

A FIVE-FACTOR THEORY PERSPECTIVE

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Abstract. Five-Factor Theory (FFT) is a conceptualization of the personality system that identifies traits as abstract Basic Tendencies rooted in biology. In this chapter, FFT is examined in relation to recent findings in cross-cultural psychology reported in this volume. FFT correctly predicts the universality of personality structure, maturation, and gender differentiation. FFT suggests that differences in the mean levels of traits across cultures may be due to differences in the distribution of trait-related alleles, and that cultural differences may be the effect, rather than the cause, of trait level differences. Reports of substantial cohort and acculturation effects pose challenges to FFT and provide special opportunities for future research.

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1. FIVE-FACTOR THEORY

In contrast to the Five-Factor Model (FFM; McCrae & John, 1992), which is in an empirical generalization about the covariation of personality traits, Five-Factor Theory (FFT; McCrae & Costa, 1996, 1999) is an attempt to conceptualize recent findings about personality traits in the context of the development and operation of the whole personality system. FFT describes how biology and culture interact in the development of habits, attitudes, values, roles, and relationships, which express both the individual's traits and the press of the social environment. The components of FFT are familiar; what is distinctive is the role assigned to each in personality functioning.

FFT originated in efforts to understand the extraordinary stability of personality traits across periods of many years (Costa & McCrae, 1994a): Longitudinal research had shown that decades of life experience appear to have little systematic impact on basic personality traits. Combined with findings from behavior genetic studies that had shown a powerful effect of genes and a vanishingly small effect of the shared environment (Riemann, Angleitner, & Strelau, 1997), these observations led to the proposal that traits are endogenous dispositions, relatively untouched by life experience. That theory certainly explains the findings of longitudinal stability and heritability; in this chapter we consider how well it squares with cross-cultural results, and what it suggests for future research on personality and culture.

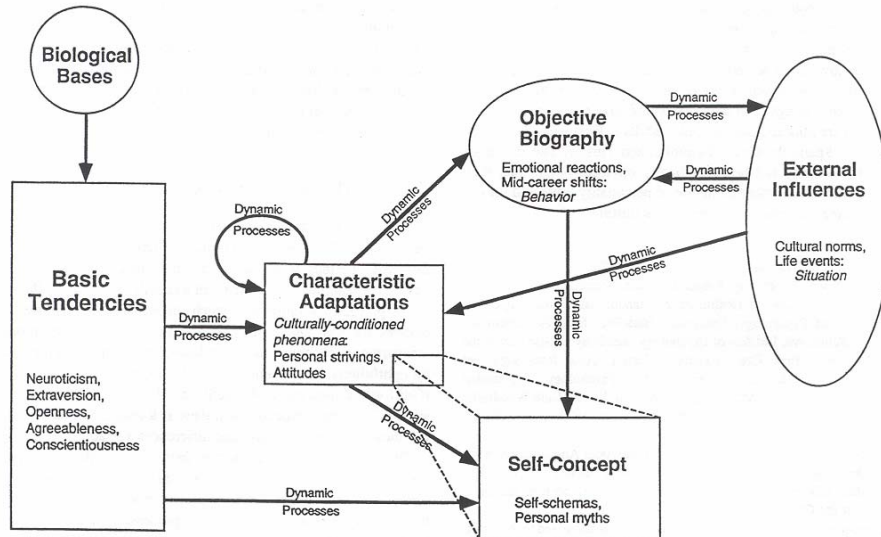


Figure 1. A representation of the personality system, with categories of variables, specific examples, and arrows indicating causal pathways.

Adapted from McCrae & Costa, 1999.

1.1. The Personality System

Figure 1 represents personality as a system. The chief inputs are *Biological Bases* and *External Influences*—the organism and the environment. The ultimate output is labeled the *Objective Biography*; it is the cumulative record of a person's acts and experiences. At any one point in time it represents the individual's behavior. More novel and interesting are the distinctions made within the system, specifically, the distinction between *Basic Tendencies* and *Characteristic Adaptations*.

