths of the present study include a large sample size and a fine-grained geographical resolution in determining participants' cities. However, there are also important limitations. First, the analysis was limited by cross-sectional data. We cannot rule out that people high in self-esteem and with certain personality profiles are better able to choose cities that fit their personality.

Second, the data were not representatively sampled. Although Internet-based samples are more diverse and representative than are the convenience samples commonly used in social-science research (Gosling et al., 2004), the representativeness of the samples might have varied across the cities examined here.

Third, city personality traits were operationalized as aggregates of its inhabitants' personality traits, which might have tilted the analyses towards stronger effects for individual-level variables. Future research needs to test whether the present findings replicate using alternative operationalizations of city personalities, such as objective city characteristics.

Conclusion

The present research provides partial support for the P-C fit hypothesis, but also emphasizes the marginal contribution of cities' personalities. Instead of a general fit pattern for each Big Five trait, we found small fit effects only for specific traits. Specifically, self-esteem was most strongly related to individuals' own emotional stability and extraversion; and these associations were not modified by the city characteristics measured in our study. For openness, agreeableness, and conscientiousness, we found statistically significant

interactions, suggesting that some people have slightly higher self-esteem in cities in which most people share these personality characteristics with them. Future studies using different operationalizations of city personality and samples from other countries are needed to evaluate the generalizability of the results across measures and geographical regions.

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Table 1. *Polynomial regressions of self-esteem on individual-level and city-level Big Five personality traits and religiosity (controlled for individual-level age and gender and city-level age and sample size).*

Big Five	*P*		*C*		*PC*		P^2		C^2		R_1^2	R_2^2	Δ AIC1	Δ AIC2
	B	*(SE)*	*B*	*(SE)*	*B*	*(SE)*	*B*	*(SE)*	*B*	*(SE)*	(%)	(%)		
Emotional Stability	4.87***	(0.01)	1.94***	(0.30)	-0.10	(0.16)	-0.42***	(0.01)	5.45*	(2.14)	26.80	26.89	-133025.07	-48.28
Extraversion	3.80***	(0.01)	0.49	(0.37)	-0.04	(0.17)	-0.31***	(0.01)	-2.57	(2.16)	18.24	18.25	-83930.05	2.78
Openness	1.24***	(0.02)	-1.33***	(0.28)	0.79***	(0.11)	-0.10***	(0.01)	0.19	(1.26)	2.91	2.92	-7515.89	-65.25
Agreeableness	1.92***	(0.02)	2.24***	(0.32)	0.77***	(0.16)	0.26***	(0.01)	2.03	(1.60)	4.94	5.04	-16914.14	-86.38
Conscientiousness	2.84***	(0.01)	2.23***	(0.30)	0.72***	(0.16)	0.07***	(0.01)	4.41*	(1.81)	9.86	9.97	-40467.73	-85.75
Benchmark														
Religiosity	1.56***	(0.02)	0.16	(0.15)	1.02***	(0.07)	0.04*	(0.02)	-1.00**	(0.29)	3.69	3.75	-10812.35	-198.73

Notes. P = individual-level characteristic; *C* = city-level characteristic; *PC* = multiplicative interaction between individual-level and city-level; P^2 = squared individual-level characteristic; C^2 = squared city-level characteristic; *B* = unstandardized regression coefficient; *SE* = standard error; R_1^2 (%) = proportion of outcome variance explained by a model including the control variables and individual-level terms (P+P^2); R_2^2 (%) = proportion of outcome variance explained by the full model including the control variables, individual-level terms, and the city-level main and interaction effects (P+ P^2+ C +C^2 + PC); AIC= Akaike Information Criterion as a measure of relative model fit (negative values indicate an improvement in model fit): Δ AIC1= model comparison between a model with control variables only and a model including the individual-level terms (P+P^2); Δ AIC2= model comparison between a model with control variables and individual-level terms (P+ P^2) and the full model including the city-level main and interaction effects (P+ P^2+ C +C^2 + PC).

