

# **Why do Geographic Differences Exist in the Worldwide Distribution of Extraversion and Openness to Experience? The History of Human Emigration as an Explanation**

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**ABSTRACT** - Studies of numerous cultures have found differences in the geographic distribution of personality traits. Europeans and Americans are higher than Africans and Asians in extraversion and openness to experience. The reason for this is unknown. Significant differences in fundamental traits between residents of entire continents suggest the operation of “strong” or deeply-rooted processes. Selective emigration of individuals with these traits during human history may explain these differences. The most active, curious, and adventurous (engaged) individuals in a culture are more likely to explore new environments and emigrate. The current geographic distribution of personality traits parallels the “Out of Africa” path of emigration of humans from their origin in Africa to Asia, and later to Europe and America, as revealed by behavioral genetic and paleoanthropological data. DNA analysis indicates prehistoric people who colonized the continents are ancestors of current residents. A “emigration as engagement” hypothesis is presented for the higher level of extraversion and openness of Europeans and Americans.

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Differences have recently been found between residents of the world’s continents in the traits of extraversion and openness to experience. It is unclear why these differences exist. Genetic findings regarding the migration of prehistoric

populations may provide an answer. The present article identifies a correspondence between the worldwide geographic distribution of these personality traits and the geographic path of emigration beginning with early behaviorally and anatomically modern humans (a.m.h.). The process of selective emigration by individuals with these personality traits can account for the present-day distribution of these traits.

The Five Factor Model of personality proposes that the Big Five traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience) comprise the fundamental architecture of personality traits. The Big Five have been found in numerous cultures and are posited as the universal structure of personality traits (McCrae & Costa, 1997; Saucier, Hampson, & Goldberg, 2000).

Two separate factor analyses of the Big Five, using different types of data and methodologies, identified two higher-order factors, indicating an underlying two-dimensional structure. Digman (1997) factor analyzed factor correlations from 14 Big Five studies and found two robust factors comprised of agreeableness, conscientiousness, and emotional stability (labeled Alpha), and extraversion and openness to experience (labeled Beta). Carroll's (2002) factor analysis of test item ratings yielded two "superfactors" of the Big Five labeled General Social Competence and General Goodness of Personality.

Although these two higher-order factors of the Big Five were interpreted quite differently by Digman and Carroll, the factors appear to share significant conceptual similarities. Olson (2005) posited two orthogonal dimensions that were consistent with the results of these factor analyses. The dimension of *Engagement* was comprised of extraversion and openness, and *Self Control* was comprised of conscientiousness, agreeableness, and emotional stability.

The Engagement dimension (engaged versus disengaged) reflects the degree of social engagement (extraversion) and experiential engagement (openness to experience). Engagement encompasses positive affectivity, openness to novel experiences, and vigorous social involvement. It entails active and enthusiastic participation in life activities and reflects the extent to which individuals actively engage their inner and outer worlds. At the low end of the engaged-disengaged continuum, disengagement is characterized by characteristics such as detachment, apathy, and low involvement in life activities.

As a fundamental trait dimension, Engagement likely provided significant adaptive benefits during evolution. By fostering engagement with the environment, this dimension would facilitate securing necessary resources for nourishment, shelter, and growth (Olson, 2005). Engagement would increase the odds the individual would explore and pursue desirable incentive and goals that enable

survival and reproduction. As discussed later, Engagement would promote emigration and may help explain differences in the worldwide distribution of traits.

### ***Geographic Distribution of Traits***

Two large-scale studies have found differences in personality traits between residents of the world's major continents. The first study included data from a broad range of 36 cultures in five continents (Allik & McCrae, 2004). A second study of 51 cultures used observer ratings to minimize the possibility that replications were due to shared response biases (such as social desirability bias in self-ratings); this study included African, Asian, Arab, and Latin American countries underrepresented in previous studies (McCrae, et al., 2005). Evidence indicated data from the various cultures could be meaningfully compared and the particular translation of the personality test had little effect on the results (McCrae, 2001).

The studies revealed a pattern not previously recognized—that the distribution of traits is organized geographically. Both studies found Europeans and Americans are higher in extraversion and openness than Africans and Asians. The origin of these differences is unclear.

One possible reason for the differences may be cultural influences such as language, customs, or beliefs that might systematically shape traits in some way. Another possibility is that national differences in personality traits may have a genetic basis. Thus, personality traits may shape culture. That is, cultural differences might be the result of variation in the distribution of alleles of trait-related genes. Behavior genetic studies within cultures have demonstrated substantial variance in traits is due to genetic influences (e.g., Riemann, Angleitner, & Strelau, 1997).

