

# A Theory of the Emergence, Persistence, and Expression of Geographic Variation in Psychological Characteristics

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**ABSTRACT**—*Volumes of research show that people in different geographic regions differ psychologically. Most of that work converges on the conclusion that there are geographic differences in personality and values, but little attention has been paid to developing an integrative account of how those differences emerge, persist, and become expressed at the geographic level. Drawing from research in psychology and other social sciences, we present a theoretical account of the mechanisms through which geographic variation in psychological characteristics emerge and persist within regions, and we propose a model for conceptualizing the processes through which such characteristics become expressed in geographic social indicators. The proposed processes were examined in the context of theory and research on personality traits. Hypotheses derived from the model were tested using personality data from over half a million U.S. residents. Results provided preliminary support for the model, revealing clear patterns of regional variation across the U.S. and strong relationships between state-level personality and geographic indicators of crime, social capital, religiosity, political values, employment, and health. Overall, this work highlights the potential insights generated by including macrolevel perspectives within psychology and suggests new routes to bridging theory and research across several disciplines in the social sciences.*

The past decade has witnessed an outpouring of exploratory investigations concerned with national differences in personality, values, subjective well-being, and self. Results from that

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work converge on the conclusion that psychological characteristics are geographically clustered across the globe. To facilitate further progress in the field, we build on that work by developing a theoretical account of how geographic psychological differences emerge and persist over time. Drawing on theory and research in the social sciences, we also propose a framework for conceptualizing the processes through which psychological characteristics prevalent within regions become expressed on geographic social indicators. Ultimately, this work seeks to (a) advance theory and research on geographic psychological differences by providing a model for developing and testing hypotheses about such differences, (b) illuminate how studying psychological characteristics at macro levels of analysis can inform our understanding of basic psychological processes, and (c) bridge theory and research on this topic across the social sciences. As a first attempt toward achieving this ambitious goal, we explore these general ideas in the context of theory and research in personality.

## GEOGRAPHIC VARIATION IN PERSONALITY

### Variation Across Nations

Originally inspired by anthropological research on the psychological characteristics of individuals in preindustrialized and industrialized societies (Benedict, 1934; Mead, 1935), psychologists have long been interested in the psychological characteristics that define and differentiate members of various nations (e.g., Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950; Inkeles, Hanfmann, & Beier, 1958; Lewin, 1936). The dominant theoretical framework underlying much of that work was rooted in a psychoanalytic view in which personality was seen as emanating from early life experiences and unconscious motives. It was believed that core psychological characteristics

are shaped by early child-rearing practices and that child-rearing practices are shaped by the larger societal institutions in which individuals live. As a result, numerous projects were conducted to identify national differences in child-rearing practices (E.H. Erikson, 1950; Gorer, 1943, 1948), motives (McClelland, 1961), values (Buchanan & Cantril, 1953; Cantril, 1965; Inkeles, 1960), and personality (Adorno et al., 1950; Inkeles et al., 1958; Peabody, 1988).

Although early research on national character generated several influential ideas (e.g., Adorno et al., 1950; McClelland, 1961), some criticized the field for lacking theoretical clarity and methodological rigor (Inkeles & Levinson, 1969; LeVine, 2001). First, the conceptual models of personality applied to nations varied significantly. Whereas some researchers focused on Freudian notions of psychosexual stages of development and described nations in terms of fixations (Gorer, 1943; Gorer & Rickman, 1949), others relied on concepts from learning theory and described nations in terms of habits and motives (Whiting & Child, 1953). Thus, there was no agreement about which personality constructs to assess. Second, there was very little consensus about how to operationalize national character. For example, some researchers defined it in terms of the customs and institutions of a nation (e.g., Benedict, 1946; Mead, 1951), others did so in terms of national stereotypes (e.g., Peabody, 1988), and still others defined it in terms of modal distributions of personality traits (e.g., Inkeles & Levinson, 1969). Third, because conceptualizations of personality and operationalizations of national character varied from one researcher to another, a panoply of methods were used to measure national character, including ethnographies and clinical interviews (Mead, 1935), autobiographical essays and surveys (Allport & Gillespie, 1955; Inkeles, 1960), and analyses of popular movies and children's books (Bateson, 1943; McClelland, 1961). Despite the novelty of these methods, questions concerning their reliability and validity were rarely considered. Hence, with no unifying theory of personality or national character and no consensus about which personality dimensions to measure or how to measure them, national comparisons of personality were difficult to interpret and, arguably, unreliable. For these and other reasons (see Duijker & Frijda, 1960; Inkeles & Levinson, 1969; LeVine, 2001), interest in national character faded from view in social and personality psychology during the 1960s.

Only recently has widespread interest in national personality differences returned to the field (e.g., McCrae, 2001; Steel & Ones, 2002; van Hemert, van de Vijver, Poortinga, & Georgas, 2002). This renewed interest stems largely from the establishment of the Five Factor Model (FFM; i.e., Extraversion [E], Agreeableness [A], Conscientiousness [C], Neuroticism [N], and Openness [O]) as a robust and widely accepted framework for conceptualizing the structure of personality (Costa & McCrae, 1992; Goldberg, 1990, 1992; John & Srivastava, 1999). Although the FFM is not universally accepted in the field (e.g., Block, 1995), scores of studies indicate that these basic personality

dimensions are rooted in biology (Jang, McCrae, Angleitner, Riemann, & Livesley, 1998; Loehlin, 1992; Plomin & Caspi, 1999), are relatively stable throughout life (McCrae & Costa, 2003; Roberts, Walton, & Viechtbauer, 2006; Srivastava, John, Gosling, & Potter, 2003), and are found in several cultures (e.g., Benet-Martínez & John, 2000; Church & Kaitigbak, 1989; McCrae & Costa, 1997; Saucier & Ostendorf, 1999).

The pervasiveness of the FFM has recently led McCrae and colleagues to examine cross-national differences in aggregates of nation-level personality traits (Allik & McCrae, 2004; Hofstede & McCrae, 2004; McCrae, 2001; McCrae & Terracciano, 2007; McCrae, Terracciano, & 79 Members of the Personality Profiles of Culture Project, 2005; Schmitt, Allik, McCrae, & Benet-Martínez, 2007). This line of research has been concerned with uncovering cross-national variation in the prevalence of traits and indicates that (a) the prevalence of certain traits varies across nations; (b) aggregate personality scores on the NEO-PI-R display respectable levels of convergence with other measures of personality (e.g., Eysenck Personality Questionnaire) and culture (e.g., Hofstede, 2001; Inglehart, 1997; Schwartz, 1994); and (c) cross-national personality differences are related to geographic social indicators, such as national rates of cancer, life expectancy, substance abuse, and obesity (McCrae & Terracciano, 2007).

The overwhelming majority of research examining geographic variation in personality has focused on national differences. That work has uncovered several interesting findings but a complete understanding of the processes underlying geographic trait variation will require examining variation across a range of geographic levels of analysis. Indeed, just as the prevalence of traits varies across nations, so too might they vary across regions within nations.

### Variation Across Regions Within Nations

Perhaps the first study to examine regional variation in personality traits was recorded in a brief report by Krug and Kulhavy (1973). Using Cattell's 16 personality factors (Cattell, Eber, & Tatsuoka, 1970), Krug and Kulhavy observed several differences across the multistate divisions outlined by the U.S. Census Bureau. Specifically, individuals living in the Northeast, Midwest, and West Coast were found to be significantly higher in "creative productivity" (defined by traits such as creativity, imagination, intelligence, and unconventionality) than were those living in the Southeast, Southwest, and Mountain regions. Less direct evidence for regional differences in personality came from Plaut, Markus, and Lachman (2002), who examined differences in self-conceptions across each of the nine U.S. Census Bureau's divisions. They too found several noteworthy differences. For example, individuals in the Mid- and South-Atlantic regions rated themselves highly on the descriptors "nervous" and "worrying," and individuals in the New England, Mid-Atlantic, and Pacific regions were highest on the descriptors "broadminded," "curious," and "sophisticated."

Work in social psychology has also identified a few individual difference variables that vary regionally, including individualism and collectivism (Conway, Ryder, Tweed, & Sokol, 2001; Kashima et al., 2004; Vandello & Cohen, 1999), emotional expression (Pennebaker, Rimé, & Blankenship, 1996), and aggression (Anderson, 1989; Anderson & Anderson, 1996; Cohen, 2001; Cohen & Nisbett, 1997). Arguably, the most extensive body of work to focus on regional psychological differences in the U.S. comes from research on the culture of honor (Cohen, 1996, 1998, 2001; Cohen & Nisbett, 1997; Nisbett & Cohen, 1996). To offer a psychological explanation for higher homicide rates in the Southern U.S., Cohen and colleagues developed and tested the hypothesis that there is a culture of honor in the South, in which individuals are willing to resort to violence to protect their reputation. Results from several studies suggest that Southerners place considerably more importance on personal reputation and respect than Northerners do and that this difference leads to higher rates of aggression and homicide in the South (but see Anderson & Anderson, 1996).

### Summary

Taken together, research on geographic variation in personality indicates that there is trait variation across nations and that there may also be variation across regions within nations. However, this work is subject to several shortcomings that limit its generalizability. First, the vast majority of studies have looked only at differences across rather broad geographic levels (either nations or multistate regions), so the analyses lack fidelity. Second, the only studies (Krug & Kulhavy, 1973; Plaut et al., 2002) to examine trait variation across regions directly relied on either an obsolete measure of personality or a limited number of specific trait adjectives, which makes it difficult to integrate them into current work in the field. Third, few studies have examined the links between aggregate-level trait profiles and geographic social indicators, limiting our understanding of the meaning of geographic personality differences. Fourth, and most crucially, there is currently no theory to explain how variation in traits might emerge, persist, and become expressed in geographic social indicators.

A systematic examination of the associations between aggregate-level personality profiles and a range of geographic social indicators would provide the empirical building blocks for a theory of the antecedents and consequences of geographic trait variation. A small number of cross-national studies have examined the links among nation-level personality scores, measures of culture, and a few social indicators; the studies have uncovered a number of links between nation-level personality profiles and national rates of crime, suicide, and mortality (Arrindell et al., 1997; Lynn & Hampson, 1975, 1977; Lynn & Martin, 1995; McCrae & Terracciano, 2007; McCrae et al., 2005; Steel & Ones, 2002; van Hemert et al., 2002), but the relationships are typically reported without any attempt to interpret their meaning. Indeed,

in a recent report documenting relationships between aggregate-level personality and national rates of crime and health, McCrae and Terracciano (2007) urged researchers to view such relationships with great caution because there is currently no theory to explain personality at the geographic level. We concur with their conclusion that, in the absence of an explicit theory of how personality might operate at the geographic level, relationships between aggregate personality and behavior cannot be fully understood.

If we are to develop a thorough understanding of the antecedents and consequences of trait variation across regions, a theory of how personality operates at the geographic level is badly needed. Fortunately, research in psychology and other social sciences already provides several clues for developing such a theory. Here, we build on existing research to begin developing a theory of the processes through which variation in personality could emerge, persist, and become expressed geographically.

### TOWARD A THEORY OF PERSONALITY AT THE GEOGRAPHIC LEVEL

Our theoretical perspective starts with a straightforward assumption: If a geographic region is comparatively high on a certain personality dimension, then people in that region will generally be higher on the relevant personality traits than will people in other regions. In turn, the psychological and behavioral tendencies associated with those personality traits will tend to be more pervasive in that region than will tendencies associated with traits less common in that population. For example, if personality traits associated with A are prevalent in a region, then it would seem reasonable to suppose that there would also be a higher prevalence of community involvement, social connectedness, and prosocial behavior than there would be in regions where those personality traits are less common. As a result, prevalent personality traits may become reflected on a range of conceptually relevant geographic variables (e.g., social capital, crime, health, public opinion).

There are good reasons to expect geographic differences in personality to be related to geographic differences on a variety of social indicators. A growing body of research in psychology indicates that individual differences in personality are associated with several important outcomes. For example, the FFM personality dimensions have been shown to relate to health and mortality (Bogg & Roberts, 2004; Costa & McCrae, 1987; Roberts, Walton, & Bogg, 2005; Smith & Spiro, 2002), social connectedness (Berkman, Glass, Brissette, & Seeman, 2000; Mehl, Gosling, & Pennebaker, 2006; Ozer & Benet-Martínez, 2006), career success (Barrick & Mount, 1991; Barrick, Mount, & Gupta, 2003; Hogan & Ones, 1997; Judge, Higgins, Thoresen, & Barrick, 1999), creative ability (Dollinger, Urban, & James, 2004; Helson, Roberts, & Agronick, 1995; Helson & Srivastava, 2002), and criminal behavior (Shiner, Masten, & Tellegen, 2002; Wiebe, 2004). Moreover, research in the social and

medical sciences reveals regional variation in the U.S. on similar geographic social indicators, including rates of health and stress-related illnesses (Devesa et al., 1999; Jemal et al., 2003; Pickle, Feuer, & Edwards, 1999), social capital (Putnam, 2000), creative capital (T.N. Clark, 2004; Florida, 2002), and crime (Ayers, 1984; Caudill, 1962; Gastil, 1971; Hackney, 1969).

These few examples of potential cross-domain links make it tempting to infer that geographic differences in behavior will reflect geographic differences in personality (e.g., geographic variation in health reflects variation in N). Yet, this inference is based on the assumption that the links between personality and behavior at the individual level operate in the same way they do at the aggregate level. Before this assumption can be made, three questions must be considered. What are the causes underlying geographic variation in personality? How might variation in personality persist? And what are the processes through which personality becomes expressed at the geographic level?

### What Are the Causes Underlying Geographic Variation in Personality?

Clearly, the causes underlying geographic variation in personality are complex. One potential cause stems from historical migration patterns. Specifically, geographic differences in personality could have emerged as a result of immigrants selectively migrating to places that satisfied and reinforced their psychological and physical needs. Early migratory patterns could have caused geographic differences in personality to emerge through genetic founder effects. That is, groups of immigrants that chose to leave their homeland—whether in search of natural resources and economic prosperity or to avoid religious persecution and social ostracism—were comprised of a nonrandom sample of individuals, and it is conceivable that such individuals' willingness to relocate and ability to survive had a genetic basis. If so, then restricted gene pools of nonrandom samples of personality traits may have emerged, which, in turn, could have caused certain regions to develop disproportionate numbers of individuals with particular personality traits.

It is also possible that early historical migration patterns caused geographic personality difference to emerge in the absence of genetic founder effects. For instance, social founder effects—the intellectual histories, customs, lifestyles, and daily practices of early settlers—could have established social norms, which may have influenced the prevalence of particular behavioral tendencies and personality traits within the region (Kitayama, Ishii, Imada, Takemura, & Ramaswamy, 2006; Nisbett, 2003). Indeed, through socialization, individuals may have acquired personality traits that were consistent with psychological and behavioral tendencies that were common and valued in the region (Hofstede, 2001). Thus, whether genetically or socially based, historical migration patterns provide an account of how geographic personality differences could emerge initially. But once those differences do emerge, how might they persist?