At issue is the definition of *traits*. Phenotypically, traits can be described as enduring tendencies to think, feel, and behave in consistent ways: Extraverts talk a lot, in many situations; conscientious people are methodical and persistent over long periods of time. Some theorists have equated traits with the behavior itself (Buss & Craik, 1983); others have identified traits as broad habits that account for consistencies in behavior (Pervin, 1994). By contrast, FFT asserts that traits are much deeper constructs: Basic Tendencies, rooted in biology, that are not directly accessible either to observation or to introspection. It is precisely because they are so deeply grounded in the organism that they resist the shaping influences of the environment.

How, then, do they operate? According to FFT, they interact with the environment in shaping those psychological structures that directly guide behavior: Habits, values, plans, skills, scripts, schemas, relationships. These are called *Characteristic Adaptations*; they are *characteristic* because they reflect the individual's underlying dispositions, and they are *adaptations* because they are designed to respond to the requirements of the environment. For example, an extravert might find that she enjoys talking

to people; learn the techniques of a good salesman; and take a job selling insurance. What she does during most of the day is a direct reflection of her occupational role, but indirectly it expresses her Extraversion.

Perhaps the most studied aspect of Characteristic Adaptations is the *Self-Concept*, an acquired view of the self based on life experience and social feedback. It, too, can be shaped by traits, as when an individual high in Neuroticism ignores his talents and accomplishments and builds a self-image around his perceived faults. The Self-Concept is of special significance because it is the source of information that people draw on when completing personality questionnaires.

1.2. The “Dogma” of Endogenous Influences

Once the constructs are understood, most of FFT is not controversial: Who would dispute, for example, that people develop value systems which help to guide behavior in relevant situations? But FFT distinguishes itself from almost all other personality theories by its claim that traits are strictly endogenous, changing only in response to intrinsic maturation or other biological inputs. In addition to genes, these biological influences include intrauterine hormones, brain injury and illness, psychopharmacological interventions, and aging processes.

McCrae and Costa (1999) do not suppose that this postulate is literally true—that the environment never has any effect whatsoever on traits—but they do believe that it is a parsimonious first approximation to the truth. It accounts for the stability of personality in adulthood (McCrae & Costa, in press), the limited role of parental influence (Rowe, 1994), even the existence of human-like personality traits in other animals (Gosling, 2001).

Perhaps more important, it provides a clear basis for formulating testable hypotheses. Almost any set of findings would be compatible with a theory that allows a mix of biological and environmental influences. But the principle of strictly endogenous influences makes clear predictions and suggests novel interpretations in many cases. It serves as a what Francis Crick (1990) called a scientific “dogma.” These “are speculative and so may turn out to be wrong. Nevertheless, they help to organize more positive and explicit hypotheses. If well formulated, they act as a guide through a tangled jumble of theories. Without such a guide, any theory seems possible” (p. 109).

One characteristic feature of Crick’s dogmas is that they can be formulated in terms of a fundamental prohibition. For example, one of the most basic dogmas of physics postulates that no material particle can travel faster than the speed of light. Analogously, the central dogma of molecular biology postulates that genetic information flows only outward from DNA to RNA to protein. Although this postulate was eventually proved wrong by the discovery of retroviruses, in which information is transferred from RNA to DNA, it served as an exquisite guiding principle for the whole field of molecular biology. The central dogma of FFT postulates that there is no “transfer” from culture and life experience to basic personality traits. Postulating this as a general heuristic principle stimulates the search for conditions—apparently not very frequent ones—where this general postulate is violated. An analysis of these special circumstances should lead to a deeper understanding of the origins of traits.

1.3. FFT and Personality Assessment

Because traits are not directly observable, knowledge about their properties must be inferred from information about people's concrete habits, attitudes, preferences, and social skills. In other words, personality traits can be assessed only through asking questions about Characteristic Adaptations. Because Characteristic Adaptations are shaped by both traits and the environment, these trait indicators are inherently fallible. Belonging to a fundamentalist religion may be an indicator of experiential closedness (Streyffeler & McNally, 1998), but it may also be the result of growing up in a fundamentalist community. The general strategy for dealing with this ambiguity is by averaging across a large pool of items, covering many different manifestations of a trait.

