

## Divided We Stand: Three Psychological Regions of the United States and Their Political, Economic, Social, and Health Correlates

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There is overwhelming evidence for regional variation across the United States on a range of key political, economic, social, and health indicators. However, a substantial body of research suggests that activities in each of these domains are typically influenced by psychological variables, raising the possibility that psychological forces might be the mediating or causal factors responsible for regional variation in the key indicators. Thus, the present article examined whether configurations of psychological variables, in this case personality traits, can usefully be used to segment the country. Do regions emerge that can be defined in terms of their characteristic personality profiles? How are those regions distributed geographically? And are they associated with particular patterns of key political, economic, social, and health indicators? Results from cluster analyses of 5 independent samples totaling over 1.5 million individuals identified 3 robust psychological profiles: Friendly & Conventional, Relaxed & Creative, and Temperamental & Uninhibited. The psychological profiles were found to cluster geographically and displayed unique patterns of associations with key geographical indicators. The findings demonstrate the value of a geographical perspective in unpacking the connections between microlevel processes and consequential macrolevel outcomes.

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From the Deep South and the Bible Belt, to the Rustbelt and the Stroke Belt, America has long been divided into a variety of distinct regions. These regions have been characterized in terms of the political, economic, social, and health characteristics that are shared by neighboring states. Recent research indicates that U.S.

states also differ systematically in terms of their mean personality scores (e.g., Rentfrow, Gosling, & Potter, 2008). Such findings raise the possibility of dividing regions, not in terms of traditional social and economic indicators, but in terms of psychological characteristics instead. Characterizations of regions based on the psychological characteristics of the people who live in them are appealing because psychological factors are likely to be the driving forces behind the individual-level behaviors that eventually get expressed in terms of macrolevel social and economic indicators. Therefore, the present work aimed to determine whether it is possible to construct a map of the United States based entirely on psychological characteristics, in this case personality traits. What would such a map look like? And how would its individual regions vary in terms of key political, economic, social, and health (PESH) metrics known to vary geographically within countries?

### Regional Variation in PESH Metrics

All behaviors take place in specific physical locations, which is why geography has long been recognized as necessary for understanding human behavior. Indeed, geographical information is a

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central focus of several disciplines, including political science, economics, sociology, and epidemiology. Political geography addresses questions about the influence of historical migration patterns and local demography on political regionalism. For example, Elazar's (1994) classic work on American political culture identified three distinct political subcultures—individualistic, moralistic, and traditionalistic—that emerged as a result of the historical settlement and migration patterns in specific regions. Other researchers have focused on the impact of ethnic diversity on regional political values (Heppen, 2003; Hero, 1998). According to Hero (1998), racially homogenous regions (predominantly in the Midwest and Great Plains) have undifferentiated social structures and are concerned with community development, whereas racially heterogeneous regions (East, South, and West Coast) have complex social structures and are concerned with maintaining social order and economic prosperity.

Geographical research in economics and sociology examines the spatial organization of various economic and social phenomena. For example, Florida's (2002) research on the creative class focuses on the regional distribution of the workforce employed in the arts, sciences, media, and technology industries. Regional analyses of the creative class show that it is concentrated in culturally diverse urban areas where residents have progressive values and are tolerant of social differences (predominantly in the Northeast and West Coast). Research on social capital examines the spatial distribution of civic engagement, or the degree to which people feel connected to family, friends, and neighbors. Putnam (2000) found that social capital varies within the United States, with the Southeast and Mid-Atlantic states showing low levels and the West, North Central, and Mountain states showing high levels. The prevalence of social capital within regions appears to be driven by religiosity, ethnic diversity, and media consumption.

Spatial epidemiology examines regional variations in disease and mortality. A well-established line of research in this field concerns the regional distribution of stroke mortality (Borhani, 1965; Lanska, 1993). Health statistics dating back more than 70 years have consistently shown that mortality from stroke and other forms of cardiovascular disease are disproportionately high throughout the Southeast and the southern Midwest, or a region dubbed the Stroke Belt. Although the key factors responsible for this geographic pattern have remained elusive, there appear to be some social characteristics common to this region that are influential. Specifically, racial composition, socioeconomic characteristics, social norms for health and nutrition, and environmental features appear to be among the main factors that contribute to the health and well-being of residents in this region (Glymour, Avendaño, & Berkman, 2007).

Taken together, research in the geographical sciences clearly shows that there are distinct regions within the United States that are defined in terms of their PESH characteristics. In light of all this geographically oriented work in the social sciences, the scarcity of research on geographic variation in psychological attributes is notable. This neglect is particularly puzzling given that many of the processes by which demographic factors become expressed in traditional PESH metrics are likely to be psychological in nature. Presumably, the phenomena studied by psychologists (e.g., stereotyping and prejudice, decision making, social support, susceptibility to stress) play a key role in mediating the links between such predictive factors as ethnic diversity, socioeconomic status, and

education and outcomes such as regional prosperity, voting patterns, and disease rates. There are some early hints that psychological processes may contribute to these regional differences in PESH outcomes. In particular, evidence is beginning to emerge from a few studies to suggest there are meaningful psychological differences across regions of the United States.

### Regional Variation in Personality

Research in psychology has only just begun to examine the interplay between geography and psychological processes. This interest stems largely from the establishment of the Big Five framework as an empirically based and widely accepted model for conceptualizing the structure of personality (Costa & McCrae, 1992; Goldberg, 1992). Results from investigations of cross-national differences using this framework show geographic variation in each of the five personality domains (e.g., McCrae, 2001; McCrae & Terracciano, 2008; Schmitt, Allik, McCrae, & Benet-Martínez, 2007; Steel & Ones, 2002). For example, there is evidence that members of Asian cultures score low on measures of Extraversion compared with members of other cultures; members of Central and South American cultures score comparatively high on measures of Openness; and members of Southern and Eastern Europe score higher in Neuroticism compared with members of other European cultures (Allik & McCrae, 2004; McCrae, Terracciano, & 79 Members of the Personality Profiles of Cultures Project, 2005).

Considerably less attention has been given to regional personality differences within nations. To date, three investigations have explored the geographical distribution of personality within the United States (Krug & Kulhavy, 1973; Plaut, Markus, & Lachman, 2002; Rentfrow et al., 2008). Conceptual and methodological differences between the studies make it hard to systematically compare the results, but a broad analysis of the general trends suggests regions do vary in their mean levels of personality traits. For example, Neuroticism appears to be highest in the Northeast and Southeast and lowest in the Midwest and West; Openness appears to be highest in the New England, Middle Atlantic, and Pacific regions and lower in the Great Plain, Midwest, and southeastern states; and Agreeableness is generally high in the Southern regions and low in the Northeast. The spatial patterns for Extraversion and Conscientiousness do not appear consistent across studies.

The regional personality differences observed within the United States have been shown to be associated with a variety of geographical indicators. Specifically, using the state-level personality scores published by Rentfrow and colleagues (2008), studies have shown that state-level personality scores are related to health and morbidity (McCann, 2010a, 2010b, 2011b; Pesta, Bertsch, McDaniel, Mahoney, & Poznanski, 2012; Voracek, 2009), psychological well-being (McCann, 2011a; Pesta, McDaniel, & Bertsch, 2010; Rentfrow, Mellander, & Florida, 2009), social capital (Rentfrow, 2010), creative capital (Florida, 2008), income inequality (de Vries, Gosling, & Potter, 2011), entrepreneurship rates (Obschonka, Schmitt-Rodermund, Silbereisen, Gosling, & Potter, 2013), political values (Rentfrow, Jost, Gosling, & Potter, 2009), and regional stereotypes (Rogers & Wood, 2010). These findings suggest that the personality traits that are common in a state are

linked to an assortment of important indicators that delineate different regions of the United States.

Thus far, all the research on regional personality differences has compared states or regions on individual traits. This approach effectively focuses the prevalence of individuals with specific personality traits and how the prevalence of individuals with certain traits relates to PESH characteristics. It is useful because it provides information about how places compare on particular psychological attributes, and it reveals the degree to which personality processes generalize across multiple levels of analysis. However, a limitation of this approach is that it focuses on traits in isolation without reference to other psychological characteristics.

An alternative approach that overcomes the limitations of trait-centered methods is the idiographic perspective, which focuses on the configuration traits. This perspective has received considerable attention within personality psychology because it provides a more holistic depiction of the person compared with the trait-centered approach. Research from this perspective has identified specific configurations of traits that commonly occur in the population, are stable over time, and predict important life outcomes (Asendorpf & van Aken, 1999; Caspi, 2000; Chapman & Goldberg, 2011; Hart, Atkins, & Fegley, 2003). At a geographical level, the idiographic perspective allows for investigating whether there are particular configurations of traits that occur with some regularity in specific regions and whether those trait configurations are related to macrolevel outcomes. Characterizing regions on the basis of the organization of multiple attributes is consistent with the approaches used to examine regional variation in various PESH indicators (e.g., the "Middle America" political region comprises states with comparatively small minority populations, low incomes, and conservative values, whereas the "Sunbelt" political region comprises states with large minority populations, high incomes, conservative values; Heppen, 2003). Thus, characterizing regions in terms of configurations of personality traits would seem to be a useful approach for exploring the psychological topography of the country, one that provides a more thorough representation of personality.