* *p* , .05. ** *p* , .01. *** *p* , .001

Figure 1. Heat maps of the z-standardized Big Five scores of the 860 cities in the present study.

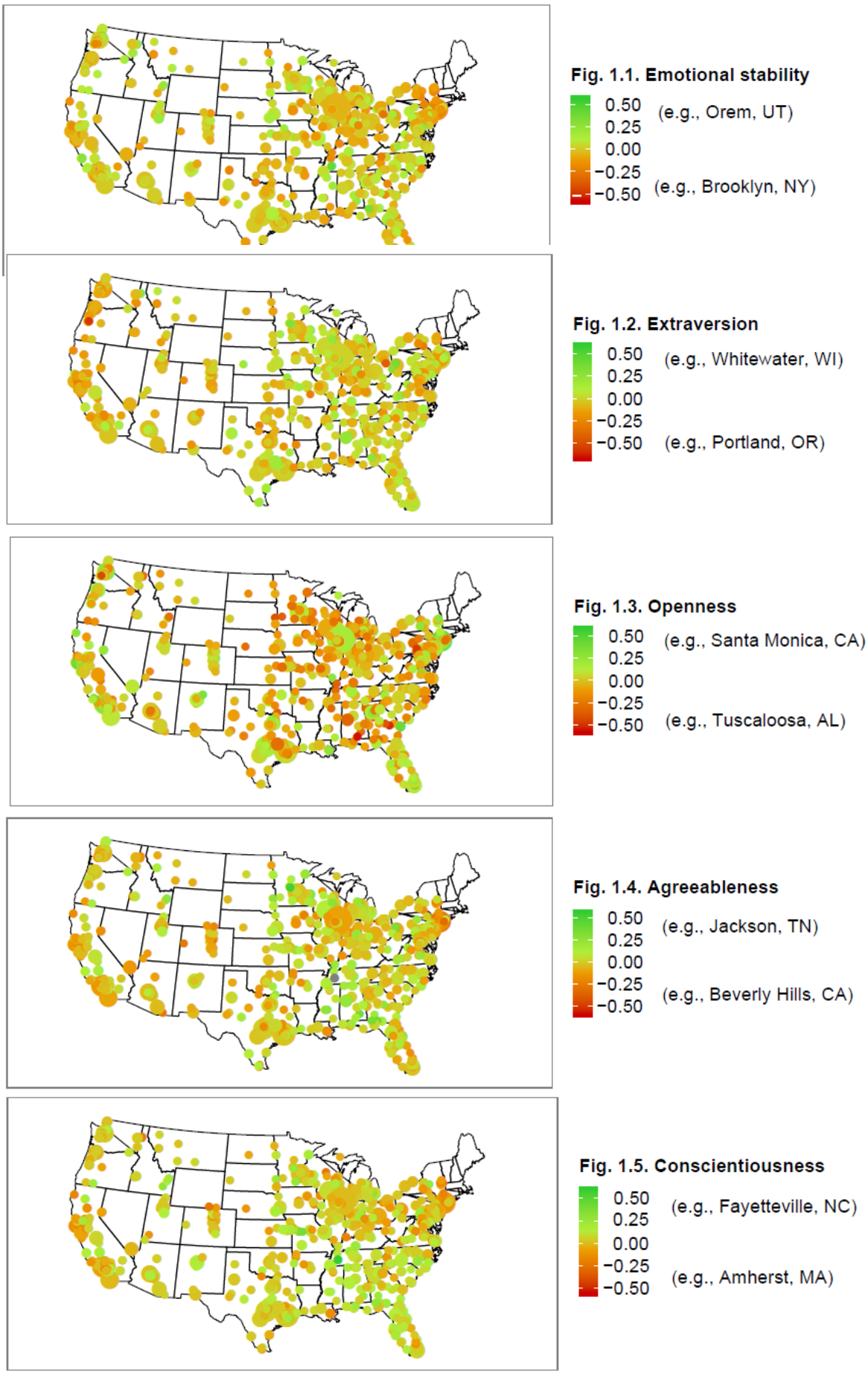


Figure 2. Response surface plots for Big Five traits and religiosity based on multilevel polynomial regression analyses (including control variables). The surface should only be interpreted within the black ellipse, which visualizes the range of actual data. The grey ellipse shows the inner 50% of the bivariate data (comparable to the box of a boxplot; Rousseeuw, Ruts, & Tukey, 1999).