The relevant Characteristic Adaptations can be assessed by direct observation; or by observer ratings, in which the acquired knowledge of the informant is utilized; or by self-reports, which are based on the Self-Concept.¹ It is well-known that the Self-Concept is not infallibly accurate, and personality researchers are painfully aware that respondents are sometimes less than candid in their answers. Given the length of the inferential chain from self-reports through the Self-Concept through Characteristic Adaptations to Basic Tendencies, it is remarkable that personality measures work at all (cf. Funder, 1989). But the success of trait psychology in predicting real life outcomes (Barrick & Mount, 1991) and the convergence of personality scores across observers (Funder, Kolar, & Blackman, 1995) and separated twins (Tellegen et al., 1988) provide ample evidence that they do.

When personality information has been gathered, it must be interpreted relative to some normative group. If groups or individuals from two different cultures are to be compared, an entirely new set of difficult issues arises. Is a given Characteristic Adaptation an equally valid trait indicator in two cultures? Praying five times a day would be seen as strong evidence of piety in America, but means virtually nothing in Saudi Arabia, where it is compulsory. Is the Self-Concept systematically biased? Americans are said to self-enhance, whereas Japanese do not (Heine, Lehman, Markus, & Kitayama, 1999). Lodhi, Deo, and Belhekar (2002) argue that socially desirable responding is more pronounced in India than America, leading to inflated scores on desirable personality traits. All these issues need to be borne in mind when considering cross-cultural comparisons.

In principle, FFT offers a way around all these difficulties: One could measure the biological bases and infer trait levels from these. At present, we do not know what the underlying biology is, nor have we made much demonstrable progress since 1967, when Eysenck published his landmark volume. If and when the genes or neuropsychic structures or neurohormones that underlie personality traits are identified, it will lead to a revolution in personality assessment with profound implications for cross-cultural comparisons.

¹When we ask respondents to tell us directly about their traits, as on adjective rating scales, we are asking them to make inferences based on their knowledge of their Characteristic Adaptations. People do not have direct, intuitive knowledge of their trait standing.

2. PERSONALITY-AND-CULTURE RESEARCH

The classic field of culture and personality research, as practiced by such anthropologists as Benedict, Mead, and Linton, was based on the premise that culture shaped personality, largely through child-rearing practices. It may seem that by denying the direct influence of culture on personality traits, FFT has abandoned interest in the personality-and-culture relationship. But traits can be expressed only in interaction with the environment, by developing Characteristic Adaptations that change over time in response to biological maturation and changes in the environment. The interaction of personality traits with the cultural environment constitutes a major subject for personality-and-culture research, but a different set of questions arise in the framework of FFT: How do different personality types adapt to various cultures? How do specific personality traits support cultural practices in the societies in which people live? Can cultures speed up or slow down the intrinsic course of maturation? Perhaps most crucially, FFT makes it reasonable to reverse the classic causal scheme and ask if personality traits in the aggregate and over time can shape culture. Would a society of introverts develop different customs and traditions than a society of extraverts?

In an effort to systematize these kinds of questions, McCrae (2000) proposed that analyses could be conducted on three levels. *Transcultural* analyses look for universals in personality that transcend cultural differences. *Intracultural* analyses examine the specific expression of traits in a given culture; in the language of FFT, they are concerned with cultural differences in Characteristic Adaptations. *Intercultural* analyses compare cultures on aggregate trait characteristics (typically means), and study their relations to features of culture. Rolland's (2002) chapter on the generalizability of the FFM is a clear instance of a transcultural analysis; Konstable, Realo, and Kallasmaa's (2002) search for variations in trait structure is an intercultural analysis. Lima (2002) discusses boredom as a typically Portuguese manifestation of high Neuroticism (N) and low Extraversion (E) in what might be considered an intracultural analysis.