### The Present Investigation

The aim of the present investigation was to investigate the viability of characterizing regions of the United States in terms of their personality attributes and explore the potential utility of these characterizations. Specifically, in the present investigation, we asked the following: Are there distinct psychological regions in the United States? How are the psychological regions geographically distributed? What are the psychological profiles of the regions? How are the psychological regions linked to PESH indicators?

In the present investigation, we sought to identify psychological regions by focusing on the organization of traits within a state. This approach is optimal for investigating psychological regions because it allows for identifying groups of states where the configuration of personality traits is similar, as is occasionally done for characterizations based on PESH indicators. Such groups constitute psychological regions in so far as they represent geographical areas that can be characterized in terms of a common personality trait profile.

Our regional analyses focused on state-level personality traits, which are the mean trait scores of respondents who live in the

state. Thus, to say that New York is high in Neuroticism is to say that the mean level of Neuroticism derived from a sample of New York residents is high compared with the mean levels of Neuroticism derived from samples of residents from other states. The approach we used effectively examines how the mean personality traits are arranged within states. So although New York may be high in Neuroticism compared with other states, New York may be lower in Neuroticism than it is in Openness, but higher in Neuroticism than Extraversion, Agreeableness, and Conscientiousness. To the extent that there are other states with a personality profile that is similar to New York's, those states would constitute a psychological region that is defined by the personality profile they share. And states that share a psychological profile that is different, where Neuroticism is also high but lower than Openness, for example, would form another psychological region.

The primary objective of the investigation was to map the psychological topography of the United States. We made no explicit predictions about the number of psychological regions that would emerge from the data, the geographical distribution of those regions, the precise organization of traits within them, or their PESH characteristics. Results from studies of cross-national personality indicate that geographical proximity is related to personality profile similarity (e.g., Allik & McCrae, 2004; McCrae et al., 2005), so we expected states that are close to one another geographically to, on average, be psychologically similar too. However, it should be emphasized that we modeled the personality clusters in the data without reference to geographical information, and only later examined whether the identified profiles produced geographically coherent psychological regions, or whether the personality profiles were distributed in some other pattern (e.g., with multiple centers or randomly) across the United States.

### Method

Our analyses were based on data from five samples that varied in their methods, Big Five trait measures, data collection periods, and recruitment strategies. This multisample approach allowed us to examine the robustness of the effects by comparing findings across samples. Information about participants' state of residence and their self-reported personalities were collected over a period of 12 years. Large samples were available for the 48 contiguous states and Washington D.C., so the analyses were restricted to those states only (i.e., excluding Alaska and Hawaii). Across all five samples, a total of 1,596,704 individuals participated. We describe each of the samples in detail below.

#### Sample 1 (S1)

S1 is the sample used by Rentfrow et al. (2008) in research on regional personality differences across the United States. The only difference between the sample used in the present study and that used previously is that the present investigation did not include personality scores for Alaska or Hawaii. Data for S1 were collected between December 1999 and January 2005 as part of the Gosling-Potter Internet Personality Project (for details, see Gosling, Vazire, Srivastava, & Swann, 2004; Rentfrow et al., 2008; Srivastava, John, Gosling, & Potter, 2003), which hosts a noncommercial, advertisement-free website containing a variety of personality measures. Respondents could learn about the project

through several channels, including search engines or links on such websites as [www.socialpsychology.org](http://www.socialpsychology.org). Respondents volunteered to participate in the study by “clicking” on the personality test icon and were then presented with a series of questions about their personality characteristics, demographics, and state of residence. After submitting their responses, participants received customized feedback about their personalities.

**Participants.** Multiple criteria were used to eliminate repeat responders and duplicate entries (e.g., removal of entries from the same IP address within a 60-min period). Implementation of the screening criteria resulted in data for 612,140 respondents (55% female). The mean age of respondents was 24.73 years ( $SD = 10.39$  years), with 347,940 (57%) respondents between the ages of 18 and 24, 252,936 (41%) between 25 and 54, and 10,284 (2%) over 55 years old. Of those who indicated, 24,479 respondents (4.0%) were African American; 38,487 (5%) were Asian; 28,059 (3%) were Hispanic; 488,427 (84%) were White; and 27,279 (4%) indicated “other.” Summary statistics for the sample are reported in the first data column of Table 1.

Participants were asked to indicate the state in which they lived at the time in which they participated in the study. The sample sizes ranged between 1,536 participants from Wyoming and 71,873 participants from California ( $M = 12,493$ ;  $Mdn = 8,368$ ).

The demographic characteristics of the sample were compared with data from the U.S. Census Bureau (2000) to determine the representativeness of the sample. Specifically, the percentage of respondents in each demographic group from the Internet sample was correlated with the percentage of the population from that group within each state. The correlation between the number of respondents in a state and the population of the state was .98, indicating that no states were over- or underrepresented in the data. With regard to ethnicity, the correlations for African Americans, Asians, Hispanics, Whites, and “other” ethnicities were .97, .84, .93, .91, and .75, respectively. With regard to age, the correlations for people aged 18–24, 25–54, and 55 and over were .24, .39, and .16, respectively. These results show that the ethnic breakdowns

for the sample are fairly representative of the population, but the age representation is less so.

**Personality.** The Big Five Inventory was used to assess personality (BFI; John & Srivastava, 1999). The BFI consists of 44 short statements designed to assess the prototypical traits defining each of the five-factor personality model dimensions. Using a 5-point Likert-type rating scale with endpoints at 1 (*Disagree strongly*) and 5 (*Agree strongly*), respondents indicated the extent to which they agreed with each statement. The psychometric validity of the BFI scales have been demonstrated in earlier research (John & Srivastava, 1999). Analyses of the present data indicated that the BFI scales were internally reliable at the individual level of analysis ( $\alpha = .85, .80, .82, .83,$  and  $.79$ , for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness, respectively).

**Sample 2 (S2)**

Data for S2 were collected between February 2005 and August 2009 as part of the Gosling-Potter Internet Personality Project. The procedure was identical in every respect to the one used with S1 except the data were collected over a different period.

**Participants.** Multiple criteria were also used to eliminate repeat responders and duplicate entries from S2. Implementation of the criteria resulted in data for 507,987 respondents (65% female). The mean age of respondents was 24.98 years ( $SD = 11.01$  years), with 326,545 (64%) respondents between the ages of 18 and 24, 176,537 (35%) between 25 and 54, and 4,905 (1%) over 55 years old. Of those who indicated, 42,897 respondents (9%) were African American; 37,001 (7%) were Asian; 44,211 (9%) were Hispanic; 353,712 (70%) were White; and 25,714 (5%) indicated “other.” Summary statistics for the sample are reported in the second data column of Table 1. Participants were asked to indicate the state in which they lived at the time in which they participated in the study. The sample sizes ranged between 857

Table 1  
Summary of Sample Characteristics

Variable	S1	S2	S3	S4	S5
Data collection period	1999–2005	2005–2009	2002–2009	2008–2010	2007–2008
Measure	BFI	BFI	TIPI	IPIP	TIPI
Recruitment method	Self-selected	Self-selected	Self-selected	Self-selected	RDD
<i>N</i>	612,140	507,987	145,307	312,568	18,182
% female	55	65	62	62	53
Age					
% <25	57	64	69	64	6
% 25–54	41	35	30	35	61
% >54	2	1	1	1	33
Ethnicity					
% African American	4	9	4	—	7
% Asian	5	7	6	—	1
% Hispanic	3	9	6	—	6
% White	84	70	79	—	82
% other	4	5	5	—	4

*Note.* S1 = Sample 1; S2 = Sample 2; S3 = Sample 3; S4 = Sample 4; S5 = Sample 5; BFI = Big Five Inventory (John & Srivastava, 1999); TIPI = Ten-Item Personality Inventory (Gosling, Rentfrow, & Swann, 2003); IPIP = International Personality Item Pool (Goldberg et al., 2006); RDD = random digit dialing. Information about participants’ ethnicity was not collected for Sample 4. Dashes indicate that data were unavailable.

participants from Wyoming and 54,945 participants from California ( $M = 10,367$ ;  $Mdn = 7,213$ ).

The demographic characteristics of the sample were compared with data from the U.S. Census Bureau (2000) to determine its representativeness. The correlation between the number of respondents in a state and the population of the state was .99. For ethnicity, the correlations for African Americans, Asians, Hispanics, Whites, and "other" ethnicities were .94, .71, .95, .94, and .80, respectively. With respect to age, the correlations for people aged 18–24, 25–54, and 55 and over were .06, .13, and .18, respectively. These results indicate that ethnicity is representative of the population, but the age is less so.

**Personality.** The BFI was used to assess personality using the same 5-point rating scale administered to S1. Analyses of the present data indicated that the BFI scales were internally reliable at the individual level of analysis ( $\alpha s = .86, .79, .83, .83, \text{ and } .78$ , for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness, respectively).