### How Might Variation in Personality Persist?

Three mechanisms probably play important roles in allowing geographic variation in personality to persist: selective migration, social influence, and environmental influence.

#### *Selective Migration*

Selective migration may not only cause geographic differences in personality to emerge (as suggested above), it may also cause such differences to persist over time. For instance, individuals high in E may try to escape the ennui experienced in small-town environments by relocating to metropolitan areas where their needs for social contact and stimulation are more easily met. Members of particular groups (e.g., gay people, Mormons) may also choose to live in regions where residents are believed to be tolerant of their lifestyles or where other members of their group live (e.g., Massachusetts, Utah). Specifically, members of certain groups may choose to live near similar group members because they are more likely to understand and share the same languages, cultures, and ways of life. Furthermore, individuals may selectively relocate in search of financial gain and job security. For example, highly open individuals may flock to places where artistic abilities have the potential for generating sustainable incomes (e.g., California, New York). Thus, as individuals selectively migrate to regions where certain psychological and behavioral tendencies are common, the prevalence of the relevant personality traits in those regions should persist over time. Furthermore, selective-migration processes could also inspire people with particular traits to flee certain regions, which would eventually result in a shortfall of those traits in the regions.

There is ample support for the idea of selective migration. Individual-level research indicates that people seek out social environments in which their attitudes, beliefs, and personalities are valued by others and can be easily expressed (Buss, 1987; Diener, Larsen, & Emmons, 1984; Ickes, Snyder, & Garcia, 1997; McCrae, 2001; Swann, Rentfrow, & Guinn, 2002). For example, extraverts tend to seek out socially stimulating environments, whereas people high in N tend to avoid highly stimulating environments (Furnham, 1981). Additional evidence comes from work in human geography, demography, sociology, and economics, which suggests that increased social mobility within the U.S. has allowed individuals to relocate to places where their values and lifestyles are shared and accepted by others (T.N. Clark, 2004; Florida & Gates, 2001; Zelinsky, 1973/1992). For instance, research in human geography and urban studies indicates that gay people have migrated for several decades to regions with large cosmopolitan centers precisely because their lifestyles tend to be tolerated in such places (Chauncey, 1994; Moss, 1997). In addition, work in regional economics indicates that bohemians (i.e., artists, musicians) tend to settle in diverse metropolitan regions because creative ability is given greater value than in less diverse environments (Florida, 2002).

### *Social Influence*

Geographic personality differences may also persist as a result of social influence. According to dynamic social-impact theory, local clustering of attitudes and beliefs can occur when individuals engage in repeated social interaction with others (Bourgeois & Bowen, 2001; Latané, 1981). As a result, “attitudes become geographically clustered not because [people] choose to live with others who share common interests but rather as a result of social influence” (Bourgeois & Bowen, 2001, p. 434). To the extent that the social environment affects personality, it is conceivable that social influence could cause geographic differences in personality to persist in at least two ways. First, if a certain personality dimension (e.g., N) is common within a region, it is possible that the psychological and behavioral tendencies associated with it (e.g., anxiety, moodiness) could influence the thoughts, feelings, and behaviors of people in that region who are initially comparatively low on the relevant traits (i.e., increase levels of negative affect). These changes in behavior, in turn, could influence the prevalence of those traits as well as their representation on conceptually relevant geographic social indicators (e.g., health and illness). Second, it is also conceivable that the sociological characteristics of a region (e.g., crime rates) could influence mean levels of particular personality dimensions (e.g., A) because people may adopt behavioral and psychological tendencies in response to the social environment (e.g., become less trusting of others). Hence, common personality traits and features of the social environment could mutually reinforce each other and cause geographic differences in personality to persist.

There is considerable evidence indicating that people’s psychological qualities can affect the thoughts, feelings, and behaviors of others. For example, research on dynamic social-impact theory indicates that college students’ attitudes about alcohol consumption are influenced by their friends’ and neighbors’ attitudes about alcohol (Bourgeois & Bowen, 2001), studies on emotional contagion suggest that individuals in relationships with depressed people tend to experience heightened levels of negative affect as a result of their relationship partners’ depression (Joiner & Katz, 1999), research on group polarization shows that individuals’ attitudes become more extreme when surrounded by others who hold similar attitudes (Moscovici & Zavalloni, 1969), and work on conformity suggests that people model the behavior of others in their environment (Asch, 1952). There is also evidence indicating that sociological variables can influence people’s thoughts, feelings, and behaviors. For instance, research in political geography indicates that the degree of racial diversity in a region affects the types of concerns people have within that region (e.g., community development, economic prosperity), which in turn, influences residents’ political attitudes (Hero, 1998), and work in urban studies has shown that the level of crime in a region contributes to residents’ levels of negative affect (Ross, 2000). Given the evidence for social influence, it seems reasonable to suppose that it plays an important role in maintaining geographic personality differences.

### *Environmental Influence*

As in the case of social influence, features of the physical environment could affect the personalities of individuals within a given region. Climate, for instance, has a significant effect on the types of activities in which individuals within a region can engage, which could, as a result, influence various psychological characteristics of individuals in that region. For example, research on seasonal affective disorder indicates that individuals living in regions that receive little direct sunlight during the cold season are prone to experiencing depression, stress, and anxiety, which are all associated with N (e.g., Magnusson, 2000; Okawa et al., 1996). Although such symptoms tend to subside during the warmer months, it is conceivable that prolonged inhabitation in such places could lead to disproportionately higher levels of N than would living in regions that receive more direct sunlight.

Although studies directly linking the physical environment and personality are rare, there is evidence suggesting that features of the physical environment (e.g., temperature, urbanization, crowding) are related to a few individual difference variables (e.g., aggression, depression, health). For example, there are considerably higher rates of aggressive behavior in regions with hot climates than there are in warm and cool climates (Anderson, 1989; Anderson & Anderson, 1996); neighborhood characteristics, such as housing quality and availability of basic necessities (e.g., hospitals, markets), appear to influence rates of depression over and above the effects of family income (Cutrona, Wallace, & Wesner, 2006; Evans, Wells, Chan, & Saltzman, 2000); and rates of all-cause mortality and psychological stress tend to be higher in densely populated regions than they are in sparsely populated regions (Fleming, Baum, Davidson, Rectanus, & McArdle, 1987; Levy & Herzog, 1978).

Selective migration, social influence, and environmental influence are three mutually reinforcing mechanisms that could each cause geographic differences in personality to persist. But once geographic personality differences are established, how might personality become expressed at the geographic level?

### **What Are the Processes Through Which Personality Becomes Expressed at the Geographic Level?**

We propose a dynamic-process model to explain the ways in which personality could become expressed at the geographic level. As shown in Figure 1, our model depicts a series of processes that could each cause personality to be represented geographically and, in turn, affect the prevalence of certain personality traits within a region.

#### *Path A: Personality Affects Behavior*

If a disproportionately large number of individuals within a region possess certain personality traits, then there should be more psychological and behavioral manifestations of those traits in that region than in other regions where the personality traits are less common. For instance, as depicted in Figure 1, if traits

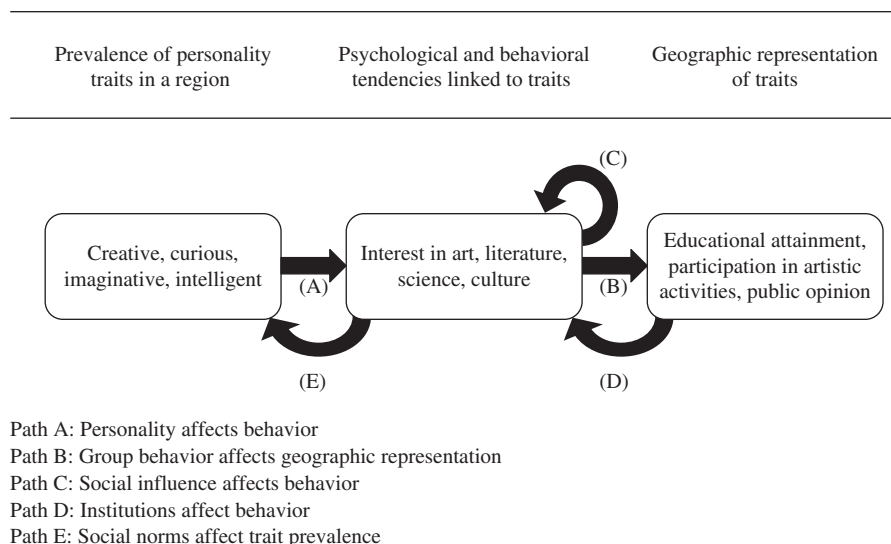


Fig. 1. Processes by which personality manifests at geographical level.

associated with O (e.g., creativity, imagination, intellect) are prevalent in a region, then it would be reasonable to expect a larger proportion of the individuals in that region to be interested in art, literature, culture, and science than that found in regions where O is comparatively low. There is ample support for this process. Indeed, the idea that personality affects behavior (labeled in this article as Path A) is at the core of most personality research, which clearly indicates that individual differences in personality are connected to a range of psychological and behavioral tendencies (Bogg & Roberts, 2004; Ozer & Benet-Martínez, 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007).

*Path B: Group Behavior Affects Geographic Representation*

To the extent that personality traits affect the prevalence of psychological and behavioral tendencies in a region, it is possible that common tendencies would eventually become represented on conceptually similar geographic social indicators. For example, if psychological and behavioral tendencies associated with O (interest in art, literature, culture, and science) are pervasive in a region, then it is likely that those same tendencies should become reflected on theoretically relevant geographic social indicators such as educational attainment rates, public participation in the arts, and public opinion (see Fig. 1). If so, then it is also plausible that this process could lead to the establishment of institutions (e.g., universities, businesses, cultural centers) that reflect and reinforce the common psychological and behavioral tendencies. Evidence that group behavior affects geographic representation (a concept we label Path B in this article) comes from work in the geographic sciences (e.g., macroeconomics, political science, sociology, cultural psychology), which conceptualizes geographic social indicators as reflections of the aggregate behaviors of individuals within given regions (Ceccato & Haining, 2005; Florida, 2002; Huckfeldt & Sprague, 1995; Vandello & Cohen, 1999).

*Path C: Social Influence Affects Behavior*

Although the representation of prevalent personality traits on geographic social indicators may be the direct result of the sum of individuals that possess those personality traits (Paths A and B), psychological and behavioral manifestations of common traits could also affect individuals in the environment who score comparatively low on those traits (see Fig. 1). For instance, if traits linked to O are prevalent, then psychological and behavioral manifestations of those traits could produce a unique psychosocial environment where new ideas are welcome, originality is valued, and diversity is accepted. This psychosocial environment could, in turn, create norms that influence the ways in which people in that region think, feel, and behave, even if those tendencies are contrary to their natural dispositions. Consequently, this process could lead to greater geographic representation of the prevalent personality traits (than would Paths A and B alone). In many respects, the idea that social influence affects behavior (which we label Path C) is the foundation of social psychology. In particular, work on social influence and emotional contagion shows that social and situational variables affect individuals' attitudes, emotions, and behaviors (Asch, 1952; Bourgeois & Bowen, 2001; Hatfield, Cacioppo, & Rapson, 1994; Joiner, 1994; Joiner & Katz, 1999; Latané, 1981; Milgram, 1974).

*Path D: Institutions Affect Behavior*

The processes described thus far reflect “bottom-up” routes through which personality traits become represented geographically, but “top-down” paths may also be viable. Social structural and institutional variables could influence the prevalence of psychological and behavioral tendencies within regions by shaping the experiences and opportunities available to people within them. For example, if a region has a dispro-

portionate number of universities, high-tech companies, museums, and cultural centers (possibly due to high rates of O, as suggested above for Path B), the presence of such institutions could affect the prevalence of psychological and behavioral tendencies associated with O by shaping individuals' educational and career aspirations, leisure pursuits, and contact with individuals from diverse backgrounds. In this way, institutional affects on psychological and behavioral tendencies (which we label Path D) could also lead to an increased geographic representation of prevalent personality traits than would those due solely to Paths A, B, and C. Support for this process comes from studies in social and cultural psychology as well as sociology, which suggest that social structure, institutions, and cultural norms affect the attitudes, opinions, and behaviors of individuals with regions (Cohen, 1996, 2001; Hofstede, 2001; Inkeles & Smith, 1974; Triandis & Suh, 2002).

#### *Path E: Social Norms Affect Trait Prevalence*

The psychological and behavioral tendencies common in a region could influence the prevalence of certain personality traits in at least three ways. First, individuals may be socialized to behave in ways that are consistent with the social norms in the region and eventually acquire the relevant traits. For instance, if a disproportionate number of people in a region are interested in art, science, and culture (tendencies associated with O), people in the region may come to value such qualities and develop O traits. Second, the psychological and behavioral tendencies common in a region may be the very things that entice people from different regions to relocate there. For example, the creativity and tolerance of a place may attract open-minded individuals from other regions who then decide to settle in that place. Finally, to the extent that personality traits are immune to normative social influence, then individuals that cannot or choose not to conform to the social norms may decide to live elsewhere. In all three instances, the psychological and behavioral tendencies that are common in a region could mutually contribute to personality trait prevalence. The concept that social norms affect trait prevalence (which we label Path E) is consistent with cultural, developmental, and evolutionary psychological perspectives, which suggest that social norms can affect personality development and influence where people choose to live (Ahnert & Lamb, 2000; Ahnert, Lamb, & Seltenhaim, 2000; Buss, 1987; Buss & Barnes, 1986; Hofstede, 2001; Hofstede & McCrae, 2004; Triandis & Suh, 2002).

The processes we are proposing are intended to provide insight into the possible ways in which the psychological characteristics prevalent in a region could eventually become represented on geographic social indicators. Although the model provides a framework for conceptualizing such connections, it is possible that certain paths may have stronger effects for certain traits than on others. For example, the geographic expression of N may be particularly strongly influenced by Path C in our model because several studies concerned with emo-

tional contagion have shown that individuals in relationships with depressed people tend to experience increased levels of negative affect (Joiner, 1994; Joiner & Katz, 1999). By extension, it is likely that living in a region where there are large numbers of depressed and anxious people could affect individuals' own levels of negative affect and behavioral tendencies over and above their trait-level N. It is also reasonable to suppose that the geographic expression of A may be affected more by Path C than by the other paths because there is evidence that A is affected more by the social environment than by genetic predispositions (e.g., Bergeman et al., 1993). In addition, there is evidence that education has a significant effect on O (McCrae, 1996), which suggests that Path D may have a comparatively large effect on the geographic representation of O because the prevalence of educational institutions in a region could increase the likelihood that individuals will receive higher education.

#### **Summary**

Drawing from theory and research in psychology and the social sciences, we have provided a theoretical account of how geographic differences in personality could emerge and persist over time and developed a model for conceptualizing the processes through which personality traits prevalent in a region could become expressed at the geographic level. The model provides a guide for developing and testing hypotheses about how psychological differences between people from various regions could become represented in a variety of geographic social indicators. Furthermore, the processes outlined could apply to variation at many geographic levels, including continents, nations, states, cities, and neighborhoods.