2.1. *Transcultural Evidence Supporting FFT*

Transcultural analyses are most directly relevant to an evaluation of FFT. If, as FFT asserts, N, E, Openness to Experience (O), Agreeableness (A), and Conscientiousness (C) are biologically-based aspects of human nature, then they must be universal: One species, one structure. A decade ago that would have been a doubtful proposition at best (Juni, 1996), but a variety of studies have now made it clear that, even with imperfect measuring instruments, the FFM can be detected in all cultures (McCrae & Costa, 1997; Paunonen, 1996). Related individual difference variables, such as emotions (Yik, Russell, Ahn, Fernandes Dols, & Suzuki, 2002) and values (Schwartz, 1992) also appear to be universal, perhaps in part because they are related to species-wide Basic Tendencies.

Studies in the United States show that there are small but consistent changes in the mean levels of personality traits across the adult life span. When college students are compared to older adults, adults score higher on A and C but lower on N, E, and O (Costa & McCrae, 1994b). These changes cannot be attributed to cohort differences,

because similar trends can be observed in longitudinal studies (e.g., McGue, Bacon, & Lykken, 1993). According to FFT, these are intrinsic maturational changes, tied to some kind of biological clock. If so, then they ought to be observed everywhere; and in fact, cross-cultural studies have revealed the same patterns of development in very different cultures, including several non-Western societies (Costa, McCrae et al., 2000; McCrae et al., 1999). These are particularly impressive findings because different countries have had different recent histories that might have been expected to leave distinctive marks on successive cohorts. But personality traits are transhistorical as well as transcultural: Chinese generations that endured the Cultural Revolution show the same age differences as middle-class Americans (Yang, McCrae, & Costa, 1998).

Lynn and Martin (1997) noted that women obtained higher mean scores on N in all 37 nations where the results of the Eysenck Personality Questionnaire were available. Men scored higher than women on E in 30 countries and on Psychoticism in 34 countries. Secondary analyses of Revised NEO Personality Inventory data from 26 cultures (total $N = 23,031$) confirmed that women report themselves to be higher in N and A, whereas men are higher in Assertiveness and Openness to Ideas (Costa, Terracciano, & McCrae, 2001). These findings are clearly consistent with the universality demanded by FFT. However, that study also showed that the magnitude of sex differences was smaller in traditional cultures (e.g., Zimbabwe) than in modern, progressive nations (e.g., Belgium). That finding, initially counterintuitive, cannot be directly explained by FFT, but it is not necessarily inconsistent with it. Costa et al. (2001) argued that the effect might be accounted for by attribution processes: In traditional cultures, men and women attribute their masculine and feminine traits to role requirements, and thus do not incorporate them into their Self-Concepts. FFT predicts that observers from outside traditional cultures (and thus not prone to the same attribution error) would rate traditional women as clearly higher in N and A than their male compatriots. This is a testable hypothesis derived from FFT.

2.2. A Political Experiment

FFT makes the bold claim that environmental interventions cannot alter personality traits (although they can certainly change Characteristic Adaptations and the resulting behavior). But changing human nature has long been a goal of religions and governments, and many political systems have tried to create a new type of personality to fit their ideological objectives. How successful have these experiments been? In this respect it is very instructive to compare people living in Eastern and Western Germany, because between 1945 and 1989 they lived under dramatically different political systems. Did Communist control of education, law, the mass media, and the economy result in a new *Homo Sovieticus* in the German Democratic Republic? If so, it should be possible to detect differences between East and West German personality profiles. Note that this is an elegant natural experiment: Before 1945, the “participants” shared a common ancestry, language, culture, and history; they were assigned to one of two conditions by accidents of geography that must have approximated randomization. When Anglietner and Ostendorf (2000) administered the German NEO-PI-R to large ($Ns = 2,174; 5,234$) Eastern and Western German samples, they found identical factor

structures. More tellingly, they also showed very similar mean levels: East Germans scored about one-fifth standard deviation lower than West Germans on O, but did not differ on any of the other factors. These surprising findings are precisely what FFT would predict.