### Sample 3 (S3)

Data for S3 were collected between August 2002 and August 2009 as part of the Rentfrow-Potter Music Preference Project, which hosts a noncommercial, advertisement-free website with a music preference and personality survey. Respondents could learn about the project through several channels, including search engines or links on such websites as [www.socialpsychology.org](http://www.socialpsychology.org). Respondents volunteered to participate in the study by "clicking" on the music test icon and were then presented with a series of questions about their music preferences, personality characteristics, demographics, and state of residence. After submitting their responses, participants received customized feedback about their music preferences.

**Participants.** This sample comprised 145,307 respondents (62% female). The mean age was 23.65 years ( $SD = 11.30$  years), with 100,080 (69%) respondents between the ages of 18 and 24, 43,575 (30%) between 25 and 54, and 1,654 (1%) over 55 years old. Of those who indicated, 6,260 respondents (4%) were African American; 8,269 (6%) were Asian; 8,520 (6%) were Hispanic; 113,319 (79%) were White; and 8,045 (5%) indicated "other." Summary statistics for the sample are reported in the third data column of Table 1.

Participants were asked to indicate the state in which they lived at the time in which they participated in the study. The sample sizes ranged between 261 participants from Wyoming and 15,690 participants from California ( $M = 2,965$ ;  $Mdn = 2,326$ ).

The correlation between the number of respondents in a state and the population of the state was .98. For ethnicity, the correlations for African Americans, Asians, Hispanics, Whites, and "other" ethnicities were .95, .87, .97, .90, and .70, respectively. With respect to age, the correlations for people aged 18–24, 25–54, and 55 and over were .01, .40, and  $-.22$ , respectively. These results indicate that ethnicity is representative of the population but that the distribution of age is less representative.

**Personality.** The Ten-Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003) was used to assess personality. The TIPI assesses each of the Big Five domains and was designed to maximize the content validity of the broad domains using only two bipolar items. Consequently, and consistent with other re-

search, analyses of internal consistency and structural validity invariably yielded comparatively low internal reliability coefficients and poor fit statistics. Nonetheless, the TIPI has good test-retest reliability, and convergent and discriminant validity with longer measures of the Big Five (Gosling et al., 2003). In the present sample, respondents were asked to report the degree to which they agreed with each item using a 7-point rating scale with endpoints at 1 (*Disagree*) and 7 (*Agree*). Analyses of the present data revealed varying degrees of reliability for each of the two-item scales ( $\alpha s = .70, .35, .56, .64, \text{ and } .40$ , for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness, respectively).

### Sample 4 (S4)

Data for S4 were collected between February 2008 and May 2010 using the "MyPersonality" Facebook application. Users of Facebook are able to create personal profiles in which they can report their age, state of residence, schools attended, as well as their leisure interests. Facebook users can enhance their personal profiles by including additional information about themselves from a wide variety of Facebook applications. The MyPersonality application allows users to complete various psychological surveys (e.g., a measure of the Big Five personality domains), and, if they choose, users can display the results on their Facebook profile. When users agree to use the "MyPersonality" application, they are asked for consent to use their responses to the surveys for research purposes. Like the other samples, S4 relied on self-selection.

**Participants.** This sample comprised 312,568 respondents (62% female). The mean age was 24.58 years ( $SD = 9.17$  years), with 125,685 (64%) respondents under 25 years old, 70,140 (35%) between 25 and 54, and 2,070 (1%) over 54 years old. At the time in which the data were collected, Facebook did not collect information about the ethnicity of users, nor did MyPersonality request such information from respondents. Summary statistics for the sample are reported in the fourth data column of Table 1.

Information about participants' state of residence was obtained from their Facebook profiles. The sample sizes ranged between 483 participants from Wyoming and 33,109 participants from California ( $M = 6,379$ ;  $Mdn = 4,232$ ).

The correlation between the number of respondents in each state and the Census Bureau's population estimates of the state was .99. With respect to age, the correlations for people aged 18–24, 25–54, and 55 and over were .22, .18, and  $-.20$ , respectively.

**Personality.** Personality was assessed in this sample using a 20-item version of the Revised NEO Personality Inventory (NEO-PI) developed from the International Personality Item Pool (IPIP; Goldberg et al., 2006), with four items assessing each personality domain. Respondents were asked to indicate the accuracy of each item using a 5-point rating scale with endpoints at 1 (*Very Inaccurate*) and 5 (*Very Accurate*). These short scales are highly correlated with the 100-item IPIP measure of the NEO-PI—Revised domains ( $r s = .91, .83, .86, .89, \text{ and } .77$ , for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness, respectively). Analyses of the present data indicated that each of the four-item IPIP scales were internally reliable at the individual level of analysis ( $\alpha s = .72, .60, .67, .65, \text{ and } .50$ , for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness, respectively).

### Sample 5 (S5)

Data for S5 were collected between December 2007 and November 2008 as part of the Cooperative Campaign Analysis Project (CCAP), a large panel study of attitudes about presidential candidates, social issues, race, and other political topics leading to the 2008 U.S. presidential election (Jackman & Vavreck, 2009). During the third wave of the project, a Big Five personality measure was administered. The project was conducted over the Internet by YouGov/Polimetrix and used participant recruitment methods designed to approximate a random digit-dialing sample. By design, CCAP was intended to provide a nationally representative sample of registered voters for analyses of the impending election. As such, the project was not designed to provide representative samples of each individual state. In addition, the so-called battleground states of presidential elections (e.g., Pennsylvania, Ohio, Florida) were overrepresented in the sample (for more details, see Jackman & Vavreck, 2009; Vavreck & Rivers, 2008), resulting in disproportionate representation for some regions. Nevertheless, despite these possible limitations, S5 is the only sample that did not rely on a self-selection recruitment method and therefore provides an important comparison sample.

**Participants.** The sample comprised 18,182 respondents (53% female). The mean age was 47.97 years ( $SD = 15.19$  years), with 1,021 (6%) respondents under the age 25, 11,108 (61%) between 25 and 54, and 6,053 (33%) over 54 years old. Of those who indicated, 1,334 respondents (7%) were African American; 180 (1%) were Asian; 1,091 (6%) were Hispanic; 14,969 (82%) were White; and 608 (4%) indicated "other." Summary statistics for the sample are reported in the fifth data column of Table 1.

Members of the YouGov/Polimetrix panels in each state were recruited to participate. The state sample sizes were small compared with S1 through S4, with 10 regions having fewer than 100 participants (Delaware, D.C., Idaho, Mississippi, Montana, North Dakota, Rhode Island, South Dakota, Vermont, and Wyoming). The sample sizes ranged between 29 participants from Wyoming and 1,876 participants from Florida ( $M = 382$ ;  $Mdn = 204$ ).

The correlation between the number of respondents in a state and the population of the state was .83. For ethnicity, the correlations for African Americans, Asians, Hispanics, Whites, and "other" ethnicities were .94, .46, .90, .93, and .75, respectively. With respect to age, the correlations for people aged 18–24, 25–54, and 55 and over were .30, .29, and .31, respectively. These results indicate that people of different ethnic and age groups were reasonably represented in the sample.

**Personality.** The TIPI (Gosling et al., 2003) was used to assess personality. In the present sample, respondents were asked to report the degree to which they agreed with each item using a 7-point rating scale with endpoints at 1 (*Strongly Disagree*) and 7 (*Strongly Agree*). As before, the reliability estimates for the two-item scales were lower than for the longer scales ( $\alpha = .62, .36, .52, .63, \text{ and } .43$ , for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness, respectively).

### Secondary Data

To determine whether the psychological regions were associated with important PESH outcomes, we gathered data from a variety of secondary sources and developed 11 social indicator indices, a common approach in studies of regional differences (e.g., Crone &

Clayton-Matthews, 2005; Florida, 2002; McCann, 2008; Richter, 1966). Specifically, we developed three economic indicators (state wealth, human capital, innovation), four sociological indicators (social capital, social tolerance, violent crime, residential mobility), two ideological indicators (political conservatism, religiosity), and two health indicators (well-being, health behavior). We also gathered demographic data from the U.S. Census. In gathering secondary data for the social indicators, we tried to obtain statistics for 2007–2008, because that was the approximate midpoint for the collection of personality data. However, in a few instances, some of the indicators were not available for that period, so we included data that were collected a few years before or after, as described below.

**Population statistics.** Population statistics were obtained from the U.S. Census Bureau (2000) and included the proportion of women and non-Whites, and median age.

**Political conservatism.** To assess regional political preferences, we gathered voting data for each of the 48 contiguous states and Washington, D.C. from *Dave Leip's Atlas of U.S. Presidential Elections*, an online database consisting of Presidential election results obtained from publications by official election agencies within each state (i.e., Secretary of State offices, State Board of Election offices, *Congressional Quarterly*, and the U.S. National Archives and Records Administration; Leip, 2009). In the present study, we computed an index of political conservatism by first standardizing the percentages of votes for George W. Bush in 2004 and for John S. McCain in 2008. The correlation between the two standardized variables was  $r = .98$ . Thus, we computed the mean of the two standardized variables for the political conservatism index.