Studies of genetic distances, which reflect the extent of shared ancestry, provide evidence for a genetic basis for national differences in traits (Allik & McCrae, 2002). A positive correlation between genetic and personality profile distances was found in 16 European cultures. Natural experiments, such as studies of acculturation, are needed to distinguish between genetic and cultural effects. Such research is rare, but two studies have addressed the issue. One study examined Hong Kong Chinese immigrants to Canada (McCrae, Yik, Trapnell, Bond, & Paulhus, 1998), and another study compared personality traits in residents of the former East and West Germanys (Angleitner & Ostendorf, 2000). The findings of both studies suggested innate rather than cultural influences on traits.

### ***Emigration as Engagement***

Economic and environmental factors often serve to stimulate migration. But not all members of a population choose to migrate. Research has shown personality

factors play a significant role in determining who will migrate (Boneva & Frieze, 2001; Winchie & Carment, 1988).

The traits of extraversion and openness to experience are associated with emigration both conceptually and empirically. Conceptually, extraversion and openness to experience reflect engagement in life activities (Olson, 2005), and highly engaged individuals are more likely to actively seek and explore new environments. Extraversion is associated with venturesomeness, excitement seeking, enthusiasm, optimism, an active and energetic nature (Costa & McCrae, 1992), risk-taking, and thrill-seeking (Piedmont, 1998), characteristics that increase the likelihood of emigration. Extraversion also reflects individual differences in the tendency to approach incentives (Carver, Sutton, & Scheier, 2000). Openness to experience is characterized by a curious and exploratory orientation and a preference for novelty, variety and change. "Openness is seen behaviorally in the willingness to try different activities and go new places" (Costa & McCrae, 1992, p.17). Engagement involves receptivity to new experiences (openness), and motivation to approach incentives and actively participate in experience (extraversion). Less engaged individuals, those lower on extraversion and openness, are less likely to venture into new environments and more likely to "stay at home." As personality traits are genetically transmitted, each succeeding wave of emigrants to a new continent would give rise over time to a population of more engaged individuals than reside in the emigrants' continent of origin.

Empirically, selective emigration has been suggested as the reason for differences in extraversion and openness in two studies of current groups in Canada and Russia. In the mid-1990's, Canadian-born Chinese scored higher in extraversion and openness than recent immigrants who were Hong-Kong born Chinese (McCrae, Yik, Trapnell, Bond, & Paulhus, 1998). In 1996, recent immigration to Canada was propelled by the take-over of Hong Kong by the People's Republic of China, and therefore personality may have been irrelevant to the decision to emigrate. But earlier generations of Chinese immigrants who were the ancestors of the Canadian-born Chinese may have emigrated voluntarily, leaving behind a familiar world to explore a new culture. Therefore they may have passed on the relevant genes to their children, who then scored higher on openness than recent Hong-Kong born immigrants (McCrae, 2004). Both openness and extraversion were higher in Canadian-born Chinese, suggesting greater Engagement is associated with emigration.

Another study compared two groups in the Russian Federation, one composed of ethnic Russians in a major city in central Russia and the other a small traditional ethnic group in the Russian Arctic, the Nentsy. The nomadic Nentsy are socially

conservative and scored lower in extraversion and openness to experience on the NEO-PI-R (Draguns, Krylova, Oryol, Rukavishnikov, & Martin, 2000). Selective emigration may account for the Nentsys' lower Extraversion and Openness. "The closedness and introversion of their reindeer-herding sample may have been due to self-selection, as more adventurous members of the group left for more interesting climates. It is known that extraverts are more susceptible to boredom and higher in excitement seeking than introverts, and thus perhaps more willing to take the risks of emigration" (Allik and McCrae, 2002, p. 313). African and Asian cultures, which are lower on openness, are also more conservative and traditional (Allik & McCrae, 2004; McCrae, et al., 2005).

Extraversion and openness are also correlated with sensation-seeking (Aluja, Garcia, & Garcia, 2003; Zuckerman, 1994), defined as the seeking of varied and novel sensations and experiences and the willingness to take risks for the sake of such experience. Sensation-seeking was a significant correlate of the decision to emigrate to Canada in two matched samples of East Indians (Winchie & Carment, 1988).