Of course, the evidence presented as support for the model is only indirect, so direct evidence at any geographic level would be extremely valuable. Evaluation of the validity of the model, therefore, need not be restricted to a particular geographic level of analysis. However, the ideal level would be one that yields a sufficient number of conceptually relevant social indicators from which hypotheses can be tested, and not all geographic levels are alike in this respect. Indeed, the number and type of social indicators available vary widely across geographic levels. Indicators of economic prosperity and health, for example, are available for many nations, but indicators of crime, social capital, religiosity, and political orientation are available for far fewer nations. Furthermore, the methods used to derive national estimates vary considerably, which could make conclusions drawn from comparisons of certain social indicators potentially misleading. However, within most industrialized nations, there are agencies that compile geographic data on an array of social indicators, which, for the present purposes, circumvents the aforementioned problems associated with cross-national comparisons. Thus, it would seem as though investigating geographic variation within nations would be a sensible approach for evaluating the validity of the model.

## OVERVIEW OF THE PRESENT RESEARCH

This research was designed to evaluate the validity of the model we propose in Figure 1 by exploring geographic variation of the FFM domains across regions of the U.S. The first step toward that end was to determine the optimal level for analyzing geographic regions within the U.S. Should we examine differences across broad multistate regions, states, or counties? Our decision was driven by considering the optimal tradeoff between bandwidth and fidelity (John, Hampson, & Goldberg, 1991). On one hand, multistate regions provide a broad bandwidth and would require comparatively fewer participants to obtain reliable personality estimates than would smaller regions. However, ample evidence indicates that states vary considerably within census divisions (e.g., Cohen, 1996), so combining states into larger regions could potentially mask meaningful differences between them. On the other hand, the county level would provide far greater precision by dramatically increasing the number of regions examined. However, there are currently more than 3,000 counties, parishes, and boroughs in the U.S., so a very large sample would be needed to obtain sufficiently reliable data. It is also important to note that there are considerably fewer social indicators available for counties than states, so the county level would severely restrict the number of geographic variables we could compare with the regional personality estimates.

Therefore, we reasoned that the optimal balance between bandwidth and fidelity would be obtained using states as the unit of analysis. The state level provides much more precision than do the census-based multistate divisions, but it requires fewer participants than would the county level. Furthermore, there are numerous social indicators available at the state level, which allows for more thorough convergent validity analyses than would the census division or county levels.

### Research Questions

We now investigate two primary research questions: How is personality, as measured with the FFM, distributed across the U.S., and what are the correlates of state-level personality? We derived predictions about expected geographic distributions and patterns of correlations based largely on extrapolations from previous research in personality and social psychology.

#### *How Is State-Level Personality Geographically Distributed?*

Given the lack of research on regional differences in personality, we made no strong predictions about how state-level personality would be distributed across the U.S. Our aim was more exploratory than confirmatory. However, we were able to formulate predictions based on the few studies that examined regional differences.

Although none of the previous studies relied on a typical FFM measure, several of the examined traits fell within FFM space. Previous research provided the basis for making predictions about only two personality dimensions: N and O. The results

from both Krug and Kulhavy (1973) and Plaut et al. (2002) indicated that individuals living in Eastern regions were higher on traits related to N than were individuals living in the West. Thus, we expected N to be higher in Eastern states than Western states in our data.

Krug and Kulhavy (1973) also found that individuals living in the Northeast and West Coast were higher in creativity and imagination than were individuals in the Great Plains and Southern regions. Plaut et al. (2002) observed a very similar pattern, with individuals in New England, the Mid-Atlantic, and Pacific regions being higher in broadmindedness, curiosity, and sophistication than individuals in the Great Plains and Southeast regions. And Zelinsky's (1974) analyses of magazine subscriptions showed that subscriptions to sophisticated and cultured magazines were higher in the Northeast and West Coast states than in the South. Therefore, we expected O to be highest in Northeast and West Coast states.

#### *What Are the External Correlates of State-Level Personality?*

If statewide differences in personality are meaningful, then based on the model presented in Figure 1, we should expect regional variation on each of the five factors to be linked to conceptually relevant state-level social indicators. With no work on statewide personality correlates to rely on, however, we used previous research on the links between personality and behavior at the individual level to inform our predictions about the state-level personality correlates. Our predictions were based on two recent reports documenting links between personality and various important life outcomes. One was an *Annual Review of Psychology* article by Ozer and Benet-Martínez (2006), which summarized research on the links between personality and criminality, community involvement, spirituality, values, occupational choice, and health. The other was a meta-analysis by Roberts et al. (2007) that examined the effects of personality on longevity, career success, and marital satisfaction. Accordingly, our analyses focused on relationships between state-level personality and crime rates, social involvement, religiosity, public opinion, occupational prevalence, health behavior, and mortality.

*E.* E is related to community involvement, preferences for social and enterprising professions, and physical health (Ozer & Benet-Martínez, 2006; Roberts et al., 2007; see also Danmer, Snowdon, & Friesen, 2001; Friedman et al., 1995). Therefore, we expected state-level E to be expressed geographically on variables related to participation in social activities, proportions of individuals working in social and enterprising occupations, and longevity.

*A.* A is positively related to community involvement, religiosity, and longevity, and negatively related to criminality (Ozer & Benet-Martínez, 2006; Roberts et al., 2007; see also Miller, Smith, Turner, Guijarro, & Hallet, 1996; Penner, 2002; Smith &



Spiro, 2002; Walton & Roberts, 2004; Wiebe, 2004). Therefore, we expected state-level A to be positively related to social involvement, religious participation, and longevity and negatively related to crime rates.

*C.* At the individual level, C is positively associated with religiosity, health-protective behavior, and longevity and is negatively related to criminality (Ozer & Benet-Martínez, 2006; Roberts et al., 2007; see also Barrick & Mount, 1991; Bogg & Roberts, 2004; Gosling, Rentfrow, & Swann, 2003; Hogan & Ones, 1997; Van Hiel, Mervielde, & De Fruyt, 2004). Therefore, we expected state-level C to be linked to religious involvement, health-promoting behavior, longevity, and low crime.

*N.* N is linked to criminal behavior, poor coping, and morbidity (Ozer & Benet-Martínez, 2006; Roberts et al., 2007; see also Abas, Hotopf, & Prince, 2002; Denollet et al., 1996; Mehl, 2006; Smith & Spiro, 2002; Trull & Sher, 1994; Wilson et al., 2005). Therefore, we expected state-level N to be associated with markers of crime, health behavior, and mortality.

*O.* O is positively related to unconventional beliefs and preferences for creative and intellectual professions (Ozer & Benet-Martínez, 2006; see also Barrick et al., 2003; Helson et al., 1995; Jost, Glaser, Kruglanski, & Sulloway, 2003; McCrae, 1996). Therefore, we expected state-level O to be represented on indicators of liberal values and artistic and investigative occupations.

Although the state-level personality correlates may reflect direct links between personality and behavior, some relationships between state-level personality and social indicators could be driven by some “third variable.” For example, if relationships are observed between state-level A and crime, it is possible that the relationships may be due to such variables as urbanization; that is, urbanization could be driving both A and crime. Which variables would be the most likely third-variable candidates? Studies concerned with regional variation have routinely found that statewide levels of education, income, racial diversity, sex, and urbanization are important predictors of several geographic social indicators (e.g., mortality, crime, voting patterns, public opinion; Axelrod, 1972, 1986; Brooks & Manza, 1997; Conway et al., 2001; R.S. Erikson, Wright, & McIver, 1993; Heppen, 2003; Hero, 1998; Huckfeldt & Sprague, 1995). Therefore, to control for the potential effects of these sociodemographic variables on statewide personality and geographic social indicators, we also conducted partial correlation analyses controlling for educational attainment, median income, percentages of African Americans and females, and the proportion of state population residing in cities with more than 1 million residents.

### Cross-Level Analysis Considerations

When working with variables that can be measured at multiple levels of analysis (e.g., at the individual or state levels), researchers may be tempted to generalize findings from one level to another.

However, although findings at one level can match findings at another level (as they often do), the different levels are logically independent, so generalizations across levels are not always warranted. This logical disconnect is referred to as the ecological fallacy, and it was famously demonstrated half a century ago in a now-classic study by Robinson (1950). Using data from the 1930 U.S. Census, Robinson showed that the ecological (i.e., group-level) correlation between the percentage of foreign-born state residents and the percentage of illiterate state residents was  $-.53$  but that the individual-level correlation between foreign-born status and illiteracy was  $.12$ . In this example, the ecological correlation indicated that illiteracy rates were higher in states where there were fewer foreign-born residents than native-born residents; however, it does not follow that illiteracy rates were higher among native-born individuals than it was among foreign-born individuals. As a matter of fact, the individual correlation revealed just the opposite. A similar, albeit less common error is the individualistic fallacy (Inglehart & Welzel, 2003; also called the reverse-ecological fallacy by Hofstede, 2001; and the compositional fallacy by Pettigrew, 1997), in which findings from individual-level analyses are assumed to generalize to aggregate-level analyses. Using the example above, one would commit the individualistic fallacy if he or she were to assume, on the basis of the individual-level correlation, that states with more foreign-born residents would have higher rates of illiteracy than would states with fewer foreign-born residents. Hence, it cannot be assumed that personality correlates observed at the individual level will necessarily generalize to the aggregate level.

The ecological and individualistic fallacies highlight the fact that the individual and ecological levels are logically independent. The decision to rely on ecological or individual levels of analysis rests chiefly on how researchers intend to use the variables and the level of analysis they are most concerned with describing (Shively, 1969). The present research is concerned with associations between personality and social indicators at the state level. Therefore, we used aggregate-level data to examine these relationships. We merely used previous individual-level findings to guide our predictions, because although individual and ecological levels are logically independent, in practice they are often connected.

### Research Design

To test our predictions we needed to obtain reliable and representative personality estimates for each state. Therefore, we required a methodology that would (a) provide a sufficiently large sample to investigate our questions, (b) enable us to collect equivalent data from respondents around the country, and (c) provide a diverse sample of respondents that would be reasonably representative of the U.S. population. To achieve these aims, we used the Internet as the vehicle for collecting personality data. Research on Internet-based studies indicates that Internet users are not perfectly representative of the general

population (Lebo, 2000; Lenhart, 2000), but Internet-based samples are much more diverse and considerably more representative than are the convenience samples commonly used in social-science research (Birnbaum, 2004; Gosling, Vazire, Srivastava, & John, 2004; Skitka & Sargis, 2006). Furthermore, similar results are typically obtained across Internet and non-Internet samples, especially with regard to personality variables (e.g., Srivastava et al., 2003), and Internet-based studies tend to yield data that are of comparable or better quality than that supplied by studies relying on paper and pencil, face-to-face, and telephone surveys (Richman, Kiesler, Weisband, & Drasgow, 1999; Skitka & Sargis, 2006).

## METHOD

### Procedure

The personality data were collected as part of an ongoing study of personality involving volunteers assessed over the World Wide Web (for details, see Gosling et al., 2004; Srivastava et al., 2003). The website is a noncommercial, advertisement-free website containing a variety of personality measures. Potential respondents could find out about the site through several channels, including search engines, or unsolicited links on other websites. The data reported in the present research were collected between December 1999 and January 2005.

Respondents volunteered to participate in the study by clicking on the personality test icon; they were then presented with a series of questions about their personalities, demographic characteristics, and state of residence. After responding to each item and submitting their responses, participants were presented with a customized personality evaluation based on their responses to all the items.

### Participants

As in all studies that collect data from individuals over the Internet, there is the possibility that respondents may complete a survey multiple times. Repeat responding has the potential to produce unreliable and misleading results, so it was necessary to remove data from potential repeat responders.

### Screening

In the present study, we used several criteria to eliminate repeat responders. First, one question included in the survey asked: "Have you ever previously filled out this particular questionnaire on this site?" If respondents reported completing the questionnaire before, their data were excluded. Second, IP addresses were used to identify repeat responders. If an IP address appeared two or more times within a 1-hr period, all responses were deleted. Third, if an IP address appeared more than once in a time span of more than 1 hr, consecutive responses from the same IP address were matched on several demographic characteristics (gender, age, ethnicity) and eliminated if there was a

match. Finally, only respondents who indicated that they lived in the 50 U.S. states or in Washington D.C. were included.

### Demographics

Implementation of the aforementioned criteria resulted in complete data for 619,397 respondents (55% female). The median age of respondents was 24 years ( $SD = 9.8$  years). Of those who indicated, 24,756 respondents (4.0%) were African American, 40,618 (6.6%) were Asian, 28,388 (4.6%) were Latino, 492,175 (80.2%) were White, and 27,957 (4.6%) indicated "Other." Of those who provided information about their social class, 54,002 (13.5%) were working class, 62,830 (15.6%) were lower-middle class, 172,188 (42.8%) were middle class, 103,473 (25.7%) were upper-middle class, and 9,720 (2.4%) were upper class.

### Representativeness

To ensure that each state was fairly represented, we correlated the percentage of total respondents from each state in our sample with the percentage of the total U.S. population for each state using data from the United States Census Bureau (2000). The percentage of respondents from each state in our sample was directly proportional to the 2000 U.S. Census Bureau's estimates of the population of each state ( $r = .98$ ).

Past research on Internet-based surveys suggests that minority groups are vastly underrepresented on the Internet (e.g., Lebo, 2000; Lenhart, 2000). Therefore, to determine whether our sample overrepresented individuals from particular racial groups or social classes, we correlated the percentage of respondents for each group from the Internet sample with the percentage of the population of that group within each state. For example, we correlated the percentage of Asian respondents from each state with the U.S. Census Bureau's estimate of the percentage of Asians in each state. The correlations for African Americans, Asians, Latinos, Whites, and "Other" ethnicities were .88, .96, .96, .93, and .74, respectively (all  $ps < .001$ ). With regard to social class, the correlations for working, lower-middle, middle, upper-middle, and upper class participants were .52, .64, .41, .66, and .43, respectively (all  $ps < .001$ ).

Overall, these analyses indicate that our Internet-based sample was generally representative of the population at large. Indeed, with the exception of "Other" ethnicities, the racial composition of our sample was almost perfectly proportional to the U.S. Census Bureau's population estimates. It appears as though our sample underrepresented individuals from lower and upper classes, but the sample is still far more representative of the U.S. population than are most psychological studies that rely on convenience samples (Gosling et al., 2004).

### Personality Measure

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 FFM dimensions: E, A, C, N, and O. Using a 5-point Likert-type rating scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*), respondents indicated the extent to which they agreed with each statement. The BFI scales have shown a robust factor structure, substantial internal and temporal reliability, and considerable convergent and discriminant validity with other FFM measures at the individual level (Benet-Martínez & John, 1998; Gosling et al., 2003; John & Srivastava, 1999).