**Religiosity.** State-level religiosity data were obtained from the Association of Religion Data Archives (2013). This organization administers polls and collects other data about religiosity and church membership in the United States. For the present study, religiosity was indexed using a marker of adherents to mainline Protestant denominations. Specifically, we examined rates of adherents to mainline Protestant religions per 1,000 residents in 2000.

**Wealth.** We gathered data from the U.S. Census Bureau to create an index of state wealth from four variables: gross regional product per capita in 2007 (the value of everything that was produced in a region in a year and reflects the level of productivity as well as the standard of living in a state), median household income per capita in 2007 (sum of the amounts reported separately for wage or salary income including net self-employment income; interest, dividends, or net rental or royalty income or income from estates and trusts; social security or railroad retirement income; Supplemental Security Income; public assistance or welfare payments; retirement, survivor, or disability pensions; and all other income), median housing value of owner-occupied housing units in 2005–2007 (owner-occupied single-family housing units on fewer than 10 acres without a business or medical office on the property, derived from the American Community Survey administered by the U.S. Census, 2005–2007), and proportion of population living below poverty for the past 12 months in 2007 (based on the state household population, and excluding individuals living in institutions, college dormitories, and other group quarters). To create an index of state wealth, we reverse keyed the state poverty variable and standardized all four variables. The interitem reliabil-

ity among the standardized variables was  $\alpha = .78$ . The state-wealth index was computed as the average of these four standardized variables.

**Human capital.** Human capital is a commonly used metric in economics for gauging the stock of knowledge and skills prevalent in a region. A state-level index of human capital was created using four measures of educational attainment (the percentage of the regional labor force with a bachelor's degree in 2006 and 2007, or with an advanced degree in 2006 and 2007, derived from American Community Survey administered by the U.S. Census, 2005–2007). We first standardized all four variables and computed the average of the four standardized variables to create the human capital index. The interitem reliability among the standardized variables was  $\alpha = .99$ .

**Innovation.** Innovation reflects the degree to which states invest and contribute to the creation and discovery of new ideas. The state-level innovation index was measured by the number of patents produced per capita data from 1977 to 2004 as reported by the U.S. Patent and Trademark Office; the proportion of working-aged adults employed in the high-tech industry; and the proportion of working-aged adults employed in scientific professions, as reported by the Bureau for Labor Statistics (2008). The interitem reliability among these three standardized variables was  $\alpha = .84$ . An innovation index was computed by taking the average of the three standardized variables.

**Social capital.** Social capital reflects the degree to which state residents value social relations and community (Putnam, 2000) and is measured in terms of rates of volunteerism, civic participation, and social trust. In the present study, we used Putnam's social capital index and supplemented it with additional markers of family relations, including the proportion of state residents who were (a) married, (b) separated or divorced (from the 2010 Census), and (c) the proportion of children living in safe and supportive neighborhoods (from the 2003 National Survey of Children's Health, conducted by the U.S. Department of Health and Human Services; Centers for Disease Control and Prevention [CDC], 2003). To compute our index, we reverse keyed the separation and divorce statistics and then standardized all four variables. The interitem reliability among the standardized variables was  $\alpha = .79$ . The four standardized variables comprised the social capital index.

**Social tolerance.** Social tolerance reflects the degree to which residents are tolerant and accepting of people who are unconventional, live alternative lifestyles, or are from different cultures. It was operationalized using four population statistics, including Florida's (2002) bohemian index (ranking states by the proportion of working-aged adults who work as professional artists, entertainers, and musicians), the proportion of gay residents (from Florida, 2002), the proportion of foreign-born residents, and the proportion of residents 5 years and older who speak a language other than English at home, both were obtained from the U.S. Census Bureau (2010). All four variables were standardized and averaged to create the social tolerance index. The interitem reliability among the standardized variables was  $\alpha = .93$ .

**Violent crime.** Crime statistics were obtained from the Uniform Crime Reporting Program at the Federal Bureau of Investigation (2008). In the present study, we examined three indicators of violent crime: murder, robbery, and aggravated assault per capita. The interitem reliability among the standardized variables

was  $\alpha = .90$ , and the violent crime index was created as an average of the three standardized variables.

**Residential mobility.** Statistics for rates of residential mobility in each state were obtained from the U.S. Census Bureau (2005–2007) American Community Survey. Four variables were used to compute the residential mobility index: the proportion of the population born in their state of residence between 2005 and 2009, the proportion of the population living in the same house between 2009 and 2010, the proportion of the population living in the same state but a different house between 2009 and 2010, and the proportion of the population who lived in a different state between 2009 and 2010. The first two variables were reverse keyed to reflect high residential mobility, and all the variables were standardized. The interitem reliability among the four standardized variables was  $\alpha = .81$ , and the residential mobility index was created as the mean of the four standardized variables.

**Well-being.** State-level well-being was indexed using markers of physical and mental health obtained from the CDC, the Gallup Organization, and the Substance Abuse and Mental Health Services Administration (SAMHSA). We gathered mortality statistics from the CDC for cancer, diabetes, and coronary heart disease, as well as state-level life expectancy. Death rates for cancer and diabetes were for 2008, and heart disease death rate and life expectancy were for 2007 (Miniño, Murphy, Xu, & Kochanek, 2011). State levels of psychological well-being were obtained from the Gallup-Healthway's (2008) Well-Being Index. For additional markers of psychological health, we gathered data from SAMHSA (2007, 2008) for the proportion of each state's population reporting being of excellent health in 2004 and the percentage of residents who suffered from serious psychological distress or serious mental illness in 2003–2004. We created the health index by first reverse keying the death rate variables and the proportion of residents who suffered serious mental illness problems, and then standardizing them. The interitem reliability among the standardized variables was  $\alpha = .88$ . Thus, we computed the mean of the seven standardized variables for the well-being index.

**Health behavior.** The health behavior index reflects the degree to which residents of a state engage in physical exercise, eat healthily, and do not smoke cigarettes. State-level data on healthy behavior were obtained from the CDC (2008). Specifically, the four variables from the Healthy People surveys were used to create the index: the proportion of the population that is physically active, consumes five or more pieces of fruit per day, eats vegetables daily, and smokes cigarettes daily. The last variable was reverse keyed, and all the variables were standardized. The interitem reliability was  $\alpha = .82$ , and we computed the average of the four variables to develop the health behavior index.

## Results and Discussion

### Preliminary Psychometric Analyses

To effectively determine whether there are distinct psychological regions in the United States, it was essential that we first evaluate the reliability and generalizability of the personality data across samples, measures, states, and levels of analysis. Doing so ensures that it is appropriate to aggregate personality scores to the state level and also reduces the possibility of making incorrect inferences from the data. Thus, before undertaking the focal anal-

yses, four sets of psychometric analyses were performed. First, to rule out that measurement artifacts drive regional personality variation, we examined whether there were systematic statewide differences in the reliabilities and discriminant validities of the personality scales. Second, to ensure that the personality scales assessed the same latent constructs across states, we examined multiple-group measurement invariance. Third, to gauge the degree of sampling error in the state-level personality means, random-intercept multilevel regression models were examined. Finally, to assess the degree of variance in state-level personality scores, we examined the state-level characteristics of the personality scales using multilevel modeling.

To determine whether there are systematic statewide differences in how participants used the personality scales, we examined the reliabilities and discriminant correlations of the individual-level scales. Specifically, we computed 1,225 individual-level reliabilities for the Big Five scales used in each sample for each individual state (five scales  $\times$  five samples  $\times$  49 states). The mean reliability coefficients were generally high, with little variance across states (across all samples,  $M \alpha = .69$ ,  $SD = .03$ ). We next computed the mean individual-level heterotrait-monomethod correlations for each sample and state, which resulted in 2,450 discriminant correlations (10 discriminant correlations  $\times$  five samples  $\times$  49 states). The mean absolute discriminant correlations were generally low, with little variance across states ( $M$  discriminant correlation = .17;  $SD = .02$ ). These results suggest no systematic statewide differences in scale reliabilities or discriminant correlations.

Second, to test whether the traits measured the same latent personality dimensions similarly in different states, we examined the measurement invariance of personality traits across states. This was accomplished by fitting a series of two-group confirmatory factor analyses in which the factor structure of each personality trait in each state was compared against the factor structure in the second group, which comprised the other 48 states. We examined both metric invariance (equal factor loadings) and scalar invariance (equal factor loadings and intercepts). Because of the large sample size and sensitivity of  $\chi^2$  test to sample size, differences in the comparative fit index (CFI) were used to evaluate invariance, with model differences of CFI larger than 0.01 considered as significant deviations from invariance (Cheung & Rensvold, 2002). For two-item scales, reliable factor structures cannot be computed, so S3 and S5, which used the two-item TIPI scales, were excluded in this analysis. Of the 735 two-group comparisons of metric invariance (three samples  $\times$  five scales  $\times$  49 states), 11 of the comparisons (or 1%) indicated significant deviations (two cases in S1, one in S2, and eight in S4). Among the additional 735 comparisons of scalar invariance, 12 of the comparisons (2%) indicated significant deviations from invariance (all cases in S4, eight of them involving Conscientiousness). The details of the deviating traits and states are presented in Table 1 in the supplemental materials. These results suggest no consistent or pronounced deviations from the overall factor structure of the Big Five traits for any of the 49 states, especially when considering the fact that a total of 1,470 models were tested.