Fig 2.1. Emotional Stability

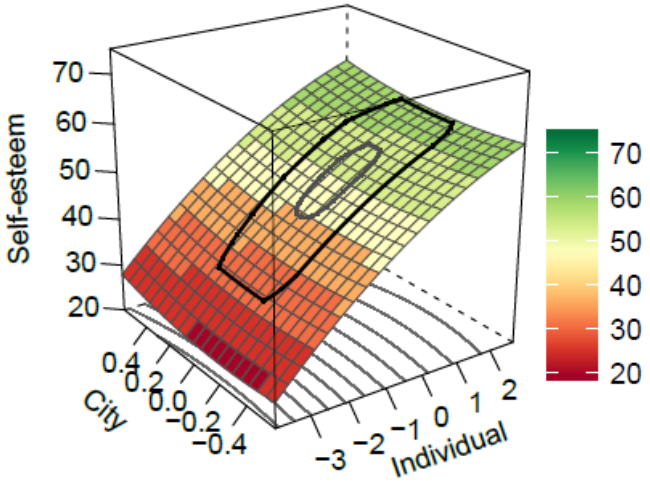


Fig. 2.2. Extraversion

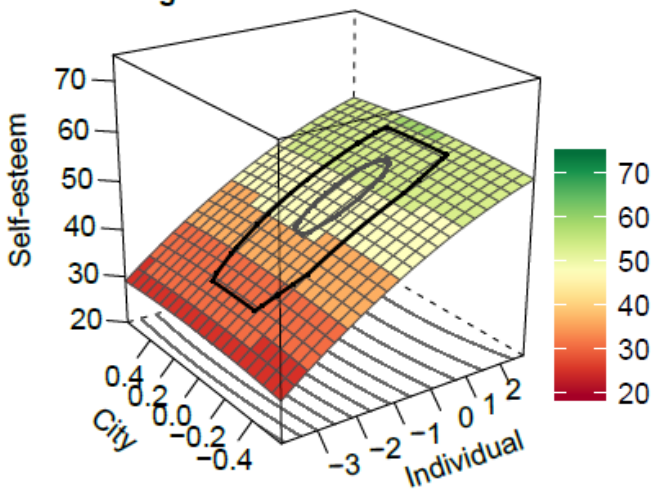


Fig. 2.3. Openness

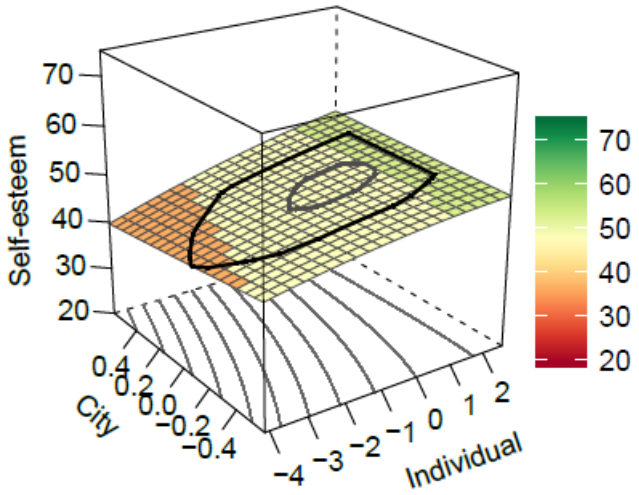


Fig. 2.4. Agreeableness

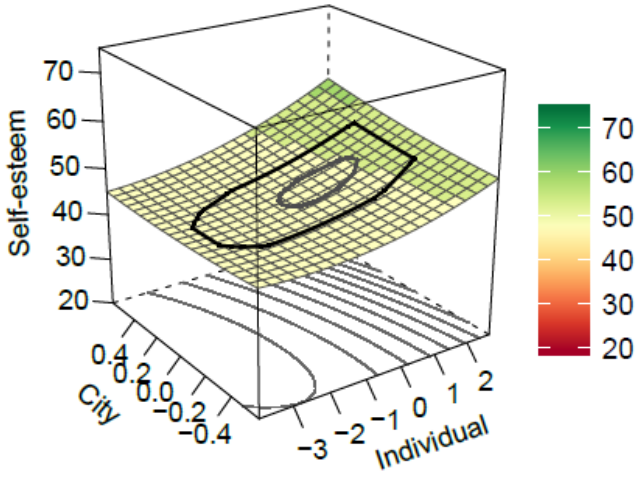


Fig. 2.5. Conscientiousness

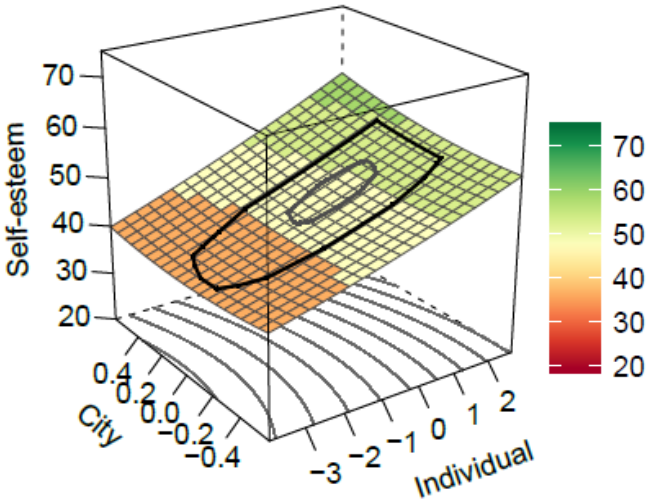
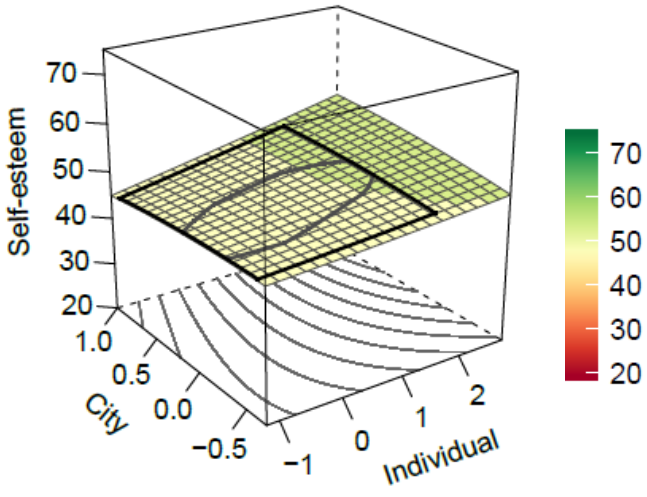


Fig. 2.6. Religiosity



Author Contributions

W. Bleidorn developed the study concept. Data collection was performed by S. D. Gosling and J. Potter. F. Schönbrodt and W. Bleidorn performed the data analyses. All authors contributed to the interpretation of the results. W. Bleidorn drafted the paper, and P. J. Rentfrow, F. Schönbrodt, J. E. Gebauer, and S. D. Gosling provided critical revisions. All authors approved the final version of the paper for submission.