Analyses of the present data indicated that the BFI scales were very reliable: Interitem reliabilities for each FFM dimension at the individual and state levels were respectable (mean  $\alpha$ s = .81 and .89, respectively), convergent analyses of state-level personality estimates derived from three random subsamples ( $N$ s = 206,531, 206,348, and 206,518) revealed very high reliabilities for each dimension (mean  $r$ s = .62, .80, .78, .85, and .93, all  $p$ s < .001, for E, A, C, N, and O, respectively), and test-retest correlations for state-level personality estimates derived from two temporally based subsamples revealed very high convergences for each dimension ( $r$ s = .70, .77, .88, .86, and .88, all  $p$ s < .001, for E, A, C, N, and O, respectively). Furthermore, a principle components analyses with Procrustes rotation of the state-level BFI-item estimates indicated that the state-level factor structure was virtually identical to the factor structure commonly found at the individual level (factor congruence coefficients are .96, .90, .86, .95, and .93, for E, A, C, N, and O, respectively; total congruence is .91).

## Secondary Data

### *Population Statistics*

Data from the U.S. Census Bureau (2000) were obtained for several sociodemographic variables, including state population, population density, racial groups, income, and education.

### *Crime Statistics*

Crime statistics were obtained from the Uniform Crime Reporting Program at the Federal Bureau of Investigation (2003). Crime statistics are obtained from state and local law enforcement agencies and published annually with statistics for several violent crimes (e.g., murder). The crime statistics used in the present work were from the 2002 Uniform Crime Report. In the present study, we examined three indicators of crime: robbery, murder, and property per capita.

### *Social Involvement, Religiosity, Values, and Health Behavior*

Data for social involvement, religiosity, values, and health behavior were obtained from the DDB Needham Life Style survey (1998). DDB Worldwide is an advertising agency that conducts national mail panel survey studies within the contiguous 49 states and Washington DC. The survey was first administered in 1975, and data are currently available up to 1998 (from Robert Putnam's website). The data have been shown to be of respectable quality, as evidenced by strong convergence with data from

other national surveys (Putnam, 2000, pp. 420–424), and are widely used among sociologists and public policy researchers concerned with statewide differences (e.g., Dutta & Youn, 1999; Putnam, 1995; Scheufele & Shah, 2000; Shah, McLeod, & Yoon, 2001). The data include information about respondents' state of residence, as well as individual-level responses to items related to social involvement (e.g., "I spend a lot of time visiting friends"), religiosity (e.g., "religion is an important part of my life"), values (e.g., "I am in favor of legalizing same-sex marriages"), and health-promoting behavior (e.g., "number of times jogged in past 12 months"). For the present study, we used the DDB data that were collected between 1990 and 1998. State-level means were computed for items administered within this time period by aggregating across respondents from each state.

### *Occupation Statistics*

State-level data about the proportion of individuals working in different professions were obtained from the Bureau of Labor Statistics (BLS). The BLS is a unit of the U.S. Department of Labor responsible for compiling nationwide statistics on employment and labor economics. Data were obtained from the *Occupational Employment Statistics Survey* (United States Bureau of Economic Analysis, 2003). We obtained employment data for individuals 16 years and older in 2003 working in social and enterprising professions (i.e., business and finance, health-care practitioners) and artistic and investigative occupations (i.e., arts and entertainment, computer and mathematical).<sup>1</sup>

As an additional marker of occupational prevalence, we obtained patent statistics from the Patent Technology Monitoring Division (PTMD) of the United States Patent and Trademark Office (2003). Every year, the PTMD provides statistics on the number of patents issued in each state. Regional economists commonly use these statistics as a proxy for creative innovation (e.g., Florida, 2002). We obtained statewide patent data for the 2003 calendar year.

### *Mortality Statistics*

Markers of state-level health were obtained from the U.S. Centers for Disease Control and Prevention's (CDC) *Healthy People 2000 Final Review* (National Center for Health Statistics, 2001). The CDC compiles health, disease, and mortality statistics for each state annually and compiled a review of the health statistics from 1991 to 2000. State-level health data included in the current work were percentages of statewide deaths due to cancer and heart disease. We also obtained life

<sup>1</sup>The BLS obtains occupational data from business payrolls, and the data indicate how many individuals work in a certain profession in a state. For individuals who live in one state and commute to a different state for work, their occupational information is recorded for the state in which they work. Although this should not produce any serious problems, it does yield misleading information for Washington, DC, because the majority of people who work in DC live in either Maryland or Virginia. For that reason, data for DC were excluded from all analyses of occupational data.

expectancy estimates for each state in 2000 from the U.S. Census Bureau (2000).

## RESULTS AND DISCUSSION

### Geographic Variation in State-Level Personality

To illuminate state-level differences in personality profiles, we ranked states on each personality dimension according to their respective means. Table 1 provides state ranks (and *z* scores) for each personality dimension.<sup>2</sup> The personality estimates listed in Table 1 provide a sense of how each state compares with the others and provides a snapshot of each state's personality profile. For example, North Dakota ranks highest on E and A, in the middle on C, near the bottom on N, and lowest on O, suggesting that North Dakotans are more sociable and affable and less anxious and imaginative than are people in other states. In contrast, New York ranks in the middle on E, near the bottom on A and C, and at the top on N and O, indicating that New Yorkers are less warm and dutiful yet more high-strung and creative than are people in the rest of the country. Viewing the results in this way provides a rich understanding of the psychological characteristics differentiating each of the states. Of course, it should be borne in mind that these estimates are merely means and that each state shows substantial variation on all of the FFM variables.<sup>3</sup>

To gain a sense of how the personality dimensions are geographically distributed, we next mapped the state personality means. Overall, the maps reveal some rather clear patterns, indicating that the personality dimensions are not randomly distributed, but geographically clustered. Specifically, E appeared to be highest in the Great Plain, Midwest, and Southeastern states and lowest in the Northwest and most of the Mid-Atlantic and East Coast states (Fig. 2). State-level A was higher in the Midwest, South Central, and Southeastern states and lowest in the Northeast (Fig. 3). State-level C was highest in the Southwest, Midwest, and Southeast states and lowest in the Mid-Atlantic and New England states (Fig. 4). In results that were consistent with previous research (Krug & Kulhavy, 1973; Plaut et al., 2002), we found that statewide N was highest in the Northeast and Southeast states and lowest in the Midwest and West Coast states (Fig. 5). The statewide distribution of O also converged with results from past work (Krug & Kulhavy, 1973, Plaut et al., 2002; Zelinsky, 1974) indicating that it tended to be high in New England, Mid-Atlantic, and West Coast states and low in the Great Plain, Midwest, and South Central states (Fig. 6).

<sup>2</sup>We were concerned that the states with smaller populations might appear at the extremes more often than would the larger states purely because their smaller sample sizes would result in less stable personality estimates. To test this possibility, we correlated the absolute values of the *z* scores for each FFM dimension with each state's sample size. The results indicated that there was a slight trend for smaller states to yield more extreme personality estimates (mean  $r = -.17$ ), but none of the correlations were statistically significant.

<sup>3</sup>Raw means and standard deviations for each state and factor are available on request.

### State-Level Correlates

We were interested in aggregate trends as a function of state, so the state-level personality correlates were analyzed using the mean personality estimates for each state. As such, all the correlations reported henceforth should be interpreted at the state level, not at the individual level. The personality means for each state were computed by averaging across all respondents in each state (and Washington, DC), resulting in 51 observations for each personality dimension. For the geographic social indicators, either the proportion of state populations, state per capita estimates, or state-level means were analyzed, depending on the nature of the data (i.e., population estimates, incidence rates, survey ratings). Correlations based on such aggregate data are referred to as "alerting" correlations (Rosnow, Rosenthal, & Rubin, 2000) because they alert researchers to general trends that might otherwise be overlooked in analyses that focus on differences among individual scores within groups (or regions). Such correlations typically yield large and stable effect sizes because of the reduced error variances that result from aggregation (Rushton, Brainerd, & Pressley, 1983).

Although the state-level personality estimates were based on thousands of individuals, our sample size was comprised of just 51 people. Relying solely on levels of statistical significance would restrict our focus to results with rather large effects (i.e.,  $r_s > .1271$ ), which could mask many smaller but potentially meaningful findings. Given the exploratory nature of the present work, it would seem reasonable to focus on effects that are at least moderate in size rather than only those that are statistically significant. We therefore established an effect size benchmark to flag potentially important findings. The threshold was based on the effect-size distribution reported in Hemphill's (2003) meta-analysis of correlation coefficients in social science research. According to this empirically derived standard, correlations in the order of .10 should be labeled as "small," .20 as "medium," and .30 or greater as "large." Thus, in the present research, we focus on correlations that were greater than .1201.

Furthermore, because our sample size was quite small, we needed to carefully select social indicators that were highly similar to the domains studied at the individual level and thus most relevant to our predictions. Although we could have examined state-level personality correlates for an enormous array of social indicators, such an approach would have increased Type I error rates and revealed several potentially spurious findings.

We computed two sets of correlations between the state-level personality dimensions and state-level indicators of crime, social involvement, religiosity, political values, social and enterprising professions, artistic and investigative professions, health-promoting behavior, and mortality. First, to obtain estimates uncontaminated by the effects of the other FFM dimensions, we computed state-level personality correlations controlling for the other four dimensions. To ensure that there was a sufficient amount of unexplained variance left over after

**TABLE 1**  
*State Rankings and z Scores for Each Five-Factor Model (FFM) Personality Dimension*

State	Sample size	E	A	C	N	O
Alabama	11,985	20 (0.22)	36 (-0.27)	36 (-0.53)	30 (-0.26)	48 (-1.32)
Alaska	4,317	49 (-1.63)	51 (-4.33)	51 (-3.00)	47 (-1.20)	49 (-1.37)
Arizona	12,570	24 (-0.03)	31 (-0.06)	9 (1.06)	45 (-1.09)	31 (-0.02)
Arkansas	4,424	31 (-0.21)	41 (-0.53)	37 (-0.54)	10 (1.01)	27 (0.06)
California	71,873	38 (-0.57)	28 (0.04)	27 (-0.13)	37 (-0.53)	6 (1.05)
Colorado	11,446	28 (-0.19)	29 (0.03)	15 (0.69)	50 (-1.97)	8 (0.97)
Connecticut	6,836	33 (-0.36)	43 (-0.72)	46 (-1.11)	15 (0.54)	12 (0.65)
Delaware	1,881	21 (0.15)	37 (-0.29)	34 (-0.48)	19 (0.21)	42 (-0.93)
District of Columbia	2,155	3 (1.73)	50 (-2.13)	40 (-0.61)	31 (-0.35)	1 (3.26)
Florida	27,424	10 (0.65)	14 (0.55)	8 (1.11)	36 (-0.50)	13 (0.59)
Georgia	18,807	6 (1.22)	8 (0.87)	3 (1.43)	33 (-0.39)	20 (0.19)
Hawaii	2,940	39 (-0.58)	24 (0.17)	49 (-1.57)	40 (-0.74)	46 (-1.28)
Idaho	3,178	46 (-1.22)	39 (-0.45)	26 (-0.09)	32 (-0.36)	30 (-0.02)
Illinois	27,739	9 (0.80)	26 (0.07)	11 (0.90)	20 (0.21)	21 (0.17)
Indiana	13,515	34 (-0.36)	19 (0.38)	14 (0.71)	13 (0.88)	34 (-0.18)
Iowa	6,514	15 (0.45)	15 (0.54)	33 (-0.44)	22 (0.15)	43 (-0.97)
Kansas	6,976	13 (0.56)	17 (0.47)	5 (1.24)	34 (-0.44)	38 (-0.52)
Kentucky	7,827	36 (-0.41)	21 (0.22)	19 (0.37)	7 (1.17)	45 (-1.10)
Louisiana	6,519	30 (-0.20)	13 (0.55)	30 (-0.24)	8 (1.14)	29 (-0.01)
Maine	3,540	11 (0.64)	46 (-0.86)	50 (-1.64)	12 (0.90)	35 (-0.22)
Maryland	12,286	51 (-1.99)	38 (-0.42)	35 (-0.51)	17 (0.45)	10 (0.74)
Massachusetts	16,154	42 (-0.81)	40 (-0.51)	43 (-0.75)	11 (0.98)	4 (1.20)
Michigan	21,938	17 (0.37)	11 (0.69)	21 (0.21)	26 (-0.09)	36 (-0.30)
Minnesota	14,532	5 (1.29)	2 (1.41)	22 (0.14)	41 (-0.80)	40 (-0.67)
Mississippi	3,609	19 (0.34)	3 (1.39)	12 (0.79)	4 (1.50)	41 (-0.80)
Missouri	12,565	18 (0.35)	16 (0.51)	10 (0.97)	25 (-0.09)	32 (-0.04)
Montana	1,945	43 (-0.94)	42 (-0.71)	29 (-0.24)	39 (-0.71)	16 (0.43)
Nebraska	4,410	4 (1.71)	10 (0.74)	7 (1.15)	44 (-1.00)	44 (-1.07)
Nevada	3,531	37 (-0.55)	48 (-1.41)	24 (-0.06)	42 (-0.83)	9 (0.94)
New Hampshire	3,255	50 (-1.87)	30 (-0.05)	44 (-0.82)	14 (0.70)	14 (0.58)
New Jersey	16,580	14 (0.54)	34 (-0.17)	45 (-1.03)	5 (1.47)	15 (0.49)
New Mexico	4,077	22 (0.15)	33 (-0.17)	1 (2.40)	29 (-0.20)	23 (0.14)
New York	32,602	32 (-0.31)	47 (-1.17)	42 (-0.67)	3 (1.55)	2 (1.32)
North Carolina	16,432	35 (-0.39)	7 (0.98)	2 (1.65)	24 (-0.06)	33 (-0.18)
North Dakota	2,372	1 (3.08)	1 (1.60)	23 (0.13)	43 (-0.84)	51 (-3.12)
Ohio	24,018	25 (-0.05)	27 (0.04)	38 (-0.56)	9 (1.10)	24 (0.12)
Oklahoma	8,095	27 (-0.14)	9 (0.86)	6 (1.16)	27 (-0.15)	37 (-0.46)
Oregon	10,211	44 (-1.10)	18 (0.42)	31 (-0.31)	48 (-1.27)	3 (1.26)
Pennsylvania	25,915	12 (0.60)	35 (-0.21)	28 (-0.19)	6 (1.22)	25 (0.09)
Rhode Island	2,021	40 (-0.61)	45 (-0.84)	48 (-1.55)	2 (1.61)	28 (0.04)
South Carolina	5,918	26 (-0.07)	20 (0.36)	16 (0.66)	16 (0.53)	26 (0.09)
South Dakota	1,572	7 (0.97)	23 (0.19)	17 (0.65)	49 (-1.68)	39 (-0.61)
Tennessee	10,662	29 (-0.19)	6 (1.08)	13 (0.72)	23 (0.11)	19 (0.19)
Texas	45,432	16 (0.42)	25 (0.12)	18 (0.42)	28 (-0.17)	17 (0.40)
Utah	8,368	8 (0.89)	4 (1.36)	4 (1.36)	51 (-2.52)	18 (0.28)
Vermont	1,637	47 (-1.22)	12 (0.55)	41 (-0.66)	18 (0.43)	7 (0.99)
Virginia	18,093	45 (-1.16)	44 (-0.80)	39 (-0.58)	21 (0.18)	11 (0.71)
Washington	17,890	48 (-1.37)	22 (0.19)	25 (-0.07)	46 (-1.10)	5 (1.20)
West Virginia	3,412	23 (0.06)	32 (-0.15)	32 (-0.41)	1 (2.36)	22 (0.15)
Wisconsin	15,863	2 (2.14)	5 (1.32)	20 (0.29)	35 (-0.45)	47 (-1.31)
Wyoming	1,536	41 (-0.78)	49 (-1.44)	47 (-1.46)	38 (-0.59)	50 (-1.80)