3. FFT AND INTERCULTURAL COMPARISONS

Analyses at the *intercultural* level compare cultures with respect to traits and seek associations between traits and features of culture. Most often, mean levels of traits have been the focus of interest, but one could also ask about cultural differences in standard deviations of trait scores (McCrae, 2002), or in the alignment of factors (Konstabel et al., 2002). FFT does not make direct predictions about intercultural comparisons. Nothing in the theory leads one to expect that Russians will be higher in N than Swedes, or that mean national level of E should be associated with cultural individualism. But FFT does provide a way of interpreting whatever findings are observed, and these interpretations are, in principle, subject to empirical test.

As Poortinga, Van de Vijver, and Van Hemert (2002) make clear, intercultural comparisons are fraught with interpretive perils. There are many reasons why raw scores on translations of an instrument might not be comparable, and most psychologists do not gather probability samples that would be truly representative of the cultures they hope to compare. Nevertheless, as McCrae (2002) has shown, comparisons of available data produce meaningful, often striking, results. We will discuss three of them—culture-level factor structure, cultural correlates, and geographical distribution—from the perspective of FFT. First, however, we need to address the problem of national character as it bears on the interpretation of scores.

3.1. *Judgments of National Character*

If there are systematic differences in the levels of personality traits in different cultures, one might expect that they would have been noticed by now. And in fact, people have long claimed that societies can be described in terms of distinctive national characters. Descriptions of national character might be based on scholarly study (e.g., Benedict, 1946), or might simply reflect popular prejudice. National stereotypes are often shared by nations and their neighbors (Peabody, 1985), and they are very resistant to change (Peabody & Shmelyov, 1996).

Until recently, the accuracy of judgments of national character could not be assessed, because there was no standard (other than consensus) against which they could be evaluated. But the personality data described in this volume give at least one way to judge accuracy: Do perceptions of national character correspond to mean levels of personality traits?

McCrae (2001) asked eight prominent cross-cultural psychologists to identify the personality factor that had been used to rank 26 cultures based on their mean NEO-PI-R scores. He asked, for example, which personality factor is lowest among Hong Kong Chinese and South Koreans, but highest among Norwegians and Americans? Rather surprisingly, these experts all considered this a difficult task and were unable to identify

factors at a better-than-chance level.

Hřebíčková et al. (2002) searched the literature for speculations about the national character of Czechs, Poles, and Slovaks, but these characterizations did not agree well with the means of self-reported data. For example, contrary to the belief that Polish people are traditional and closed, Polish adolescents rated themselves as most open in comparison with Czechs and Slovaks. On the other hand, Lima (2002) found some support for writers' views of the Portuguese in the mean levels of her NEO-PI-R data.

The most focused and systematic attempt to compare national stereotypes with the means of self-reported personality traits was undertaken by Church and Katigbak (2002). In this study, 43 judges who had lived in both the Philippines and the United States for a considerable time, rated whether Filipinos or Americans would tend to show a particular trait more. These bicultural judges were in high agreement with each another, but were not consistent with the mean NEO-PI-R profiles.

It is possible to fault the methodology of these studies. McCrae's (2001) judges may not have been familiar with all 26 cultures; Church's trait descriptions may not have matched the NEO-PI-R constructs exactly. But the strong preponderance of negative findings suggests that mean trait levels and national stereotypes are not alternative measures of the same construct. Why not? What do they each represent?

One attractive interpretation is to discount beliefs about national character as a form of mythology (cf. Pennebaker, Rime, & Blankenship, 1996). National stereotypes may be historical accidents, or self-serving attributions, or totems that serve the function of cementing group identity, rather than veridical accounts of aggregate personality traits. Indeed, it seems unrealistic to expect that people could reach correct judgments of mean personality profiles. The measured differences are rather small for most traits, and it may be impossible for individuals to perceive them accurately (Stricker, 2000). It is unclear how individuals make a composite judgment of a large body of people (most of whom they have never met), and we have long known that statistical predictions are more accurate than clinical judgments (Meehl, 1954) and do not necessarily agree with them.