The "emigration as engagement" hypothesis proposes that the process describe above for ethnic Russians and Canadian-born Chinese occurred on a worldwide scale. This hypothesis posits that current populations of Europe and America are descendants of relatively more highly engaged forebears. As indicated in the following section, the temporal and geographic pattern of worldwide dispersal of a.m.h. is consistent with this interpretation of current geographic differences in these two traits.

### ***History of Ancient Emigration***

As noted earlier, Americans and Europeans are higher on extraversion and openness than Asians and Africans. Significant differences in fundamental traits between residents of entire continents are unlikely to have occurred by chance. Such differences imply the operation of "strong" or deeply-rooted causes.

Paleoanthropological and DNA findings on the routes of dispersal of our ancient ancestors from their origin in Africa suggest an explanation. To the extent that extraversion and openness to experience are associated with emigration, the current geographic distribution of these traits can be linked to the migration patterns of ancient peoples because (a) there is evidence for a substantial genetic component for personality traits and, as will be discussed, (b) DNA analysis allows identification of the ancestry of current residents of the world's continents, and (c) analysis of genetic markers in the DNA from individuals from different parts of the world reveals

migration routes of prehistoric peoples who colonized the continents and who are the ancestors of current residents of the continents.

There are two primary competing models of the origin of modern humans: the Out of Africa (OA) model and the Multiregional Continuity Model (Relethford, 2001; Conroy, 2005). OA posits that modern *Homo Sapiens* arose as a new species in Africa relatively recently (approximately 150,000 to 200,000 years ago) and then expanded outside Africa, replacing all non-African archaic populations. Thus, the OA model holds that ancestors of all living humans originated in Africa. The Multiregional model hypothesizes that modern humans have a much more ancient origin and arose not only in Africa but also in Europe and Asia.

Most genetic evidence argues in favor of OA (Foley, 1998; Ray, Currat, Berthier, & Excoffier, 2005) and this model is supported by a majority of scholars (Macaulay et al., 2005; Stringer, 2000). Evidence supporting OA includes findings that (a) most current genetic loci show greater diversity in African populations than in other populations, suggesting a greater amount of time during which genetic diversity has evolved in Africa than outside of Africa, and (b) genetic data places the first branch in phylogenetic trees between African and all non-African populations (Seielstad, Bekele, Ibrahim, Toure, & Traore, 1999).

Because the genetic history of humans can be identified by comparing DNA samples of people in different nations, ancestral origins can be inferred. Mitochondrial DNA (mtDNA) analysis, which identifies maternal lineage, has documented the initial dispersal of modern humans from Africa on a route through North and East Africa (Cann, 2001). Mass spectrometry of stone-age tools shows that humans were living along the African coast of the Red Sea about 125,000 years ago and indicates widespread coastal marine adaptation by humans (Walter et al., 2000). Perhaps 100,000 years ago, human populations dispersed along the Red Sea coast out of Africa into the Levant (Walter et al., 2000). Archaeological evidence shows the first location of a.m.h. outside of Africa was in the Middle East (Cavalli-Sforza, Menozzi, & Piazza, 1994).

Phylogeography, the study of the geographic distribution and diversity of genetic variation (Avice, et al., 1987), is a useful approach to investigating migration during prehistory. This approach led Cann (2001) to the conclusion that humans leaving Africa “may have taken a coastal route across Saudi Arabia, through Iraq and Iran, to Pakistan, along Indian coastlines, and then further across East Asia until they reached Southeast Asian island regions” (p. 1744). More recent mtDNA evidence also supports the dispersal from Africa via a southern coastal route through India and onward into Southeast Asia (see Forster & Matsumara, 2005; Macaulay et al., 2005).

Paleoanthropological and DNA evidence indicates that a.m.h. traveled from Africa to Asia, later spreading to Europe and America. After the first emigrants from Africa took a coastal route to southern Asia, Y-chromosome analysis of current populations, which delineates male lineage, suggests a second major wave of migration occurred from Africa to Central Asia and India at the beginning of the Upper Paleolithic period 40,000-50,000 years ago. From Central Asia, migration then proceeded to Europe and later to America (Wells et al., 2001; Wells, 2002). The earliest evidence of modern humans in Europe is 42,000-43,000 years ago (Cavalli-Sforza, 2000), and in America between 15,000-35,000 years ago; "a.m.h. advanced geographically from Africa and West Asia toward East Asia, Europe, America, and Australia. Anatomically modern humans are first found in the west and seem to have gradually worked their way eastward to occupy all of the Old World, finally entering the New World from a western direction" (Cavalli-Sforza et al., 1994, p. 64). MtDNA analysis supports the conclusion that the first appearance of a.m.h. in Europe was 40,000-50,000 years ago (Richards et al., 1996). Recent radiocarbon data indicate that a.m.h. first entered Europe 46,000 years ago; within 5,000 years, a.m.h. had spread across Europe and completely supplanted Neanderthals who became extinct (Mellars, 2006).