**Note.** E=Extraversion; A=Agreeableness; C=Conscientiousness; N=Neuroticism; O=Openness.

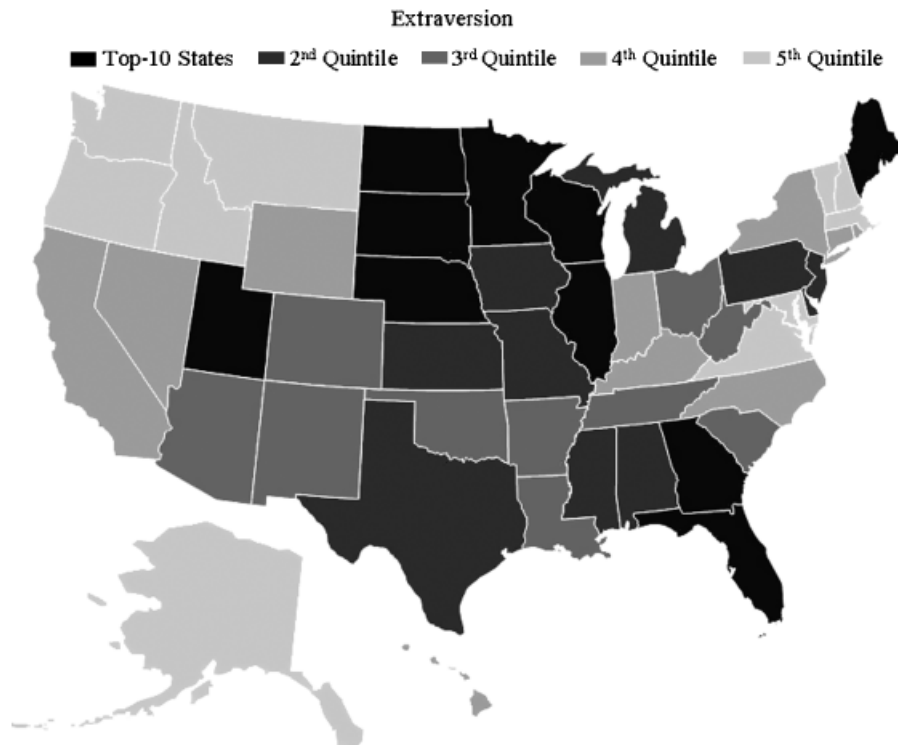


Fig. 2. Map of state-level Extraversion.

controlling for the other traits, we conducted five multiple regression analyses in which each trait was regressed onto the other four. After controlling for the other four traits, the amount of unexplained variance left over was 78%, 48%, 46%, 96%,

and 86% for E, A, C, N, and O, respectively, indicating that there were substantial proportions of variance unexplained.

Second, to determine whether any “third” variables accounted for the observed state-level relationships, we conducted

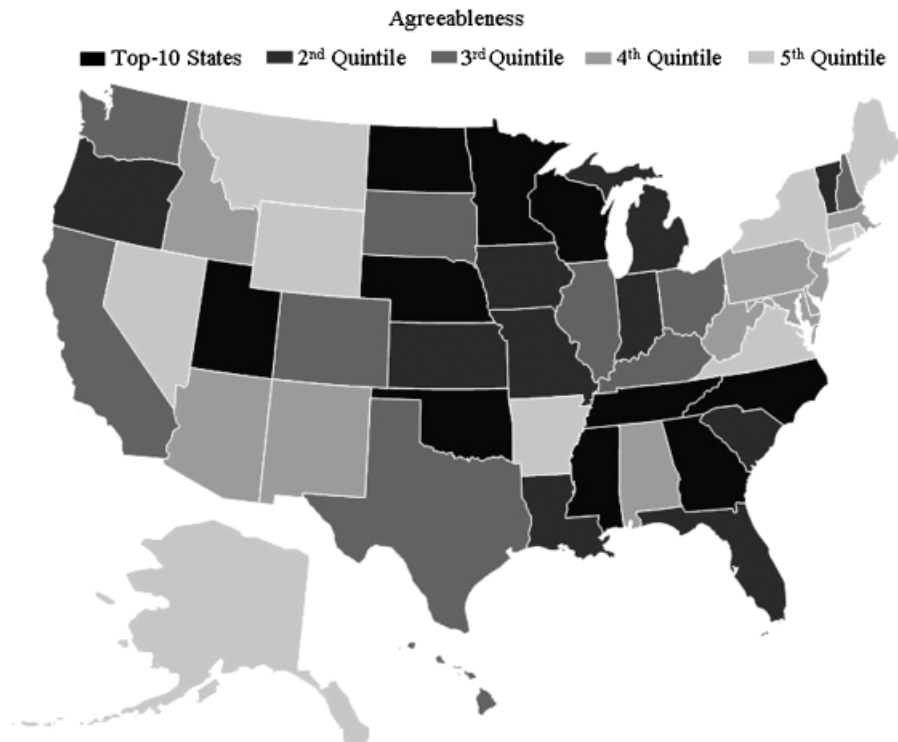


Fig. 3. Map of state-level Agreeableness.

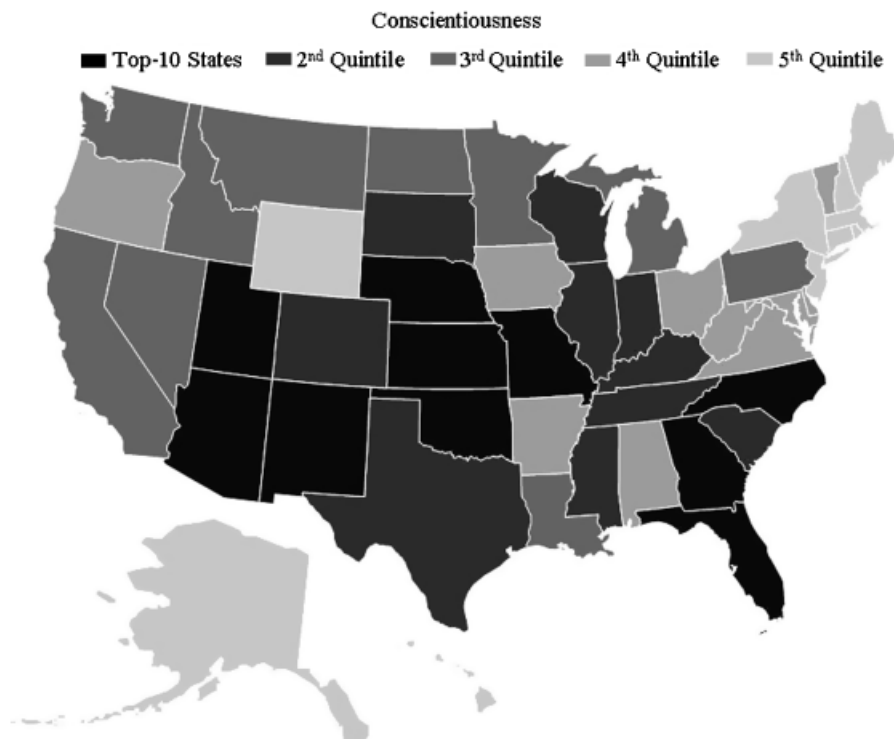


Fig. 4. Map of state-level Conscientiousness.

partial-correlation analyses controlling for statewide sociodemographic differences. These analyses provide a more conservative test of the relationships between personality and the state-level social indicators; therefore, any partial correlations

that meet or exceed our |.20| benchmark should be considered as strong evidence for the importance of a particular personality dimension at the state level. The sociodemographic variables included in these analyses were median income, percentage of

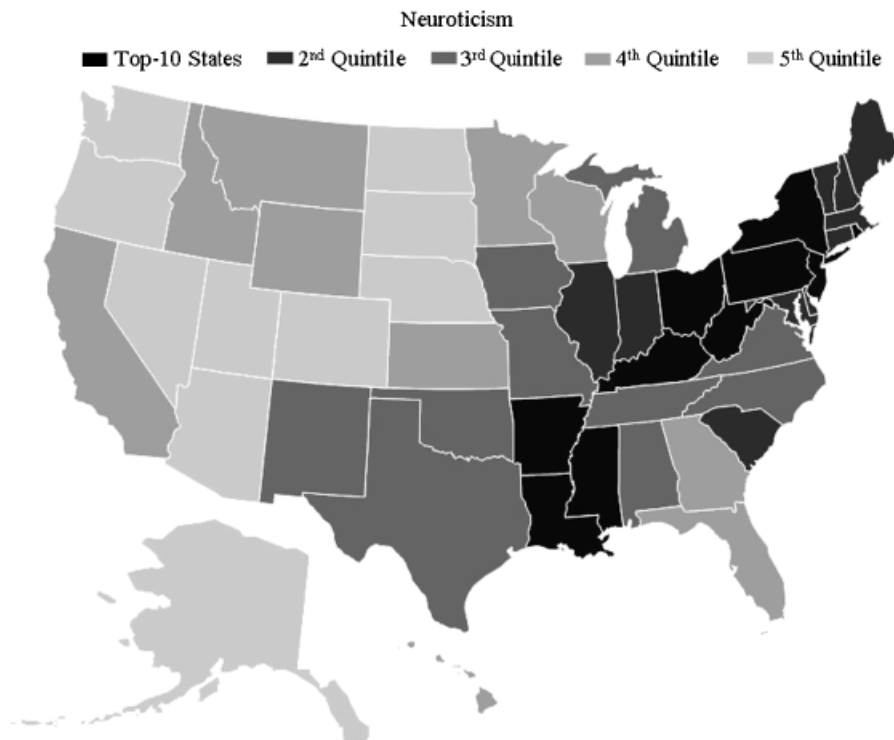


Fig. 5. Map of state-level Neuroticism.

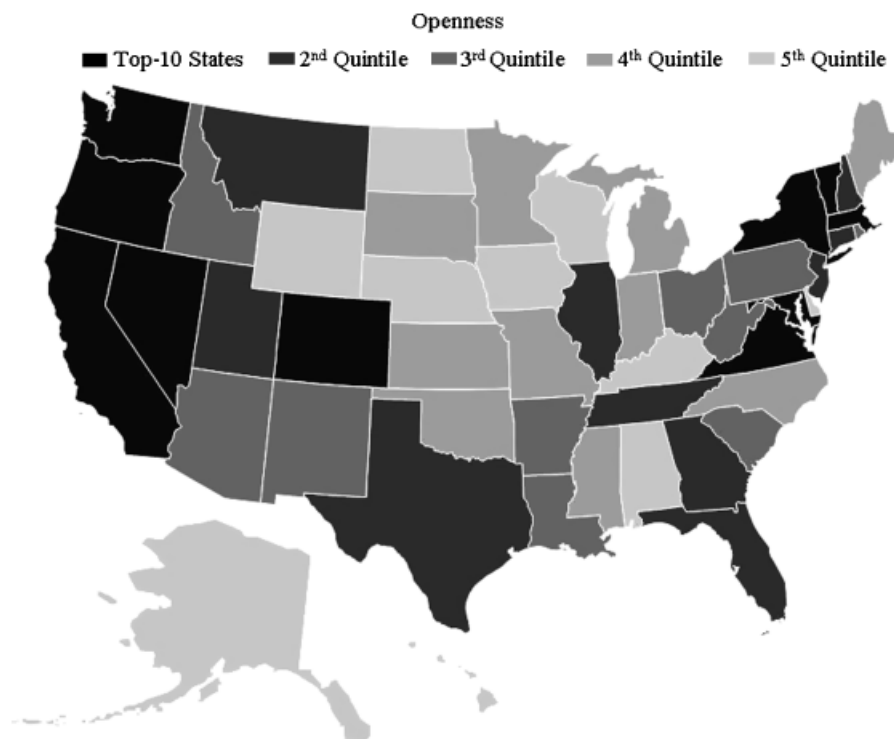


Fig. 6. Map of state-level Openness.

state residents with higher education (i.e., at least a college degree), percentage of African Americans, percentage of females, and proportion of state population living in urban cities (i.e., states with cities that have a population of 1 million or more). Again, to ensure that this strategy was appropriate, we conducted another five multiple regression analyses, regressing each trait on the other four traits and the five sociodemographic variables. The amount of unexplained variance left over was 62%, 50%, 61%, 28%, and 46% for E, A, C, N, and O, respectively, indicating that substantial proportions of variance were not explained by the other traits or sociodemographic variables.<sup>4</sup>

<sup>4</sup>Results from large-scale survey studies indicate that access to and use of the Internet varies across states (e.g., Peslak, 2004; Spooner, Meredith, & Rainie, 2003). For example, use of the Internet tends to be highest in the Northeast and West Coast, as well as in large metropolitan cities (Spooner et al., 2003). Moreover, sex, race, age, income, and education are among the strongest predictors of Internet usage (Peslak, 2004). It is therefore possible that our Internet-based method may have resulted in the over- or undersampling of certain demographic variables. However, for all analyses of the state-level indicators, we conducted partial correlation analyses controlling for statewide differences in sex, race, income, education, and the proportion of residents living in large cities. These demographic variables have been shown to covary strongly with statewide differences in Internet usage (Peslak, 2004; Spooner et al., 2003). Nonetheless, to be sure that these variables account for possible differences in Internet usage, we obtained state-level estimates of Internet use from the U.S. Census Bureau (Day, Janus, & Davis, 2005) and redid all of our partial correlation analyses controlling for Internet usage along with the five sociodemographic variables. The results from those analyses were virtually identical to the results obtained when the Internet usage variable was not included as a covariate. Thus, even though statewide differences in Internet access may account for some of the state-level personality correlations, its influence is redundant with the sociodemographic variables already included in the analyses.

Below, we present the results for each of the FFM personality dimensions. Specifically, we begin each section by focusing on the state-level relationships for the sets of social indicators that were predicted and by offering some potential interpretations of the results. Then, we present state-level relationships for the social indicators that were not predicted but yielded at least one correlation that met or exceeded our effect size benchmark (.20), and we speculate on what may underlie the correlations that we did not predict. Of course, we acknowledge that some of the interpretations are rather tentative. Nevertheless, these entirely novel analyses highlight some potentially important general geographical trends, so our interpretations are presented in the hope of stimulating future work on these topics. The correlations between each of the state-level FFM dimensions and the social indicators are reported in Tables 2–6 for E, A, C, N, and O, respectively. For presentational clarity, the predicted correlations for each dimension are listed in boldface type.