Third, some of the samples included fewer than 1,000 participants per state, so using raw sample means in calculations of state-level mean scores could potentially introduce sampling error for smaller states. So to generate more robust estimates of state-level

personality scores for each sample, random-intercept multilevel regression models were fitted to predict state means (states as Level 2 units), and state-level personality scores for individual samples used in subsequent analyses were derived as best linear unbiased predictions (BLUP; Gelman & Hill, 2007) from the models. In the total sample with sufficient numbers for all states, the BLUP and sample mean estimates were virtually identical ( $M$  convergent  $r = .99$ ;  $SD = .10$ ). We next examined the correlations between state-level estimates across the five samples. All the mean convergent correlations were positive and moderate to large in magnitude, ranging from .27 for Extraversion to .61 for Openness, with an average correlation across all traits of .45. The convergent correlations for all the samples are shown in Table 3 in the supplemental materials.

Fourth, to examine the degree of variance in personality at the state level, we examined the spatial autocorrelations and group-mean reliabilities of the traits. Spatial autocorrelations are commonly used in the geographical sciences to measure the degree to which variables geographically cluster. Across the personality traits, the total adjacency-based autocorrelations ranged from .21 to .54 in the total sample, suggesting a good degree of spatial clustering such that neighboring states were more similar in personality compared with nonneighboring states. To determine whether the group-level personality means were reliable and that the groups could be reliably differentiated, we examined the average group-mean reliabilities. In the total sample, the average group-mean reliability (i.e.,  $ICC2$ ; Bliese, 2000) across the traits was high ( $M ICC2 = .96$ ;  $SD = .05$ ). Table 2 in the supplemental materials shows the spatial autocorrelations for both adjacency and inverse-weight matrices, as well as intraclass correlations for the personality traits in each sample.

In summary, the results from our analyses of the psychometric characteristics of the individual-level and state-level personality scales indicated that there were no clear or consistent statewide differences in any of the scale properties. Furthermore, the state-level personality trait scores converged across samples, indicating that the scores were reliable and generalizable. These findings offer strong justification for computing state-level personality trait scores, which were based on the mean of the unit-weighted scale scores of participants in each state for each sample. So that all the mean scores were on the same metric, we converted them to  $z$ -scores. This procedure resulted in 1,225 standardized state-level personality trait scores.

### Focal Analyses: Identification of Psychological Regions

The second wave of analyses focused on identifying psychological regions. We first performed a series of cluster analyses on the state-level personality traits from each sample to determine whether there is a robust set of regional personality profiles; that is, are there particular configurations of personality traits that are found repeatedly across states? Next, we mapped the geographical distribution of the personality profiles identified in the previous step. Finally, we examined the correlations between the psychological regions and the state-level PESH indicators.

**Cluster analyses.** We examined psychological regions using an elaboration of the multistep clustering procedure de-

scribed by Chapman and Goldberg (2011) to investigate personality prototypes at the individual level. In all the following analyses, the unit of measurement was the state and the personality variables analyzed were the standardized state-level personality trait scores from each of the five comparison samples. First, we determined the optimal cluster structure by conducting Ward's hierarchical clustering (using Euclidean distance) separately within each of the comparison samples. These analyses were used to derive initial cluster centers and to identify the optimal number of clusters for each sample. Second, we used K-means clustering to achieve clusters with the highest within-cluster similarity and the greatest between-cluster variability. This procedure produces a clearer cluster solution than relying solely on hierarchical clustering (Breckenridge, 1989; Chapman & Goldberg, 2011). Third, states from each sample were assigned to clusters derived from each of the five comparison samples on the basis of the Euclidean distance to those cluster centers. This cross-classification technique was performed a total of 20 times. Finally, we measured cross-classification agreement using Cohen's kappa to determine the generalizability of the clusters.

The results from the hierarchical clustering suggested two to seven clusters, so we performed the aforementioned multistep procedure for two to seven cluster solutions. The empirical kappa distributions for the cross-classifications are shown in Table 2. As can be seen in the first data row, the mean kappa coefficients ranged from .44 for the seven-cluster solution to .61 for the three-cluster solution. The three-cluster solution provided the best fit compared with the other models and exceeded the threshold for substantial agreement (i.e.,  $\kappa$  coefficients  $\geq .60$ ; Fleiss, 1981; Landis & Koch, 1977). These results indicate that the three-cluster solution provided the most robust and generalizable solution.

The results from the cluster analyses suggest that statewide variation in personality can be reliably characterized in terms of three psychological regions. Furthermore, the degree of convergence suggests that these clusters generalize across samples and methods. Given the consistency across the five samples, we created a sixth set of personality scores by computing mean scores for each personality domain averaging across the five samples (the Appendix presents these state-level personality estimates converted to *T*-scores). All subsequent analyses are based on the clusters derived from the combined samples.

**Regional personality profiles.** To gain an understanding of the nature of the regional personality clusters, we plotted the cluster centers for the three clusters. The means depicted in Figure

1 show the personality profiles for each cluster. As can be seen in the first set of five bars, the profile for Cluster 1 was marked by high Extraversion, Agreeableness, and Conscientiousness, and low Neuroticism and Openness. This configuration of traits portrays a region of people who are, on average, conventional, friendly, sociable, compliant, and emotionally stable. On the basis of this configuration and the especially low Openness score, we labeled this cluster the Friendly & Conventional profile. As can be seen in the second set of bars, the profile for Cluster 2 was marked by low Extraversion, low Agreeableness, average Conscientiousness, very low Neuroticism, and very high Openness. The image depicted by this profile represents a region of people who are, on average, creative and relaxed, reserved, and perhaps somewhat socially distant. Given this configuration of traits, we labeled this cluster the Relaxed & Creative profile. The third set of bars for Cluster 3 reveal slightly below-average Extraversion, low Agreeableness, low Conscientiousness, very high Neuroticism, and slightly above-average Openness. This configuration represents a region of people who are, on average, irritable, impulsive, and quarrelsome. This pattern of traits led us to label this cluster the Temperamental & Uninhibited profile. Of course, as with all factor labels, these profile labels are provided for the sake of communication and give only a broad sense of the makeup of the profiles, so investigators are urged to base their understanding on the full configuration of traits, not the profile labels alone.

**Geographical distribution.** To examine the geographical distribution of the three state-level personality profiles, we mapped the state-level prototypicality scores for each of the three clusters. Specifically, we first computed profile correlations between each state's personality profile and the three sets of cluster centers that were derived from the combined sample. States with large positive profile correlations are prototypical of a cluster, whereas states with negative profile correlations are most different from that cluster. We then applied the Getis-Ord  $G^*$  statistic for geographical clustering analysis (also known as "hotspot analysis") to locate geographical concentration or concentrations of high and low values of profile correlation values. The  $G^*$  statistic identifies areas that have high (or low) values and that also have neighboring areas that have high (or low) values in the profile correlations (Ord & Getis, 1995). The statistic is interpreted as a *z*-score, with values above 1.96 or below -1.96 indicating statistically significant clustering. This analysis was performed using the *spdep* package of R 2.15.1 (Bivand, Pebesma, & Gómez-Rubio, 2008), with contiguity spatial weight matrix (0 = does not share boundary, 1 = shares boundary). (The corresponding maps of raw profile correlation values instead of  $G^*$  statistics are presented in the supplemental materials, Figure 1.)

The maps displayed in Figure 2 show the geographical concentrations of the personality clusters across the United States. What is especially striking is that each of the personality clusters formed a distinctive geographical pattern. Cluster 1 (Friendly & Conventional) comprises states predominantly in the north central Great Plains and in the South. States in the Mountain, Pacific Coast, Mid-Atlantic, and New England regions were the least similar to this particular cluster. States predominantly in the West and some along the Eastern Seaboard were prototypical of Cluster 2 (Relaxed & Creative), whereas most of the states in the Midwest, Great Plains, and Gulf Coast were most different from this cluster. Finally, states in New England and the Middle Atlantic were

Table 2  
*Characteristics of Empirical Kappa Distributions Derived From the State-Level Personality Traits in Five Samples*

Variable	Number of clusters					
	2	3	4	5	6	7
<i>M</i>	.44	.61	.50	.54	.47	.44
<i>Mdn</i>	.28	.35	.31	.26	.10	.11
<i>SD</i>	.63	.73	.64	.69	.71	.62
Minimum	-.29	.05	.01	.01	.01	.01
Maximum	.99	.99	.99	.99	.99	.97

Note.  $N = 49$ .