Y-chromosome analyses indicate three major prehistoric migrations of modern humans out of Africa (Jin et al., 1999). One group of haplotypes (distinct DNA clusters) has a high frequency in East Asia and is also present on the Indian subcontinent, which suggests a migration route from Africa along the southern coast of Asia to Southeast Asia, and then northward to northeast Asia. Another migration occurred from Asia to Oceania. A third major group of haplotypes originated in Africa and spread via West and Central Asia predominantly to Europe but also to America. The pattern of Y-chromosome diversity emphasizes the critical role that Central Asia played in human history (Wells et al., 2001). After the initial dispersal from Africa, Central Asia "was most probably an early nexus of expansion of modern humans" (Edmonds, Lillie, & Cavalli-Sforza, 2004, p. 978).

DNA studies are able to describe the most important human prehistoric movements and also to delineate the genetic composition of contemporary populations (Underhill et al., 2001). MtDNA of current residents of Europe and the Middle East indicates the great majority of modern Europeans are descended from the settlement of Europe by a.m.h. during the Upper Paleolithic (Richards et al., 1996, p.7). A detailed phylogeographic portrait of the origins of contemporary global population structure based on Y-chromosome data revealed various migrations of a.m.h. from Africa to Asia and later to Europe and America; this data is also

consistent with climatic, paleoanthropological and other genetic data (Underhill et al., 2001).

Together these studies indicate that a.m.h. dispersed from Africa predominantly to Asia before migrating to Europe and America. The earliest migration out of Africa was on a coastal path to southern Asia. Another major migration was from Africa to Central Asia, later spreading to Europe during the Upper Paleolithic perhaps 40,000 years ago.

The earliest American settlers entered America from Asia. These settlers are the ancestors of Native Americans. Central Siberia is the origin for Native American Y-chromosomes; the next common ancestor further back was probably from the central Eurasian region (Santos et al., 1999). However, the primary settlement of North America resulted from large emigrations from Europe during the last 300 years (Hoerder, 1995). Y-chromosome analysis indicates the geographic origin of the majority of current Americans is European (Hammer et al., in press).

### ***Emigration as Engagement***

Selective emigration in the progression of a.m.h. from their origins in Africa to Asia, and then to Europe and America, provides an explanation for the geographic distribution of extraversion and openness. The “emigration as engagement” hypothesis suggests that emigrants to Europe and America should be higher on engagement traits than persons who remained in Africa and Asia. Because personality traits have substantial heritability, and the genetic structure of current populations of the world’s continents is generally concordant with the genetic structure of their ancestors who colonized those continents, then the personality traits of current populations should reflect the traits of those ancestors.

The current distribution of traits shows that Americans and Europeans indeed are higher on Engagement traits (extraversion and openness) than Africans and Asians (Allik & McCrae, 2004; McCrae et al., 2005), consistent with the idea that current populations reflect the relative trait engagement of their forebears. Thus, the current geographic distribution of extraversion and openness corresponds to the geographic pattern of emigration of the continents’ ancestors from whom current residents are descended.

The present analysis does not imply personality superiority of residents of a particular continent. As an outcome of natural selection, both high and low standing on a trait may have adaptive benefits and costs in particular circumstances. For example, with respect to prehistoric emigration, high extraversion and openness (Engagement) would not necessarily be advantageous. Engagement traits that prompted migration to more hospitable environments would be beneficial during

certain climatic and ecological conditions, such as scarcity of food and other resources. However, under different conditions, traits that increased the likelihood of emigration could conceivably *decrease* chances of survival. Ancient emigration may have entailed risks. At times, a more prudent strategy would involve caution and avoiding venturing into unexplored, uncertain, and potentially hazardous territory. *Disengagement* from goals and incentives also has adaptive benefits (Olson, 2005).