## E

*Predicted findings.* At the individual level, E is associated with sociability, energy, and health. We therefore predicted that E would be related to conceptually similar indicators at the state level. As can be seen in Table 2, the results generally support our predictions.

State-level E was positively related to indicators of social involvement, such as attending club meetings, spending time in bars, and entertaining guests at home. Moreover, these relationships remained when the sociodemographic variables were



**TABLE 2**  
*Extraversion Correlations at the State Level*

Variable	Extraversion	Partialling socio-demographics <sup>a</sup>
Crime		
Robbery per capita	.55	.42
Murder per capita	.51	.41
Social involvement		
Went to a club meeting <sup>b,c</sup>	<b>.38</b>	<b>.38</b>
Went to a bar or tavern <sup>b,c</sup>	<b>.24</b>	<b>.33</b>
Entertained guests at home <sup>b,c</sup>	<b>.10</b>	<b>.19</b>
I spend a lot of time visiting friends <sup>c</sup>	<b>-.04</b>	<b>-.08</b>
Religiosity		
Religion is an important part of my life <sup>c</sup>	.31	.15
Attended church or other place of worship <sup>b,c</sup>	.28	.14
Social and enterprising occupations		
% Business and finance	<b>.27</b>	<b>.18</b>
% Healthcare practitioners	<b>.22</b>	<b>.24</b>
Artistic and investigative occupations		
% Arts and entertainment	.32	.15
Patent production per capita	-.27	-.14
Health-promoting behavior		
Exercised at home <sup>b,c</sup>	-.27	-.11
Jogged <sup>b,c</sup>	-.28	-.30
Mortality		
% Dead from cancer	<b>.15</b>	<b>-.12</b>
% Dead from heart disease	<b>.13</b>	<b>-.09</b>
Life expectancy	<b>-.12</b>	<b>.10</b>

**Note.** Researchers computed all Extraversion correlations while controlling for the other four personality dimensions. Predicted correlations are in boldface type. Correlations greater than  $|\cdot27|$  are significant at  $p < .05$  ( $N = 51$ ). % = proportion of state population.

<sup>a</sup>Controlling for median income, percentage of African Americans, percentage of females, percentage of residents with at least a college degree, and proportion of state population living in a city with one million or more residents.

<sup>b</sup>Frequency in the last 12 months.

<sup>c</sup> $N = 49$ .

held constant (as seen in partial correlations in the second data column of Table 2). Curiously, state-level E was not related to rates of spending time with friends. Although this finding would seem inconsistent with individual-level research, the pattern of E and social involvement correlations seem to suggest that state-level E reflects sociability and outgoingness more than friendliness and warmth, which tend to be associated more with A at the individual level (John & Srivastava, 1999). Thus, individuals appear to spend more time socializing in states where E is high than they do in low-E states, but their socializing is apparently somewhat indiscriminate and is not restricted to close friends.

We also predicted that states where E is high would have larger proportions of individuals working in social and enterprising occupations than would low-E states. The correlations

reported in both columns in Table 2 provide support for this prediction. E was positively related to proportions of the working population employed in industries in which social interaction is an essential aspect of work life, such as business (e.g., sales) and healthcare (e.g., nursing). These associations appear robust because they remained even after the sociodemographic variables, including education and income, were held constant. It is worth emphasizing that these findings converge with research at the individual level indicating that extraverted individuals tend to prefer occupations that involve leading, helping, and persuading others for economic or organizational gains (Barrick et al., 2003). Thus, at the state level, it would seem reasonable to suppose that social and enterprising industries may flourish in high-E states because there are large numbers of people who are comfortable socializing, negotiating, and interacting with others.

On the basis of previous individual-level research, we also expected state-level E to be related to indicators of mortality. As can be seen in Table 2, the results for this prediction were tenuous at best. The correlations listed in the first data column reveal small associations suggesting that E was negatively linked to longevity. However, as shown in the second data column, the direction of these relationships reversed after we controlled for sociodemographic variables, revealing a slight trend for state-level E to be positively associated with longevity, as predicted. Explanations for the protective effects of E at the individual level suggest that it is actually social support, not E per se, that buffers against illness (Roberts et al., 2007). The current results indicate that state-level E is related to social involvement but not to maintaining close social ties (e.g., time spent with friends), which may explain why no strong protective effects of E were observed in the present study.

*Unpredicted findings.* Although the state-level E results were generally consistent with our predictions, there were several unpredicted state-level E correlations that met our effect size benchmark and alerted us to potentially important geographic trends. As shown in the top portion of Table 2, state-level E was positively related to rates of robbery and murder, even after we controlled for key sociodemographic variables. Why is E related to crime rates at the state level? Excitement seeking is widely regarded as a component of individual-level E (John & Srivastava, 1999), and there is some evidence suggesting that excitement seeking is positively related to impulsive risk taking (Romero, Gomez-Fraguela, Luengo, & Sobral, 2003) and having a criminal record (Samuels et al., 2004). Because there are comparatively large proportions of individuals with excitement-seeking traits and frequent social interactions in high-E states, it is tempting to suppose that these factors may increase the likelihood for some interactions to end in violence. There may actually be some validity to the hypothesis that there are more crimes against persons in high-E states than in low-E states, as we did not find a relationship between E and rates of property crime ( $r = .01$ ).

We also found a trend for high-E states to be higher in religiosity than states low in E. Although the correlations exceeded our benchmark (as seen in the first column of Table 2), the correlations were comparatively smaller after we controlled for the sociodemographic variables, suggesting that statewide differences in education, income, and racial diversity may underlie these links. Although the association between state-level E and religiosity tends to be small, it is conceivable that in states with large numbers of extraverts, religiosity tends to be high because religion provides a social forum for people to congregate and interact with others. This interpretation is justifiable, as a few individual-level studies have reported modest yet stable relationships between E and religiosity (L.A. Clark & Watson, 1999; Saroglou, 2002; Watson & Clark, 1993).

State-level E was also related to the proportion of state residents working in artistic and investigative professions. As can be seen in Table 2, E was positively related to proportions of artists and entertainers, but negatively correlated with patent production. However, these relationships decreased markedly when the sociodemographic variables were controlled.

As shown in Table 2, health-promoting behavior, such as exercising and jogging, appear to be lower in high-E states than in low-E states. Although we are not aware of any published research documenting such relationships at the individual level, it would seem as though the relationship between E and physical exercise should be positive, as extraverts tend to be active and energetic. However, exercising at home and jogging are activities typically done alone, and, in light of the E correlates reported, it would appear as though state-level E reflects statewide differences in social orientation. If so, then it is conceivable that physical activities that are more socially oriented (e.g., team sports) may be more common in high-E states than they are in low-E states. Two items in the DDB dataset enabled us to test this hypothesis: frequency of playing volleyball and softball in the past 12 months. The correlations between these unpredicted variables and state-level E failed to meet our benchmark (both were less than  $1.20$ ), so they are not reported in Table 2, but when we controlled for the sociodemographic variables, the partial correlations provided some support for this idea (partial  $r_s = .22$  and  $.21$ , for volleyball and softball, respectively). These findings suggest that individuals in high-E states are more likely to engage in physical activities that involve other people.

## A

*Predicted findings.* A reflects warmth, compassion, cooperativeness, and friendliness at the individual level. If the model we propose in Figure 1 is valid, then we should expect statewide differences in A to be associated with indicators of prosociality, social involvement, religiosity, and mortality. Overall, the state-level A correlations presented in Table 3 are consistent with our predictions.

The correlations presented in Table 3 indicate that state-level A was negatively related to rates of robbery, murder, and prop-

erty crime. The fact that state-level A was associated with indicators of robbery and murder, even after we controlled for statewide demographics (e.g., urbanization, income), suggests that those relationships are robust. Overall, these findings are consistent with research linking individual-level A with delinquency and antisocial behavior (Ozer & Benet-Martínez, 2006; Wiebe, 2004), and they suggest that state-level A may reflect aspects of prosocial behavior.

Also shown in Table 3, state-level A was associated with several indicators of social involvement. Specifically, A was positively associated with activities that promote tight social relations, including spending time with friends and entertaining guests at home. Surprisingly, however, state-level A was negatively related to spending time in bars and attending club meetings. At present, it is not entirely clear how these particular findings should be interpreted. Future geographic-level personality research that assesses involvement in a wide variety of social activities may illuminate the nature of these relationships.

We predicted that state-level A would be positively related to religiosity, and the correlations reported in Table 3 provide support for that prediction. Individuals living in states high in A are more likely to be religious and attend places of worship than are individuals living in states where A is comparatively low, which is consistent with individual-level research (e.g., MacDonald, 2000; Ozer & Benet-Martínez, 2006). Thus, it would appear as though state-level A also reflects the extent to which individuals in a state endorse and maintain religious principles.

We also expected state-level A to be inversely related to mortality, and the correlations in Table 3 are consistent with that expectation. Specifically, there was a trend for states high in A to have fewer deaths due to cancer and heart disease than do states low in A. Although these effects failed to reach our effect size benchmark, further support for the protective effects of A comes from the strong positive correlation with life expectancy. These results dovetail nicely with results from recent research indicating that high A is related to longevity (Roberts et al., 2007). The evidence reported thus far would seem to suggest that state-level A reflects the degree to which individuals within a state are friendly, warm, and altruistic, which, apparently, seems to contribute to an environment marked by social, psychological, and physical health.

*Unpredicted findings.* By and large, the state-level A correlates were consistent with individual-level research. However, we did find a few unpredicted social indicators with correlations that reached our effect size benchmark. As can be seen in Table 3, state-level A was positively associated proportions of artists and entertainers. The fact that this relationship remained after we controlled for the sociodemographic variables suggests that it is robust. This finding is surprising because there is no clear evidence linking A and occupational preference. At present, it is not entirely clear how this relationship should be interpreted.

**TABLE 3**  
*Agreeableness Correlations at the State Level*

Variable	Agreeableness	Partialling socio-demographics <sup>a</sup>
Crime		
Robbery per capita	-.41	-.44
Murder per capita	-.42	-.41
Property crime per capita	-.11	-.03
Social involvement		
I spend a lot of time visiting friends <sup>c</sup>	.28	.26
Entertained guests at home <sup>b,c</sup>	.24	.20
Went to a bar or tavern <sup>b,c</sup>	-.17	-.26
Went to a club meeting <sup>b,c</sup>	-.18	-.30
Religiosity		
Attended church or other place of worship <sup>b,c</sup>	.21	.22
Religion is an important part of my life <sup>c</sup>	.07	.23
Artistic and investigative occupations		
% Arts and entertainment	.21	.23
Mortality		
Life expectancy	.39	.38
% Dead from heart disease	-.07	-.14
% Dead from cancer	-.15	-.07

**Note.** Researchers computed all Agreeableness correlations while controlling for the other four personality dimensions. Predicted correlations are in bold-face type. Correlations greater than  $|\ .27 |$  are significant at  $p < .05$  ( $N = 51$ ). % = proportion of state population.

<sup>a</sup>Controlling for median income, percentage of African Americans, percentage of females, percentage of residents with at least a college degree, and proportion of state population living in a city with one million or more residents.

<sup>b</sup>Frequency in the last 12 months.

<sup>c</sup> $N = 49$ .

## C

*Predicted findings.* Research at the individual level indicates that C reflects dutifulness, responsibility, and self-discipline and that it is positively associated with religiosity, health-promoting behavior and negatively related to criminal behavior and mortality. Drawing from the logic outlined in Figure 1, we expected statewide levels of C to be associated with conceptually similar social indicators. The results reported in Table 4 provide partial support for these predictions.

As can be seen in Table 4, state-level C was positively related to rates of murder and robbery. These findings are contrary to individual-level research, which suggests that low-C individuals are more likely to commit acts of violence and deviance than are high-C individuals (Ozer & Benet-Martínez, 2006; Wiebe, 2004). However, the state-level C relationships with crime dropped substantially once we held the sociodemographic variables constant. So it would appear as though any relationship between state-level C and criminal behavior is subsumed by sociodemographic variables such as urbanization, education, and income.

Consistent with our predictions, we found that religiosity was positively related to state-level C. As shown in Table 4, in high-C

states, individuals are more likely to place importance on religion and attend places of worship than are individuals in states low in C. These results are consistent with individual-level studies linking C and religiosity (L.A. Clark & Watson, 1999; McCullough, Emmons, & Tsang, 2003; Saroglou, 2002), which suggests that religion provides sets of rules and conventions that appeal to conscientious individuals' need for order and discipline. Thus, the state-level relationships between C and religion make it tempting to infer that there may be a premium placed on order, dutifulness, and discipline in states where C is prevalent.

We also predicted that state-level C would be positively related to indicators of health-promoting behavior. The correlations reported near the bottom of Table 4 reveal a slight positive trend for state-level C to be related to jogging and exercising at home. These results converge with individual-level studies, suggesting that conscientious individuals tend to engage in health promoting behavior and live long healthy lives (Bogg & Roberts, 2004; Roberts et al., 2007).

However, the long-term benefits of exercise at the state level do not appear to exist. Indeed, contrary to our predictions, there were no clear protective effects of C at the state level. As can be seen in the first data column in Table 4, state-level C was positively related to mortality, but once the sociodemographic variables were held constant, these relations became blurred, with state-level C no longer being related to deaths due to heart disease and negatively related to cancer-related deaths and life expectancy. If individuals in states high in C engage in more health promoting behavior, why are there no protective effects of C? It is conceivable, albeit highly speculative, that high-C states place greater emphasis on rules and standards than do low-C states, which, in turn, may lead to statewide differences in levels of stress. That is, if there is more emphasis placed on order and self-discipline in high C states, perhaps this elicits a certain amount of stress among less-conscientious residents, which then has deleterious health consequences. Although this interpretation is very tentative, it may nevertheless provide one interesting path for future research.

*Unpredicted findings.* Although we did not predict any relationships between state-level C and social involvement, C was negatively related to spending time in a bar and entertaining guests at home. Moreover, the relationship between C and entertaining guests at home remained after we controlled for the sociodemographic variables. It is not entirely clear how to interpret this finding, as there is no clear evidence at the individual level that C is related to social involvement.