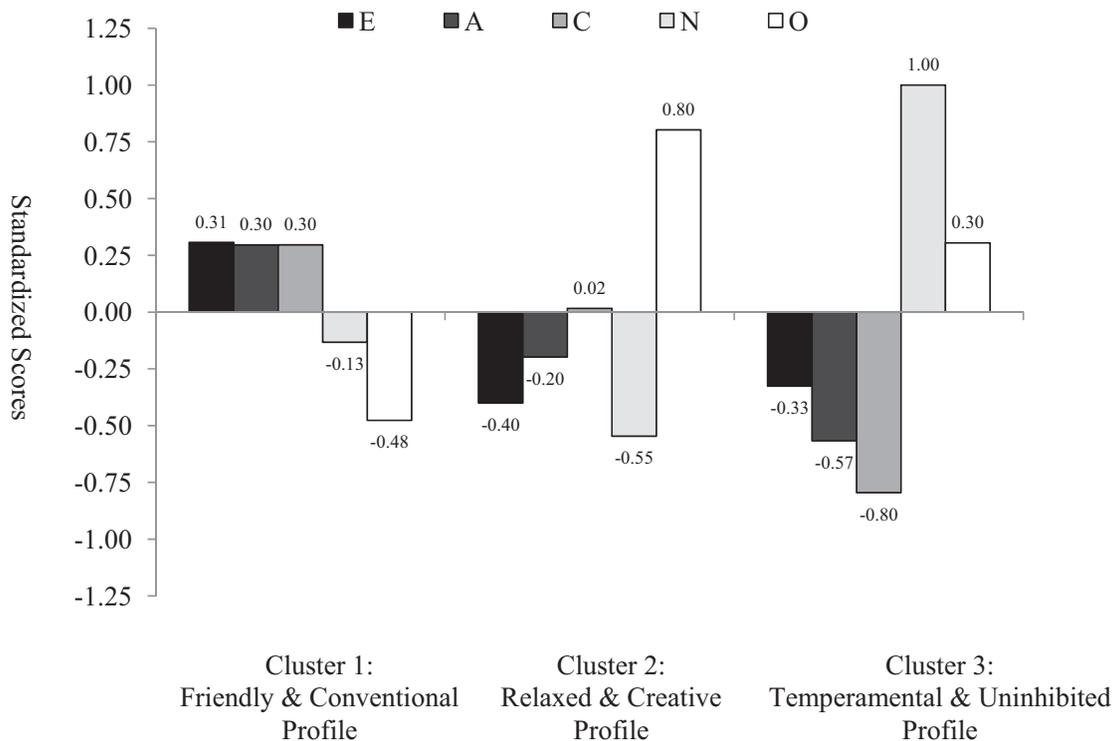


Figure 1. Mean Big Five standardized scores by cluster profile. E = Extraversion; A = Agreeableness; C = Conscientiousness; N = Neuroticism; O = Openness.

prototypical of Cluster 3 (Temperamental & Uninhibited), whereas states in the Southeast, Great Plains, and Mountain region were not members of this cluster.

**Correlations with PESH indicators.** To gain a broader understanding of the three psychological regions, we examined the correlations between the state prototypicality scores and the PESH indicators. The correlations shown in Table 3 reveal a number of associations between the clusters and indicators.<sup>1</sup> In general, the patterns of relationships appear to be unique to each cluster and thus highlight the distinctiveness of the regions.

As can be seen in the first data column of Table 3, states in the Friendly & Conventional region displayed strong negative correlations with all three economic indicators, indicating that this region is less affluent, has fewer highly educated residents, and is less innovative compared with states in the other regions. States in this region also appeared to have higher levels of social capital and less social tolerance compared with states in other regions. Moreover, Friendly & Conventional states were more politically conservative and Protestant compared with other regions. Analyses of the health indicators suggest that residents of Friendly & Conventional states are less healthy and engage in less health-promoting behavior compared with people who live in other psychological regions.

The patterns of relationships displayed in the second data column of Table 3 show the correlations for the Relaxed & Creative region. The positive correlation with the proportion of non-White residents suggests that relaxed and creative states are culturally and ethnically more diverse than states in other regions. It also appears that the Relaxed & Creative region is wealthier, has more

highly educated residents, and is more innovative than other regions. The links with the social indicators indicate that levels of social capital are comparatively low, that residents are socially tolerant and accepting, and that levels of residential mobility are comparatively high in this region. States in this region cast fewer ballots for conservative presidential candidates and had fewer Protestants compared with states in other regions. The patterns of correlations with the health indicators indicate that residents of the Relaxed & Creative region are comparatively healthy and engage in health-promoting behaviors.

The last data column in Table 3 shows the correlates of the Temperamental & Uninhibited region. The associations with the demographic indicators show that this region has larger proportions of women and older adults than states in other regions. Levels of state wealth were also positively associated with this region, suggesting that residents of this region were more affluent than residents of other states. The negative association with residential mobility suggests that most residents of this region are from their home state. Residents of this region also appear to be politically liberal, as evidenced by the negative association with votes for Republican presidential candidates. There also appear to be smaller proportions of Protestants in this region.

<sup>1</sup> The corresponding associations between social indicators and state-level personality scores for the individual traits of the Big Five are shown in Supplementary Figures 2–14. Most of the associations were observed fairly consistently with similar effect magnitudes across the five studies, providing evidence for convergent external validity for state-level personality scores determined from the different samples.

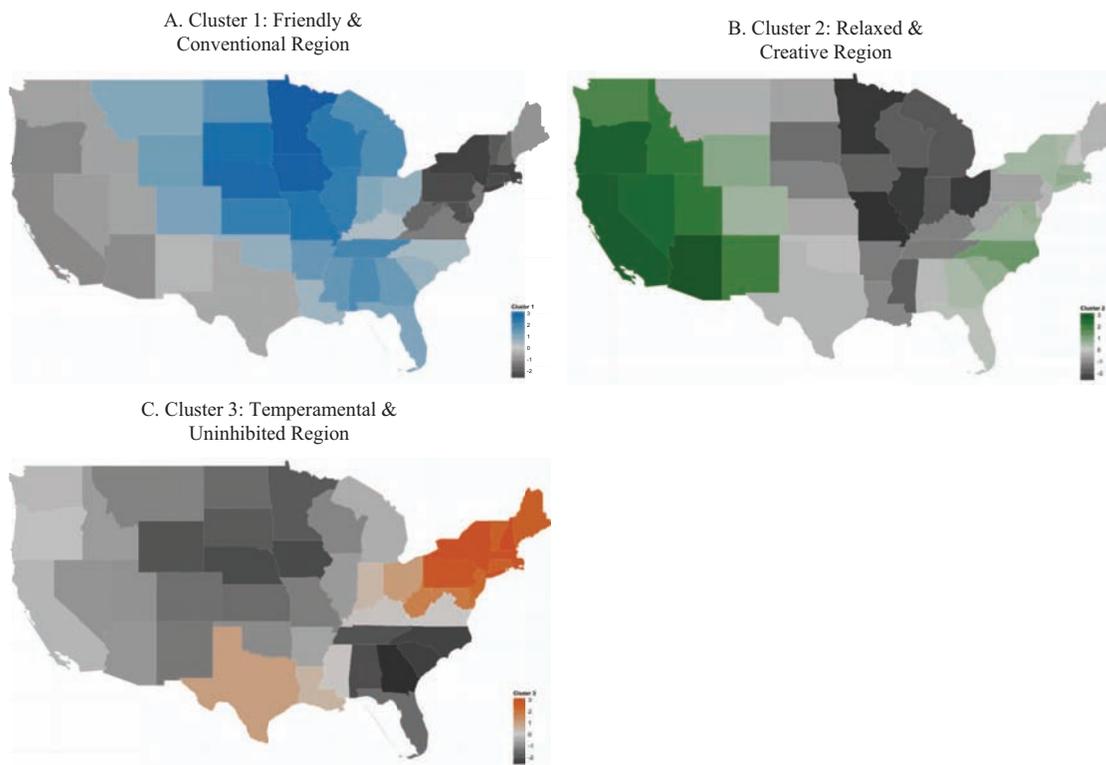


Figure 2. Maps of multistate personality clusters. Cluster scores were based on the  $z$ -transformed profile correlations between the state-level personality scores from the combine samples and the cluster centers. The colored areas are hotspots derived from the Getis-Ord  $G^*$  statistic.

### General Discussion

The aim of the present article was to map the psychological topography of the United States. To that end, we gathered data from five large samples that used different measures and sampling procedures. Analyses of the psychometric properties of the personality measures revealed no systematic differences between samples or geographic regions. Results from the clustering analyses converged, indicating that statewide variation in personality can be characterized in terms of three psychological regions. The psychological regions comprised states with similar personality profiles that were geographically close. Each region was uniquely related to the PESH indicators. Taken together, these results provide strong evidence that there are robust psychological differences between regions of the United States that are associated with important geographical factors.

### A Theoretical Framework for Regional Variation in Personality

In the light of the present findings, we may draw on theory and research in personality, as well as research on migration, contagion, and social influence, to begin to construct a theoretical framework for understanding the causes and consequences of regional variation in personality. The present work provides an empirical foundation on which to develop such a framework. It must begin by characterizing the regions and considering the potential mechanisms that could have shaped them.