### ***Related Issues***

The present article explains geographic differences in personality traits in terms of selective migration. This raises the possibility that other aspects of cultural differences might be similarly explained. For example, cultures differ in their emphasis on values such as individualism versus collectivism, the degree to which individuals are integrated into groups. In individualist societies, ties between individuals are loose; people are expected to look after themselves and their immediate family. In collectivist societies, people are integrated into strong, cohesive in-groups to which they are strongly loyal (Hofstede & McCrae, 2004).

Europeans and Americans score higher on measures of individualism than Africans and Asians (Allik & McCrae, 2004). This result is similar to the findings for extraversion and openness. Additionally, in two studies of a wide range of cultures, individualism correlated with the Engagement traits of extraversion ( $r = .64$  and  $.51$ ) and openness ( $r = .34$  and  $.33$ , respectively; McCrae, 2002; McCrae et al., 2005).

Because it is associated with weak attachment to the group, individualism is consistent with a tendency toward leaving the existing group and emigrating, whereas a collectivist orientation would encourage retaining established ties and remaining with the group. Therefore, following the previous analysis for extraversion and openness, selective emigration during history may also explain why Europeans and Americans would be more likely to embody an individualistic orientation, and residents of Africa and Asia would have a stronger collectivist orientation. Individualistic persons would be more likely to leave the group and emigrate while collectivist individuals would be more likely to stay behind. Thus, data show that Europeans and Americans, the descendants of previous emigrants, have a greater individualistic orientation than Africans and Asians. The relation of cultural values to the process of selective emigration has received little attention and requires additional research.

Although research has found clear-cut geographic differences for extraversion and openness, conflicting findings have been obtained regarding trait agreeableness. Allik & McCrae (2004) found agreeableness was lower for Europeans and

Americans than Asians and African, but McCrae et al. (2005) found agreeableness was *higher* among Europeans and Americans. The reason for these differing results is unclear.

In relation to the historical pattern of human emigration, the finding of lower agreeableness in Europeans and Americans can be more easily explained. At least two explanations (which are not mutually exclusive) can be posited. One possibility is that the competitive orientation associated with low agreeableness (Piedmont, 1998) would be more likely to stimulate emigration than would a more cooperative stance. Competition for scarce resources has been a major stimulant to migration by various species throughout evolution. Walter et al. (2000) proposed that with the adaptation to coastal marine environments in Africa by 125,000 years ago, the eventual dispersal of humans out of Africa was due to increased human competition for marine resources, perhaps during hyper-arid conditions caused by fluctuating glacial-interglacial climate cycles that were especially pronounced. The greater competitiveness of humans low in agreeableness may have stimulated a higher rate of emigration in pursuit of more hospitable environments and abundant resources.

Another hypothesis is that the antagonism and abrasiveness of individuals low in agreeableness, and associated interpersonal conflict, would tend to lead to rejection and ostracism by the primary tribe or group. Therefore persons low in agreeableness would be more motivated to leave the group settlement and emigrate. Individuals with a congenial and communal (agreeable) nature would be more content to stay with the existing social group, and the group would likely welcome their presence more than that of disagreeable persons. Additional research is needed to reconcile the conflicting findings regarding geographic differences in agreeableness.

The analysis presented in this article fits several sources of data, but several cautions should be noted. The hypothesis assumes a genetic basis for personality traits, and the path of progression by a.m.h. from Africa to Asia to Europe hypothesized by a variety of paleoanthropologists and behavioral geneticists. An ongoing debate exists about the origins of modern humans between proponents of the OA, multiregional, and various intermediate hypotheses. However the majority of genetic evidence and scholarly opinion favors OA. Additional data from the fields of anthropology, paleontology, archaeology, and behavioral genetics may shed more light on this question.

A unique aspect of the present article is the use of documented prehistoric behavior, as delineated by the genetic history of population migrations, to explain a specific current-day personality trait finding (worldwide geographic difference in traits). One might speculate this analysis could also operate in the reverse direction. If current-day genetic signatures can be used to trace prehistoric ancestry, as has

been done in numerous studies, then current distributions of personality traits which are also genetically encoded may be able to demarcate ancient populations. Thus, personality trait data might help address issues such as OA versus multiregional hypotheses of human origins. Other psychological phenomena which are genetically based may also illuminate differences between ancient populations and shed light on the psychological heritage of modern-day descendants. Therefore, in addition to physical anthropology and cultural anthropology, a new field of “personality anthropology” could be developed to study the historical forces that shaped modern-day personality.

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