On the other hand, Church and Katigbak (2002) make a good point when they note that "the backgrounds of our bicultural judges would seem to be fairly ideal for their task. Thus, if their judgments of average cultural differences are not valid, it is not clear whose judgments would be" (p. 149). Echoing cautions raised by Poortinga et al. (2002), they conclude from these findings that mean level comparisons across cultures must be viewed with skepticism.

The research agenda here is clear. Replications of Church and Katigbak's study should be conducted in a wide variety of cultures. That information would allow a definitive test of the concordance of mean levels and national stereotypes, but it would also allow far more informative analyses. For example, it might be the case that certain domains or facets consistently show convergence, whereas other do not; a comparison of the two might suggest reasons. National stereotypes, gathered within the comprehensive framework of the Five-Factor Model, could also be used in intercultural comparisons: Are they geographically ordered? Do they have culture-level correlates? Finally, one could test the relative predictive utility of judgments and assessed means: Which tells us more about industrial production or rates of homicide or artistic styles?

Pending a resolution of these issues, we can return to a consideration of measured mean trait scores and their interpretation from the perspective of FFT.

3.2. *The Culture-Level Factor Structure*

McCrae (2001, 2002) reported culture-level factor analyses of NEO-PI-R facet scores. In these analyses, aggregate data from college age and adult men and women were treated as cases. The resulting factors reflect the covariation of traits across cultures. As Bond (2001) has noted, there is no logical requirement that this structure will have any resemblance to the factor structure observed when individual data are analyzed. We might, for example, find that cultures tend to promote either emotional or intellectual approaches to exploring the world, but not both. In that case, a culture-level factor might emerge contrasting Openness to Feeling with Openness to Ideas—traits that are positively related at the individual level.

In fact, however, the observed culture-level factors closely resemble individual-level factors, and can readily be interpreted as N, E, O, A, and C. There are three possible explanations for this intriguing finding, and all deserve attention.

Artifact. A first possibility is that mean trait levels do not in fact covary meaningfully across cultures; instead, the observed factor structure results from the operation of response biases. For example, all the Neuroticism items of the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975) are keyed in the positive direction; an intercultural factor analysis of those items might uncover a factor resembling N simply because cultures vary systematically on acquiescent response tendencies. That interpretation cannot be applied to the NEO-PI-R, however, because all scales (in all translations) are roughly balanced to control the effects of acquiescence. Again, as discussed in McCrae (2002), extreme versus neutral responding is unlikely to explain either mean levels or covariation of traits.

Social desirability, however, is a more promising candidate. Lodhi, Deo, and Belhekar (2002) suggest that high A scores among Marathi-speaking Indians might be due to socially desirable responding. If social desirability affects all—and only—facets of A, then cultural variation on this response tendency would tend to create an A factor. It is possible that this accounts in part for the observed structure, but it cannot account for it completely. If intercultural factor structure were nothing but social desirability, we would expect a single evaluative factor (contrasting N with E, O, A, and C) or perhaps two factors, corresponding to Positive Valence (E and O) and Negative Valence (N vs. A and C; McCrae & Costa, 1999). There is no obvious way in which familiar response styles could give rise to the culture-level FFM.

Cultural mechanisms. The culture-level factor structure could be the result of cultural influences that mimic sources of structure at the individual level (McCrae, Jang, Livesley, Riemann, & Angleitner, 2001). In this interpretation, differences in trait levels across cultures are real, and they are created by cultural processes. For example, Openness to Ideas and Openness to Feelings may covary because some cultures encourage

Openness in general, whereas others discourage it. Indeed, the appearance of a culture-level FFM seems to imply that any cultural influences must operate on a factor-by-factor basis. Perhaps the same child-rearing practices that foster need for achievement also encourage caution and deliberation, leading to high C; perhaps the same kinship systems that inhibit gregariousness also inhibit cheerfulness, leading to low E.