**Friendly & Conventional region.** In many respects, the Friendly & Conventional region reflects Middle America, or “Red” states. Not only is this region in the geographical center of the country, the psychological profile and all the social indicators betray a region that is marked by conservative social values. The region is defined by moderately high levels of Extraversion, Agreeableness, and Conscientiousness, moderately low Neuroticism, and very low Openness. This configuration of traits portrays the sort of person who is sociable, considerate, dutiful, and traditional, qualities that are also reflected in the patterns of correlations with the PESH indicators. This region comprises predominantly White residents with comparatively low levels of education, wealth, economic innovation, and social tolerance. Residents of this region also tend to be politically conservative, religious, and civically engaged in their communities. The associations with health indicators suggest that disproportionate numbers of people who inhabit in this region live unhealthy lifestyles. Taken together, the characteristics of this psychological region suggest a place where traditional values, family, and the status quo are important.

What are the mechanisms that might contribute to the emergence of this psychological region? One likely mechanism is selective migration, or the notion that individuals selectively move to places that satisfy their needs. Recent research indicates that high Openness is associated with moving from one’s home state to a different state (reflecting an interest in and tolerance of novelty), high Extraversion is associated with relocating within one’s home state (reflecting high activity coupled with connection to one’s

Table 3  
*Correlations Between State Prototypicality Scores for Three Regional Personality Clusters and State-Level Indicators*

State-level indicator	Cluster		
	1: Friendly & Conventional region	2: Relaxed & Creative region	3: Temperamental & Uninhibited region
Demographic			
Women	-.22	-.16	.39*
Non-Whites	-.26 <sup>†</sup>	.52*	-.10
Mdn age	-.18	-.17	.44*
Political/Ideological			
Votes for Republicans	.50*	-.35*	-.42*
Mainline Protestants	.43*	-.49*	-.24*
Economic			
Wealth	-.42*	.35*	.28*
Human capital	-.50*	.47*	.26 <sup>†</sup>
Innovation	-.42*	.45*	.22
Sociological			
Social capital	.34*	-.37*	-.14
Social tolerance	-.38*	.54*	.08
Violent crime	-.17	.24 <sup>†</sup>	.01
Residential mobility	.12	.27 <sup>†</sup>	-.38*
Health			
Well-being	-.23	.47*	-.06
Health behavior	-.46*	.56*	.15

Note.  $N = 49$ .

<sup>†</sup>  $p < .10$ . \*  $p < .05$ .

social group), and high Agreeableness is associated with staying within one's hometown (Boneva et al., 1998; Jokela, 2009; Jokela, Elovainio, Kivimäki, & Keltikangas-Järvinen, 2008). Given the psychological and PESH characteristics of the Friendly & Conventional region, it is conceivable that this region emerged as a result of individuals choosing to settle in areas near family and friends. We investigated this hypothesis by examining the proportion of residents in this region who lived in the same state in the past year, which was one of the variables in the residential mobility index. Our analysis indicated that a large proportion of residents in the Friendly & Conventional region lived in the same state the previous year ( $r = .30, p < .05$ ), lending support to the idea that people in this part of the country are more likely to stay close to home than to move away.

For people with Friendly & Conventional psychological profiles, settling near family and friends helps them to preserve and maintain intimate social relationships that can bring fulfillment and support throughout life. This notion is consistent with the comparatively high rates of social capital observed in this region, as well as the positive associations with political conservatism and rates of Protestantism. If residents of this region are indeed placing a particular importance on traditional family values, it might help explain why the economic indicators are comparatively low in this part of the country because people might be choosing to stay near family and friends and thus forgoing educational and career opportunities that require relocating.

**Relaxed & Creative region.** The Relaxed & Creative region comprises predominantly states along the West Coast, Rocky Mountains, and Sunbelt. According to the U.S. Census (Ihrke & Faber, 2012), states in this region are among the most popular destinations for people with college degrees and for non-Whites. The psychological profile of this region is marked by low Extra-

version and Agreeableness, very low Neuroticism, and very high Openness. There are disproportionate numbers of non-White residents in this region, in addition to people who are wealthy, educated, and economically innovative. Social capital is comparatively low here, but tolerance for cultural diversity and alternative lifestyles is high. This is an area where significant numbers of people are choosing to settle, as indicated by the positive association with residential mobility. It is also a place where residents are politically liberal, as well as psychologically and physically healthy. There are fewer mainline Protestants here, too. In general, the qualities of this region depict a place where open-mindedness, tolerance, individualism, and happiness are valued.

It is likely that selective migration has also played a crucial role in the formation of this region. Indeed, the West was the last region settled in the United States, as migrants traveled from New England and the Midwest, through the Great Plains and Rocky Mountains along the Oregon Trail. The trek itself was dangerous and the living conditions were poor, so only certain types of people would have chosen to endure such a difficult move. Kitayama and colleagues argue that settlers of frontier regions are independent, dominant, resilient, and adventurous (Kitayama, Conway, Pietromonaco, Park, & Plaut, 2010; Kitayama, Ishii, Imada, Takemura, & Ramaswamy, 2006; Varnum & Kitayama, 2011). These characteristics are directly in line with the Relaxed & Creative profile. To explore the possibility that frontier settlement might have contributed to the emergence of this psychological region, we examined the association between the Relaxed & Creative profile and the year in which states were founded as an index of frontier settlement and obtained some support for this hypothesis ( $r = -.28, p < .05$ ). This finding suggests that the Relaxed & Creative psychological profile is more common in frontier regions.

The link to frontier settlement offers clues about how this psychological region came about, but why has it persisted? This region is undergoing more residential mobility than other parts of the nation because young people, professionals, and immigrants are choosing to move here to pursue educational and employment opportunities. Such challenging and exciting opportunities are likely to attract individuals who have creative psychological profiles, which then become expressed in terms of human capital, wealth, and economic innovation. The open-minded atmosphere fostered in this region might also attract individuals from different cultures or people who live alternative lifestyles who sense that this is a place where social and cultural differences are tolerated and accepted. Taken together, there appear to be several reasons why individuals with Relaxed & Creative psychological profiles would choose to settle in this part of the country.

Another mechanism that could be at work in this region is social influence, or the notion that the social environment affects people's thoughts, feelings, and behaviors. Research on attitude change, for example, suggests that individuals' opinions and beliefs are affected by the attitudes and behaviors of the people in their environment (e.g., Bourgeois & Bowen, 2001; Pettigrew & Tropp, 2006). Moreover, Openness, which is a central trait in this profile and the most value-laden trait among the Big Five, has been shown to change in response to college education and experience (McCrae, 1996). Thus, given the social diversity and tolerance in this region, it is conceivable that people's attitudes about culture, race, and sexual orientation are influenced by the attitudes of those around them, which could perpetuate a climate of open-mindedness.

**Temperamental & Uninhibited region.** The Temperamental & Uninhibited region comprises states predominantly in the Mid-Atlantic and Northeast. This region is made up of the quintessential Blue states. The psychological profile of the region is defined by low Extraversion, very low Agreeableness and Conscientiousness, very high Neuroticism, and moderately high Openness. This particular configuration of traits depicts the type of person who is reserved, aloof, impulsive, irritable, and inquisitive. There are disproportionate numbers of older adults and women in this region, in addition to affluent and college-educated individuals. Residential mobility is low here, and in fact, data from the U.S. Census (Ihrke & Faber, 2012) indicates that significant numbers of residents of this region are leaving the area. Residents of this region also appear to be politically liberal and not mainline Protestants. Overall, it appears that this psychological region is a place where residents are passionate, competitive, and liberal.

How did the Temperamental & Uninhibited region emerge? Compared with other parts of the country, this region is undergoing an exodus of residents, with many people relocating to the South and Southwest. Recent work by Jokela (2013) suggests that individuals who desired to and actually did move to another part of the country were comparatively high in Openness, Conscientiousness, and low in Neuroticism, characteristics that are almost entirely opposite of the Temperamental & Uninhibited profile. These findings make it reasonable to speculate that one mechanism responsible for the psychological profile of this region stems from residential mobility, or rather immobility. In other words, the psychological profile common in this region reflects the characteristics of residents who have chosen not to move to another region.

Another mechanism that could be at work in this region is social influence. For example, this region has the longest settlement history, which means it has the oldest traditions and institutions in the country. It is conceivable that over time, the norms and institutions established here have shaped the behavior and psychological characteristics of residents. This idea is consistent with much theorizing in cultural psychology, which argues that norms and institutions have top-down effects on personality development by influencing what people are socialized to believe is right and wrong, and by shaping life experiences and opportunities (Hofstede & McCrae, 2004). Such processes should be less likely to occur in frontier regions because norms and values are more variable (Kitayama et al., 2010). In addition to norms and institutions, social influence could also contribute to the psychological characteristics of this area by way of emotional contagion. For example, research indicates that the positive and negative affect of one's friends and romantic partners can influence individuals' levels of happiness and depression (Fowler & Christakis, 2008; Joiner & Katz, 1999). Considering that the Temperamental & Uninhibited profile is marked by high Neuroticism, it seems reasonable to speculate that social influence might facilitate the spread of anxiety and irritability across the region.