State-level C was also related to several indicators of occupational prevalence. As can be seen in the first data column in Table 4, state-level C was negatively related to business and finance, computers and mathematics, patent production, and arts and entertainment. However, these relationships changed markedly when we controlled for the sociodemographic variables, with only computer and mathematics and arts and entertainment remaining. The partial correlations suggest that

**TABLE 4**  
*Conscientiousness Correlations at the State Level*

Variable	Conscientiousness	Partiallying socio-demographics <sup>a</sup>
Crime		
Murder per capita	<b>.18</b>	<b>.01</b>
Robbery per capita	<b>.16</b>	<b>.08</b>
Social involvement		
Went to a bar or tavern <sup>b,c</sup>	-.22	-.05
Entertained guests at home <sup>b,c</sup>	-.45	-.29
Religiosity		
Religion is an important part of my life <sup>c</sup>	<b>.38</b>	<b>.31</b>
Attended church or other place of worship <sup>b,c</sup>	<b>.27</b>	<b>.31</b>
Social and enterprising occupations		
% Business and finance	-.38	.06
Artistic and investigative occupations		
% Computer and mathematical	-.21	.28
Patent production per capita	-.24	-.09
% Arts and entertainment	-.52	-.34
Health-promoting behavior		
Jogged <sup>b,c</sup>	<b>.15</b>	<b>.13</b>
Exercised at home <sup>b,c</sup>	<b>.06</b>	<b>.28</b>
Mortality		
% Dead from heart disease	<b>.31</b>	<b>.00</b>
% Dead from cancer	<b>.11</b>	<b>-.11</b>
Life expectancy	<b>-.44</b>	<b>-.27</b>

**Note.** Researchers computed all Conscientiousness correlations while controlling for the other four personality dimensions. Predicted correlations are in bold-face type. Correlations greater than |.27| are significant at  $p < .05$  ( $N = 51$ ). % = proportion of state population.

<sup>a</sup>Controlling for median income, percentage of African Americans, percentage of females, percentage of residents with at least a college degree, and proportion of state population living in a city with one million or more residents.

<sup>b</sup>Frequency in the last 12 months.

<sup>c</sup> $N = 49$ .

there may be large proportions of computer scientists and mathematicians in high-C states and more artists and entertainers in low-C states. There is little evidence at the individual level that C is related to occupational preferences; however, a meta-analysis concerned with links between personality and occupational preferences revealed a small relationship ( $r < .10$ ) between C and preferences for occupations that involve methodical and procedural activities (Barrick et al., 2003). Thus, it may be that the relationships between state-level C and the occupational indicators reflect the degree to which individuals in a state prefer systematic and focused tasks and clearly defined rules and regulations. This interpretation is consistent with a broader conceptualization of state-level C as reflecting a need for order and discipline.

*N*

*Predicted findings.* At the individual level, N reflects anxiety, stress, impulsivity, and emotional instability and is related to

antisocial behavior, poor coping, and poor health. Accordingly, we predicted relations between state-level N and crime, health-promoting behavior, and mortality. The results reported in Table 5 are generally consistent with those predictions.

The correlations reported at the top of Table 5 indicate that N was positively linked to incidents of robbery and murder. Although these findings are consistent with individual level research suggesting that aspects of N, particularly hostility and impulsivity, are related to antisocial behavior, the direction of these relationships changed when we held key sociodemographic variables constant. Specifically, N was negatively related to rates of robbery and was no longer related to incidents of murder. It appears though the links between N and crime rates may be accounted for by statewide sociodemographic variables, such as urbanization and income.

We also predicted that state-level N would be inversely related to health-promoting behavior and the results shown near the bottom of Table 5 are consistent with that prediction. Specifically, individuals in high-N states tend to jog less and engage in less exercise at home than do individuals in low-N states. The links between N and health-promoting behavior appear robust, as these relationships remained rather large in magnitude even after the sociodemographic variables were held constant.

Individual-level research indicates that N is negatively related to longevity, and the results reported at the bottom of Table 5 suggest that this effect generalizes to the state level. Indeed, state-level N was positively related to deaths due to heart disease and cancer and negatively related to life expectancy. Furthermore, these relationships remained large in magnitude even when the sociodemographic variables were controlled. That N is positively associated with morbidity at the state-level converges with individual-level research showing inverse relationships between N and longevity (Ozer & Benet-Martínez, 2006; Roberts et al., 2007). Furthermore, epidemiological research indicates that regional variation in morbidity is linked to statewide differences in income, education, and race (Devesa et al., 1999; Jemal et al., 2003; Pickle et al., 2003), so the fact that state-level N remained linked after controlling for those variables is especially strong evidence for the role of N in public health.

*Unpredicted findings.* As can be seen in the first column of Table 5, state-level N is negatively related social involvement. Specifically, in high-N states, individuals are less likely to attend club meetings, spend time with friends, and attend bars than are individuals in low-N states. All but one of these relationships dropped near zero when the sociodemographic variables were held constant. Thus, it would appear as though state-level N accounts, at least partially, for regional variation in social involvement. These results are strikingly similar to recent individual-level research on the daily lives of depressed individuals, which indicates that subclinical depression is positively related to spending time alone and inversely related to rates of socializing, conversing in groups, and entertainment consumption

**TABLE 5**  
*Neuroticism Correlations at the State Level*

Variable	Neuroticism	Partialling socio-demographics <sup>a</sup>
Crime		
Robbery per capita	<b>.14</b>	<b>-.19</b>
Murder per capita	<b>.12</b>	<b>-.06</b>
Social involvement		
Went to a club meeting <sup>b,c</sup>	-.22	-.19
I spend a lot of time visiting friends <sup>c</sup>	-.26	-.01
Went to a bar or tavern <sup>b,c</sup>	-.37	-.02
Religiosity		
Religion is an important part of my life <sup>c</sup>	.30	-.02
Attended church or other place of worship <sup>b,c</sup>	.26	.03
Social and enterprising occupations		
% Business and finance	-.40	-.07
Artistic and investigative occupations		
Patent production per capita	-.20	-.01
% Computer and mathematical	-.34	-.06
% Arts and entertainment	-.62	-.37
Health-promoting behavior		
Jogged <sup>b,c</sup>	<b>-.33</b>	<b>-.27</b>
Exercised at home <sup>b,c</sup>	<b>-.51</b>	<b>-.40</b>
Mortality		
% Dead from heart disease	<b>.74</b>	<b>.43</b>
% Dead from cancer	<b>.70</b>	<b>.30</b>
Life expectancy	<b>-.50</b>	<b>-.24</b>

**Note.** Researchers computed all Neuroticism correlations while controlling for the other four personality dimensions. Predicted correlations are in bold-face type. Correlations greater than  $|\ .27 |$  are significant at  $p < .05$  ( $N = 51$ ). % = proportion of state population.

<sup>a</sup>Controlling for median income, percentage of African Americans, percentage of females, percentage of residents with at least a college degree, and proportion of state population living in a city with one million or more residents.

<sup>b</sup>Frequency in the last 12 months.

<sup>c</sup> $N = 49$ .

(Mehl, 2006). In addition, the present results dovetail with Putnam's (2000) work showing that individuals residing in states with a wealth of social capital (i.e., social involvement) tend to be psychologically healthier than those living in places with lower rates of social involvement.

Table 5 also indicates that N was positively related to religiosity. However, the partial correlations show that the relationships were reduced to zero after we controlled for state sociodemographic variables.

State-level N was also related to several indicators of occupation prevalence. Specifically, N was negatively related to business and finance, patent production, computer and mathematics, and arts and entertainment. All but one of these relationships dropped below our effect size benchmark when the sociodemographic variables were held constant. Thus, it would appear as though there are more artists and entertainers in states low in N. As there

**TABLE 6**  
*Openness to Experience Correlations at the State Level*

Variable	Openness	Partialling socio-demographics <sup>a</sup>
Crime		
Robbery per capita	.65	.42
Murder per capita	.55	.37
Property crime per capita	.23	.07
Social involvement		
Went to a bar or tavern <sup>b,c</sup>	-.35	-.34
I spend a lot of time visiting friends <sup>c</sup>	-.40	-.44
Religiosity		
Religion is an important part of my life <sup>c</sup>	-.21	-.37
Attended church or other place of worship <sup>b,c</sup>	-.33	-.43
Liberal values		
The use of marijuana should be legalized <sup>c</sup>	<b>.73</b>	<b>.57</b>
I am in favor of legalized abortions <sup>c</sup>	<b>.53</b>	<b>.30</b>
I am in favor of legalizing same sex marriages <sup>c</sup>	<b>.52</b>	<b>.36</b>
Social and enterprising occupations		
% Business and finance	.49	.08
Artistic and investigative occupations		
% Arts and entertainment	<b>.55</b>	<b>.23</b>
% Computer and mathematical	<b>.50</b>	<b>.24</b>
Patent production per capita	<b>.32</b>	<b>.28</b>

**Note.** Researchers computed all Openness correlations while controlling for the other four personality dimensions. Predicted correlations are in bold-face type. Correlations greater than  $|\ .27 |$  are significant at  $p < .05$  ( $N = 51$ ). % = proportion of state population.

<sup>a</sup>Controlling for median income, percentage of African Americans, percentage of females, percentage of residents with at least a college degree, and proportion of state population living in a city with one million or more residents.

<sup>b</sup>Frequency in the last 12 months.

<sup>c</sup> $N = 49$ .

is no evidence at the individual level that N is related to preferences for artistic professions, it is not precisely clear what this relationship means.

## O

*Predicted findings.* O reflects curiosity, intellect, and creativity at the individual level. If our model is valid, then we should expect state-level O to be represented on conceptually similar social indicators. Thus, we predicted that O would be positively related to indicators of liberal values and the prevalence of artistic and investigative professions. As can be seen in Table 6, there is considerable support for both of these predictions.

As shown in Table 6, we observed very robust relationships between O and the liberal values indicators. Overall, people in high-O states tend to espouse more tolerant views on marijuana, abortion, and gay marriage than do those in low-O states.

Furthermore, results from the partial correlation analyses suggest that these relationships are independent of the effects of social class on public opinion. These findings are very consistent with research at the individual-level showing that O is related to the content of social and political attitudes (Jost et al., 2003; McCrae, 1996; Saucier, 2000), and they suggest that states marked by large proportions of open individuals may have more progressive and tolerant views about sundry social issues.

State-level O was also associated with indicators of artistic and investigative occupations. As can be seen in Table 6, O was positively related to state proportions of individuals working in the arts and entertainment and computer industries, as well as per capita patent production. Moreover, these connections remained substantial in size even when sociodemographic variables, such as education and income, were held constant. These results converge nicely with research on personality and occupational preferences, which indicates that open individuals prefer jobs that involve a high degree of abstract and creative thought (Barrick et al., 2003; Ozer & Benet-Martínez, 2006). In addition, these findings are consistent with work in regional economics (Florida, 2002) that link regional variation in high-tech growth to differences in creativity. Thus, it would appear as though state-level O reflects, among other things, the extent to which individuals in a state are intellectual and creative.

*Unpredicted findings.* As can be seen at the top of Table 6, state-level O was positively related to per capita estimates of robbery, murder, and property crime. Although the size of these relationships was smaller when we held the sociodemographic variables constant, the partial correlations with robbery and murder remained large in magnitude. These findings appear unique to the state level, as no research at the individual level has observed connections between high O and antisocial behavior. Thus, it is not precisely clear how these findings should be interpreted.

State-level O was negatively related to indicators of social involvement. As shown in Table 6, the partial correlations indicate that these associations remained large after the sociodemographic variables were controlled. Why might individuals in high-O states participate in fewer social activities than individuals in low-O states? To the extent that state-level O reflects unconventional beliefs and values, it is conceivable that residents of high-O states place less importance on maintaining close social relationships than do those in low-O states because family and community bonds may be more important in places where tradition is valued.

As shown in Table 6, the religiosity indicators were negatively related to state-level O, and they held steady after the sociodemographic variables were controlled. Thus, it would appear as though individuals in high-O states place considerably less importance on religion and attend church less often than do those in low-O states. These findings appear consistent with the other O correlates and suggest that state-level O reflects the

degree to which individuals in a state uphold or reject conventional value systems.

O was also positively related to proportions of individuals working in business. However, this relationship was reduced considerably when the sociodemographic variables, including education and income, were partialled out.

## GENERAL DISCUSSION

### Overview of Results

This research was an attempt to extend previous work on geographic variation in personality. Whereas past research has examined geographic trait variation across nations, we examined variation at a narrower geographic level of analysis to obtain greater fidelity. Guided by research in the social sciences, we articulated a theoretical framework for conceptualizing the antecedents and consequences of geographic variation in personality and developed and tested the hypothesis that there are meaningful personality differences across the U.S. Analyses of personality data from over half a million U.S. residents revealed robust statewide personality differences and clear patterns of geographic variation. Furthermore, statewide personality differences were related to an array of geographic social indicators, including crime, social involvement, religiosity, values, occupational prevalence, health behavior, and mortality. Together, these results suggest that there are meaningful differences in the personalities of individuals living in different regions of the same nation.

The rankings and maps of the state personality dimensions revealed some striking geographic trends. In particular, the state-level personality means appeared to be geographically clustered, with nearby states having similar personality scores. The geographic distribution of E showed that it tends to be highest in the central states and lowest in the Northwest and most of the East Coast states. State-level estimates of A suggested that there are larger proportions of agreeable people in the Midwest and Southern states than in the Northeast states. State-level C appears to be highest in the Southern and Midwest states and lowest in the Northeastern states. The pattern for N revealed a “stress belt” dividing the East and West, with states from Maine to Louisiana being highest, states to the immediate Northwest and Southeast having slightly lower levels, and states in the West having the lowest levels. A clear geographic divide also emerged for O, such that O in the Northeast and West Coast states is higher than it is in the Midwest and South states. These patterns are remarkably consistent with multistate findings reported by both Krug and Kulhavy (1973) and Plaut et al. (2002).

We predicted that the state-level personality dimensions would be related to geographic social indicators that are conceptually similar to the types of variables linked to personality at the individual level. As summarized in Table 7, the results revealed patterns of correlations between the state-level FFM

**TABLE 7**  
*Summary of Relationships Between FFM Dimensions and Indicator Variables at the Individual and Regional Level of Analysis*

Variable	E		A		C		N		O	
	Ind	Reg	Ind	Reg	Ind	Reg	Ind	Reg	Ind	Reg
Crime		+	-	-	-	∅	+	∅		+
Social involvement	+	+	+	+ -		∅ -		∅		-
Religiosity		+	+	+	+	+		∅		-
Liberal values		∅		∅		∅		∅	+	+
Social and enterprising occupations	+	+		∅		∅		∅		∅
Artistic and investigative occupations		∅		+		+ -		- ∅	+	+
Health-promoting behavior		-		∅	+	+	-	-		∅
Mortality	-	∅	-	-	-	+ ∅	+	+		∅

**Note.** Individual-level relationships are based on research reported in Ozer and Benet-Martínez (2006) and Roberts et al. (2007). Region-level relationships are based on the correlations reported in Tables 2–6. E=Extraversion; A=Agreeableness; C=Conscientiousness; N=Neuroticism; O=Openness; Ind=individual level; Reg=regional level; ∅=no relationship; +=positive relationship; -=negative relationship.

dimensions and social indicators that were generally consistent with individual-level research. Indeed, we made 16 predictions about how personality would be represented on various state-level social indicators and we obtained support for 12 (75%) of them. These results are impressive because they imply that the effects of personality on individuals' basic tendencies are so pronounced that they operate alongside broad social forces.