It must be stressed that, at present, no one has demonstrated that child-rearing practices or kinship systems or any other features of culture in fact influence the mean levels of traits. Rohner and colleagues (e.g., Rohner & Britner, 2002) have gathered an impressive array of evidence to show that perceived parental rejection is associated with poorer psychological adjustment around the world, but the causal order is not clear: Perhaps individuals high in N misperceive their parents to have been rejecting even when they were not; perhaps parents of high N children come to reject them because they are so difficult. These alternative interpretations are consistent with FFT, which provides another explanation for the factor structure.

Endogenous influences. A simple explanation for the culture-level FFM can be derived from FFT. People living in the same culture by and large share a common ancestry, and thus genetic similarity. The alleles that shape personality factors may be more common in some of these populations than others, and we know from studies of individuals that facets that define the same factor are genetically related (McCrae et al., 2001). Thus, the Agreeableness factor emerges in culture-level analyses because societies differ in the distribution of Agreeableness-related genes.

Poortinga et al. (2002) have argued that a genetic explanation for group differences in personality traits is unlikely, because there is no compelling reason why certain traits would be differentially selected in different groups. But Tooby and Cosmides (1990) have hypothesized that, within the normal range, personality traits are of no evolutionary significance, and are thus perpetuated as genetic noise. Random fluctuations in personality-related genes in ancestral populations may have been preserved and transmitted to contemporary cultures.

3.3. Cultural Correlates

If culture does not affect the mean levels of personality traits, then we might find no association between features of culture and mean levels of traits. Indeed, this is precisely what Angleitner and Ostendorf (2000) reported when they examined the former East and West Germans. Long-standing differences in religion, educational policies, and political ideology had no lasting impact on NEO-PI-R scores. But that situation was imposed on the people of Germany by conquering nations. Where institutions and customs have evolved naturally, some association is possible, according to FFT, because personality traits may help shape culture.

Consider, for example, the correlations McCrae (2002) reported for Hofstede's (2001) Power Distance dimension. Groups low in E and O and high in C scored high on Power Distance, implying that their members had a high tolerance for status differences and preferred a hierarchical structure in society, with some people giving orders and some taking them. This would appear to be a natural social organization for people who

are closed and conscientious, because it is both predictable and efficient. The preponderance of introverts would also be consistent with the fact that in hierarchical organizations there are always more people taking orders than giving them—a situation more tolerable for introverts than extraverts.

It remains to be seen how such fit between aggregate personality and social structure develops. Presumably trial and error is involved; structures that work well are retained, whereas those that do not are discarded. Social structures may develop on small scales, perhaps within the family, and become a model for larger organizational patterns (as filial piety became the model for ministers' relations to the emperor in Confucian societies; Gabrenya & Hwang, 1996).

There is one way, consistent with FFT, that cultural patterns could contribute to the personality profiles of nations: Individuals may be selected in or out. Extraverts lost in the lower levels of a hierarchy in a high Power Distance society may decide to try their luck elsewhere; individuals low in C may be forced out. Draguns, Krylova, Oryol, Rukavishnikov, and Martin (2000) speculated that 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. Lynn (1981) noted that nations like Australia, Canada, and the United States, whose populations are almost entirely made up of relatively recent immigrants, tend to have higher E scores than the European countries from which the emigrants largely came. The effects of self-selection were not seen in Angleitner and Ostendorf's (2000) study of East Germany, presumably because it was infamously prohibited.

We wish to make it clear that we are not claiming that personality traits are the only or even the most important influence on social structure and other cultural patterns. Obviously, climate, economics, religion, and the fortunes of war all have powerful influences on customs and institutions and on the resulting conduct of life. Only over long time periods and in favorable circumstances would one expect to see effects of aggregate personality traits.

3.4. The Geography of Personality

Although the Hofstede dimensions are linked to a wide variety of outcomes and national characteristics, they are ultimately based on self-report responses, and it might be argued that response biases create the correlations with personality measures. The same shared social desirability biases that lead people in some cultures to describe themselves as conscientious may also lead them to endorse high Power Distance values. It would be useful to have correlates that entirely avoid issues of method variance.