### Implications of Psychological Regions for PESH Research

Although PESH researchers may be especially interested in specific regions of the country that are conservative, prosperous, helpful, or unhealthy, and, in turn, focus on the key demographic variables that contribute relevant outcomes in those domains, the present research provides a new set of variables for researchers to consider. Indeed, all of the outcomes studied in PESH subjects are related, if not driven, by the behaviors of the same people (each and every individual has personal values, a level of productivity, strategies for coping with stress, etc.), and these behaviors are affected by personality traits and other psychological variables. So the psychological approach used in the present investigation offers the promise of unifying the causal nexus of these varied (and typically partitioned) outcomes. Specifically, the present research offers a means for understanding the unit (persons) that unifies the behavioral outcomes that are typically studied in isolation at geographical levels of analysis.

The present findings have the potential to inform our understanding of theory and research in political science. For example, the psychological regions resemble, to some degree, the political regions identified by Elazar (1994). Specifically, 10 of the 11 (91%) primary states located in the individualistic political region—where government's sole function is to maintain a healthy economy—are located in the Temperamental & Uninhibited region, and seven of the 10 (70%) primary states in the traditional political region—where government's sole function is to maintain the status quo—are located in the Friendly & Conventional region. The present findings raise interesting questions about the possible connections between political and psychological regions. The most common explanations for the American political divide point to religion, racial diversity, education, or wealth (Bishop, 2008; Gelman, Shor, Bafumi, & Park, 2007; Heppen, 2003). The present findings suggest another explanation for the differences, stemming from the psychological characteristics of residents. In left-leaning

regions, it appears that residents are generally open, reserved, and socially distant, whereas in right-leaning regions, residents appear to be friendly, warm, dutiful, and traditional. It is also noteworthy that so-called Blue states were divided into two separate psychological regions, suggesting there are distinct psychological profiles differentiating East Coast from West Coast liberals.

The psychological regions also cast new light on our understanding of the geographical distributions of various economic indicators. Indeed, the core assumptions underlying theories of creative capital, for example, are based on psychological concepts (e.g., creativity, openness, prejudice), yet the nature of the disciplines within which most of that research has been carried out does not actually assess psychological constructs. The present research provides important evidence that links psychological characteristics to such macrolevel processes by suggesting that part of the reason why certain regions of the United States are economically vibrant may have to do with the psychological characteristics of residents. Indeed, the present results and recent research on entrepreneurial rates (Obschonka et al., 2013) strongly suggest that the proportion of individuals with personality traits associated with high Openness and low Neuroticism is an important factor contributing to economic innovation and prosperity.

Research on psychological regions has the potential to inform our understanding of regional variation in rates of social capital, crime, and cultural diversity. Typically, variation in such social indicators is attributed to population structures and demographic shifts. However, the psychological characteristics of regions would appear to offer some insight, too. For example, the configuration of traits represented by the Friendly & Conventional profile appears to reinforce our understanding of the psychological underpinnings of social capital by suggesting that communal orientation at a macro level is based, in part, on the prevalence of traits associated with sociability, warmth, dutifulness, and conventionality. With this combination of traits, it is conceivable that social capital might arise as a result of a preponderance of individuals with Friendly & Conventional profiles. If so, efforts to foster or create social capital in places where it is absent could be ineffective because residents may not value such close social ties.

The psychological regions also have implications for research on regional health disparities. Indeed, of the 11 states that comprise the Stroke Belt, nine (82%) are located in the Friendly & Conventional region. Given the robust associations between personality and health outcomes at the individual level of analysis (e.g., Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007) and the present findings, it is conceivable that the psychological characteristics of regions may contribute to healthy lifestyles and longevity. The Friendly & Conventional region displayed evidence of poor well-being and health behavior, whereas the Relaxed & Creative region displayed evidence of good health. How might the psychological characteristics of regions affect health? One possibility is through additive effects. Specifically, if there were disproportionate numbers of people in a region with a particular combination of traits, such as low Neuroticism and high Openness, the health of that region would reflect the fact that there are large numbers of residents who do not typically overreact to difficult events and who use effective coping methods. A related possibility is that the behaviors that are most common in a region create a psychological atmosphere that fosters health-promoting behaviors, such as healthy eating, physical exercise, and meditation. So, for

instance, large numbers of people who have a disposition to engage in physical exercise might help produce an environment that encourages others to engage in exercise, too. Whatever the specific pathways are, there would be much gained by integrating psychological and health perspectives for research on geographical differences in health and well-being.

## Conclusion

The present investigation was designed to extend theory and research in psychology and the geographical sciences by mapping the psychological topography of the United States. Characterizing regions on the basis of the psychological characteristics of residents is important because psychological factors are likely to be the force behind the individual-level behaviors that are expressed on macrolevel PESH metrics. Our approach to addressing this issue provides an entirely novel perspective on geographical personality differences. In a sense, our approach challenges the standard methods of dividing up the country (e.g., on the basis of economic indicators, voting patterns, cultural stereotypes, or geographical and physical features) that appear to have become ingrained in the way people think about the United States. In their stead, our approach offers a new empirically derived system for understanding the country that brings psychological characteristics to the fore, clustering regions for the first time in terms of psychological traits. By showing how these psychological configurations relate to important social indicators, the present work underscores the value of this new way of thinking. We believe this approach offers the promise of unifying the causal nexus that drives macrolevel behavioral outcomes.

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(Appendix follows)

**Appendix**  
**Sample Sizes and Aggregate Personality Scores for Each State**

State	Sample size	Personality <i>T</i> -scores				
		E	A	C	N	O
Alabama	27,690	55.5	52.7	55.5	48.7	42.7
Arizona	33,569	50.6	46.6	58.4	38.1	54.7
Arkansas	13,941	49.9	52.7	41.0	56.2	40.3
California	177,085	51.4	49.0	43.2	39.1	65.0
Colorado	28,995	45.3	47.5	58.8	34.3	57.9
Connecticut	17,769	57.6	38.6	34.2	53.4	53.9
Delaware	4,957	47.0	38.8	36.5	62.4	42.7
District of Columbia	6,774	64.8	21.4	44.1	41.6	77.5
Florida	81,002	60.9	50.7	62.7	40.8	61.0
Georgia	52,631	63.2	60.0	68.8	38.0	56.9
Idaho	9,314	40.7	52.9	44.5	44.2	44.7
Illinois	72,011	62.5	48.3	50.9	51.2	55.2
Indiana	36,483	48.9	50.2	56.2	59.3	44.9
Iowa	19,821	62.8	56.6	52.2	49.1	33.7
Kansas	18,039	45.5	48.9	50.8	49.0	40.1
Kentucky	21,791	53.4	48.1	51.3	62.5	43.0
Louisiana	17,414	52.2	49.7	45.0	60.4	53.7
Maine	8,963	44.2	32.8	24.0	71.0	50.8
Maryland	30,568	35.2	37.3	37.5	49.4	56.6
Massachusetts	38,270	44.4	40.7	32.2	63.8	59.6
Michigan	59,221	55.2	54.7	53.0	48.6	43.4
Minnesota	38,597	52.9	61.6	52.5	43.4	38.5
Mississippi	10,479	56.8	63.3	59.7	52.0	46.2
Missouri	34,558	62.9	59.3	60.8	48.3	45.7
Montana	5,052	33.1	52.3	56.1	43.0	55.0
Nebraska	12,102	60.0	62.9	64.3	41.6	34.3
Nevada	10,196	46.4	31.8	55.8	44.0	61.3
New Hampshire	8,076	40.2	53.5	38.0	61.8	48.7
New Jersey	39,549	59.9	44.6	40.8	56.4	57.6
New Mexico	9,408	32.4	45.4	58.5	51.6	62.0
New York	86,855	47.0	29.8	37.7	62.7	64.5
North Carolina	45,940	51.0	63.6	68.4	44.8	49.6
North Dakota	4,808	52.4	52.4	51.4	49.6	21.8
Ohio	61,683	54.6	45.9	46.5	58.5	46.0
Oklahoma	19,515	39.7	54.3	54.7	52.1	42.2
Oregon	25,403	30.9	59.1	45.8	39.5	58.8
Pennsylvania	67,938	54.6	42.8	52.4	61.4	49.6
Rhode Island	5,322	43.3	35.2	48.5	61.9	59.4
South Carolina	17,375	60.0	55.4	69.6	45.7	55.3
South Dakota	4,581	58.7	56.7	55.8	36.1	41.9
Tennessee	29,738	51.3	66.6	62.0	49.0	50.1
Texas	116,094	55.2	52.3	54.4	44.3	52.7
Utah	20,715	55.8	69.4	54.5	30.4	47.7
Vermont	4,118	26.5	60.0	38.2	55.8	54.2
Virginia	45,898	48.5	47.4	45.3	44.7	57.1
Washington	44,150	30.6	55.8	45.0	36.9	56.6
West Virginia	8,349	38.5	51.8	42.6	79.2	36.8
Wisconsin	40,731	69.8	57.8	47.6	48.6	35.7
Wyoming	3,166	46.0	40.7	42.4	46.1	42.4

*Note.* Aggregate personality scores are the mean of the five samples, converted to *T*-scores (with a  $M = 50$  and  $SD = 10$ ).  
 E = Extraversion; A = Agreeableness; C = Conscientiousness; N = Neuroticism; O = Openness.

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