Although the results are encouraging and generally in line with our predictions, we emphasize that they are still very preliminary and that additional research on this topic is necessary to evaluate their robustness. Nonetheless, in light of the current results, we may begin to conceptualize the meaning of the state-level personality dimensions. The central aspect of E that emerged from the results seemed to emphasize social orientation; that is, state-level E seems to reflect the extent to which people in a region socialize with others. The state-level correlates of A allude to friendliness, trust, and helpfulness, which is very similar to conceptualizations of social capital. The defining features of C that emerged seem to denote restraint, order, and dutifulness; that is, individuals in high-C states seem to place more value on rules and obedience than do people in low-C states. State-level N reflects social, psychological, and physical well-being. Indeed, the patterns of correlations converged, suggesting that individuals in high-N states are socially isolated and generally unhealthy. State-level O seems to capture the degree of creativity, unconventionality, and tolerance in a region.

### Evaluation of Model

One of the primary goals of this research was to articulate a model of the processes through which psychological characteristics become represented at the geographic level and how they are reinforced by broad social structural and institutional variables. Although the present data do not allow us to empirically test the relative impact that each path in Figure 1 has on the expression of personality at the state level, the results are gen-

erally consistent with the processes we propose in our model. Because several of the state-level personality correlates are consistent with research at the individual level, it seems likely that Paths A and B are factors. For example, in states where there are large proportions of extraverts, there are also high rates of social involvement. Thus, it is possible that statewide differences in social involvement may be a direct result of the number of state residents who possess traits associated with E.

Some of the relationships we found also suggest that Path C may be a factor. For instance, recall that state-level N is positively related to markers of physical health. There is evidence linking N and morbidity at the individual level (Smith & Gallo, 2001; Suls & Bunde, 2005), so it is possible that state-level morbidity may be a result of the number of neurotic individuals that live in a state (Paths A and B). However, if a region has a high proportion of irritable, stressed, and anxious individuals, then it is also reasonable to suppose that those individuals may produce a tense and unstable psychosocial environment. If so, then that psychosocial environment may affect the stress levels of other people (Path C) and, as a result, further contribute to state-level health. This explanation is consistent with work on emotional contagion (Hatfield et al., 1994; Joiner, 1994; Joiner & Katz, 1999) and with research documenting on the deleterious effects of psychological stress on physical health (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002; Schneiderman, Ironson, & Siegel, 2005; Segerstrom, Taylor, Kemeny, & Fahey, 1998; Smith & Mackenzie, 2006).

Path C may also contribute to the relationship between state-level A and crime. For example, higher crime rates may be the result of fewer agreeable people in a state (Paths A and B), but it is conceivable that the level of crime in a region could have an effect on the prevalence of A. Specifically, people living in crime-ridden regions are at a greater risk of being a victim than are people in safer regions, so people in high-crime areas may adapt by becoming less generous, helpful, and trusting of others (Path C). Indeed, in such environments it would be in people's best interest to be skeptical and wary of strangers.

The results also provide some support for Paths D (institutions affect behavior) and E (social norms affect trait prevalence). Consider, for instance, the associations between state-level O and the proportions of artistic and investigative occupations. The number of artists, entertainers, and computer scientists in a state may be the direct result of the number of open people that live there (Paths A and B). Yet it is also conceivable that state-level O may be affected by the types of industries in the region that capitalize on qualities such as intellect, ingenuity, and creativity. That is, the industries that predominate a region (e.g., artistic and investigative) may affect the prevalence of psychological and behavioral tendencies of O (Path D) by encouraging employees to think and behave more openly than usual. If so, then this could increase psychological and behavior tendencies of O. Furthermore, this process could potentially affect the prevalence of relevant traits (Path E) in that region (through selective migration or reproduction with high-O individuals). This explanation is consistent with theory and research in cultural psychology, which suggests that the histories, institutions, and social norms in a region influence behavior and cause geographic differences to persist (Kitayama et al., 2006).

It is necessary to reiterate that the model we propose is not limited to personality trait variation across states—it could apply at other geographic levels too. Indeed, our model provides a framework for conceptualizing how prevalent traits become expressed at any geographic level, which includes continents, nations, states, cities, and neighborhoods. Although each level of analysis has its own set of limitations, from obtaining sufficiently large samples to derive reliable personality estimates to the availability of social indicator data, we believe our model is general enough to apply across several levels and that the processes we propose in Figure 1 underlie the personality differences observed across nations.

It is also necessary to emphasize that the model we propose is not restricted to geographic variation in personality traits. Indeed, the model can be applied to geographic variation on a wide variety of individual differences, from individualism and emotional expressivity to aggression and political orientation. To illustrate, consider individual differences in racism. If a region has a large proportion of individuals with racist tendencies, then it is likely that there will be more prejudice and discrimination (e.g., hate crimes committed against members of minority groups) than there are in places with fewer racist people (Path A). Interpersonal manifestations of racism may eventually be represented at the broader geographic level in the form of racial economic inequality, disparities in educational attainment, and widespread support for ideologies that promote racial segregation (Path B). To the extent that interpersonal interactions are marked by expressions of prejudice and discrimination (e.g., racist jokes), then individuals who are not inclined toward racism may nevertheless begin to espouse such beliefs after repeated interactions with others in the environment (Path C). Furthermore, geographic representations of racism (e.g., edu-

cational disparities between majority and minority groups) may serve as justification for such beliefs and reinforce racist tendencies (Path D) and the prevalence of racist individuals within the region (Path E). Thus, whether applied to individual differences in traits and dispositions or to attitudes and opinions, our model provides a useful framework for conceptualizing how variation on any number of individual differences may become represented geographically.

### Limitations and Future Directions

Although these results are still quite preliminary, this research raises several new questions about the nature of personality, the effects of the social environment on personality, and the role that aggregate personality plays in society. Are people happier in environments where their personalities fit the modal personalities of the places they live? Does a lack of fit predict depression or decisions to live elsewhere? Do regional differences in personality have a genetic or environmental origin? How stable is region-level personality over time? Are regional differences in personality related to differences in regional cultures? If so, does one give rise to the other? Can regional personality differences influence the efficacy of social, economic, or health policy reforms? That is, are certain policies more effective in environments where specific personality traits are prevalent? What are the regional characteristics that attract people to live in a place? Do people find those characteristics equally attractive? Do natural disasters or sudden economic shifts within regions affect personality trait prevalence? From our perspective, it is clear that including a macro-level perspective to the study of personality and social psychology will provide many interesting avenues for future research.

Although several of the state-level correlates were consistent with the paths proposed in our model, the causal directions of those relationships are not yet clear. Investigations of the casual directions are needed to inform our understanding of the causes and consequences of personality and culture. Indeed, cross-cultural research shows that there are meaningful psychological differences between people from different nations, but the source of those differences is not yet clear. Whereas some researchers attribute geographic differences to biology (e.g., McCrae, 2001) and suggest that culture is a reflection of biological and genetic differences, others attribute the differences to culture and argue that national differences in culture cause individuals to develop different personalities (Hofstede, 2001; Triandis & Suh, 2002). We believe our conceptual model provides a useful framework for developing and testing hypotheses about the causes and consequences of geographic differences in personality and culture. On one hand, if personality traits are unaffected by learning and experience, then personality would be considered among the primary causes of geographic differences in attitudes and behavior and, hence, culture (Hofstede & McCrae, 2004, pp. 74–78). Accordingly, only Paths A and B in



our model would be factors. On the other hand, if the environment does have an effect on personality, then culture and society may be considered key causes of geographic personality differences (Hofstede, 2001; Hofstede & McCrae, 2004, pp. 70–74). In that case, only Paths C, D, and E in our model would be factors. Future work is needed to evaluate these competing claims directly.

Time-lagged analyses using geographic personality estimates and social indicator data collected over several years could be used to test such causal hypotheses. If region-level personality is a cause of differences in culture and geographic social indicators (e.g., crime rates, public opinion, morbidity), then changes in personality trait prevalence should lead to changes in the outcome variables. For example, if an increasing number of individuals with traits associated with O migrate to a particular region, that change may lead to an increase in liberal public opinion and patent production and, thus, to a more open culture. In contrast, if macrosocial variables precipitate regional differences in personality, then societal changes should lead to changes in personality trait prevalence. For instance, if there is a reduction in crime in a particular region, then that may lead to an increase in A within that region. It is possible that residents may acquire traits associated with A in response to the changes in their region and that highly agreeable individuals may choose to live in the region because of the low crime. These ideas are not entirely unreasonable, as many social policy initiatives are based on the notion that changes in the environment will affect the characteristics of residents.

We attempted to extend previous research on geographic variation in personality by examining statewide differences, but there is reason to believe that it would be useful to examine even narrower geographic levels of analysis. For example, Kashima et al. (2004) found that geographic differences in individualism and collectivism are moderated by urbanization. Specifically, the researchers made comparisons of self-reported individualism and collectivism using data from participants living in either a rural or urban city in Australia (Wodonga or Melbourne) or Japan (Kagoshima or Tokyo). On average, Japanese participants were higher in collectivism than were Australian participants; however, participants from rural locales were higher in collectivism than were those living in metropolitan cities. These findings provide evidence from two different countries that self-conceptions can vary within nations, and they suggest that cross-national differences may not solely reflect differences between national cultures, but also between regional cultures. By examining multiple geographic levels of analysis (e.g., cities, states, and nations), multilevel analyses could be used to identify possible sources of geographic variation in personality and culture.

When comparing geographic social indicators with state-level personality estimates, we were careful to select indicators that were conceptually similar to the types of variables that are known to relate to the FFM. Of course, one of the huge advan-

tages of working at the aggregate level is that there is an enormous number of social indicators to analyze, many of which are relevant to the types of constructs examined at the individual level. For example, we recently examined the links between state-level personality and percentages of votes cast in previous U.S. Presidential elections (Rentfrow, Jost, Gosling, & Potter, in press). The results indicated that significantly higher percentages of votes were cast for Democratic Presidential candidates in the 1996, 2000, and 2004 elections in high-O and low-C states than in low-O and high-C states. In addition, those effects remained after controlling for statewide differences in income, education, and race. Another advantage of working at the aggregate level is that it affords the opportunity to examine connections between personality and behaviors that have low base-rates (e.g., murder, disease) and phenomena that can only be observed at an aggregate level (e.g., population density, cultural diversity). Our hope is that this work will serve as a guide for researchers inclined to explore this rich terrain and facilitate the discovery of new connections between personality and social phenomena not yet identified.

The state personality estimates were derived from a self-selected sample of Internet users. A growing body of evidence indicates that Internet-based psychological data are of similar or better quality than the data collected from convenience samples (e.g., Gosling et al., 2004; Skitka & Sargis, 2006). Indeed, our analyses indicated that the BFI scale reliabilities are comparable with those obtained from college-student samples. For research concerned with making geographic comparisons, sampling is critical because individuals within regions are treated as representative of the entire region. Analyses of the demographic composition of our sample revealed that it was generally more representative of the U.S. population than most convenience samples are (Gosling et al., 2004). Nevertheless, our sample under represented working- and upper-class individuals and older adults. Subsequent research should include greater representation of people from every social class and older individuals to ensure sufficient representation. Although Internet access is becoming increasingly widespread, it would be worthwhile to supplement the present data with a large stratified sample of individuals from around the country. Moreover, studies that also ask respondents to provide information about physical and psychological health, attitudes, occupation, and community involvement would allow for more direct tests of the paths proposed in our model.

Although the focus of this research was on the links between personality and behavior at the geographic level, countless studies in social and personality psychology have made it very clear that behavior is a function of both persons and situations. Therefore, our understanding of geographic variation will no doubt benefit from research that examines geographic differences in basic social psychological processes and other individual-difference variables. For example, one potentially fruitful direction would be to examine whether emotional con-

tagion (Hatfield et al., 1994; Joiner & Katz, 1999) at the geographic level is affected by such macrovariables as population density. Perhaps the degree of concentration of individuals affects the speed and efficiency with which emotions spread.

Another intriguing direction for research would be to examine whether the marital dissatisfaction associated with wife-demand/husband-withdraw communication styles (Gottman, 1998; Swann, Larsen-McClarty, & Rentfrow, 2007; Swann, Rentfrow, & Gosling, 2003) is uniformly distributed or regionally clustered. Perhaps the negative effects of such communication styles are pronounced in conservative regions, where traditional sex-roles may be widely accepted and assertive women are viewed negatively.

Given that regions vary in terms of racial diversity, it might prove useful to consider whether the effects of stereotype threat (Steele & Aronson, 1995) vary across regions of the U.S. Are the negative effects of stereotype threat greater in certain regions than others? Perhaps the effects are weaker or even absent in racially homogenous environments (with a token minority) because stigmatized individuals need not be reminded of their minority status—they may be constantly under some form of threat.

It would also be useful to examine geographic variation in individual differences variables other than personality. For example, are there geographic differences in honesty, attachment, or need for achievement? It is tempting to suppose that geographic variation in such variables would be linked to an assortment of important geographic social indicators, such as crime, social capital, marriage and divorce rates, and economic growth. Moreover, analyses of the interactions among individual difference variables and geographic social indicators and between the two sets of variables could reveal several intriguing relations that may only be observable at geographic levels of analysis.

Future research may also consider the motives underlying selective-migration processes. What makes a specific area or region attractive as a potential residence? What do individuals want from their place of residence? What effect does in-migration and out-migration have on an area? Researchers concerned with regional differences in economic growth and urban development (e.g., T.N. Clark, 2004; Florida, 2002, 2005) are beginning to explore these questions, and they are finding that individuals choose to live in cities where residents are believed to share their values and lifestyles and in areas where urban and outdoor amenities are plentiful. Furthermore, areas that lack such qualities tend to experience difficulties attracting and retaining residents. For example, many areas have begun creating initiatives to encourage young adults to live there after graduating from college (Florida, 2002). The bulk of this research, however, has focused on highly educated individuals who work in creative industries (e.g., high-tech, the arts, research and development) and are thus likely to possess traits associated with O, so it is unclear whether the results generalize across all individuals or to only those with certain psychological characteristics. Thus, work in this field may benefit from con-

sidering the potential effect that personality has on the places in which people choose to live and the qualities they find most important in a potential residence.

Examining the generalizability of social psychological phenomena, individual differences, and migration patterns across geographic regions will greatly inform our understanding of the psychological and social processes underlying behavior. Although the Internet may not provide the ideal method for studying such important topics, it is conceivable that geographic meta-analyses could be conducted to compare the effects of various social psychological phenomena across regions. Moreover, use of individual-difference data collected by researchers at various universities and institutions around the world will be helpful in generating region-level personality estimates; such data would be invaluable for cross-validating the current estimates.

### Conclusion

In this article, we provide a map of the psychological topography of the U.S. and highlight potential landmarks for exploration. We have shown that personality traits can be conceptualized at broad regional levels of analysis, that trait prevalence varies across the U.S., and that trait variation is linked to a range of attitudinal and behavioral indicators. We have developed a model for conceptualizing these links and obtained preliminary evidence for it. The work presented here lays a foundation of basic findings on which to bridge theory and research across the social sciences. Thus, we encourage personality and social psychologists to consider a macro-level perspective in their research. Doing so will no doubt broaden our understanding of human behavior.

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