Geographical location is one, and several studies have shown that personality traits are organized geographically. Costa et al. (2001) reported that European countries differed from Asian and African countries in the degree of gender differentiation. McCrae (2002) showed a similar pattern with trait variances, which are larger in Europe. Allik and McCrae (2001) showed more detailed associations between psychological and physical proximity. They used cluster analysis to identify similarities among

personality profiles in 26 cultures. Pairs of cultures with closest profiles included Spain and Portugal, Indonesia and the Philippines, Zimbabwe and Black South Africa, and Taiwan and South Korea. These associations are remarkable when it is considered that different languages and often different sampling methods were used in each country.

Geographically adjacent cultures often share both geophysical features, like climate, and cultural features, like religion or language family. In addition, however, they are likely to share ancestry and thus to have overlapping gene pools (Cavalli-Sforza, Menozzi, & Piazza, 1994). Psychologists in general have a long-standing bias toward environmental explanations, and most would probably favor a cultural account of these findings. But FFT holds that the genetic similarities are the more likely sources of personality similarities, and as we have seen, FFT is strongly supported by several lines of evidence, including many of the findings of cross-cultural studies.

A direct test of this view provides modest support. Cavalli-Sforza et al. (1994) provide data on *genetic distances* between cultures, which are determined by similarity in the distribution of a variety of alleles. By and large, these genetic distances correspond to known patterns of human migration. From the data in Table 3 of McCrae (2002) we can calculate personality profile distances, most simply as the Euclidean distance between the five factor scores. Genetic distances are given by Cavalli-Sforza et al. for 16 of the cultures in McCrae; the correlation between genetic and personality profile distances across the 120 pairs of cultures is $r = .19, p < .05$. When Yugoslavia, which is identified as an outlier by Cavalli-Sforza et al. (1994, p. 268), is omitted, the correlation rises to $r = .24, N = 105, p < .05$. These correlations are modest in part because there is relatively little genetic differentiation within European countries, and correspondingly little variation in mean personality levels. If the analysis were conducted on samples from around the world, larger associations would probably be found.

Of course, even very large correlations would not prove causal associations. Genetically related groups tend to share geography, history, and culture as well as genes, and genetic distance may simply serve as a marker of cultural distance.

3.5. Ethical Considerations

It is not possible to discuss the idea of genetic differences among human groups without acknowledging the potential for its misuse. Historically, traits attributed to despised minorities have been used to justify enforced sterilization, slavery, and genocide. It is common to ascribe undesirable traits to members of other cultures, but to suggest that they are genetically based seems further to imply that there is no hope that they will change. In this way, psychology may unwillingly give ammunition to racists.

If there were no mean level differences in traits across cultures, or if the data were clearly uninterpretable, we would have been spared the task of dealing with these issues. But there are meaningful differences, and it is scientifically possible, even likely, that these are due in some degree to genetics. Personality psychologists need to learn how to evaluate such claims cautiously but thoroughly, and to begin to deal with the ethical implications if they are in fact supported. It is probably only a matter of time before someone identifies a gene linked to a trait and demonstrates that the distribution of the gene alleles differs across cultures (cf. Gelernter, Kranzler, & Satel, 1999).

Questions will then arise about the implications for social behavior, and if we psychologists are not prepared to answer them, someone else will—someone who may be less scientifically informed, and perhaps less well-intentioned, than we are.

Any suggestion that there may be biologically-based differences in personality between two groups should be properly qualified, noting the limitations of the available evidence. That is, of course, true of any scientific conclusion, but special care is needed here. FFT suggests that different personality profiles across cultures may result from differences in the distribution of trait-related alleles. But that is only one possible interpretation of the evidence, and we must be clear that the question is far from settled.

In justifying intercultural comparisons, McCrae (2002) relied on the principle that errors in some datasets are likely to average out when comparisons are made across a range of cultures. This is a reasonable assumption, but it must be kept in mind that the resulting conclusions apply only at a general level. There is considerable evidence that Asian cultures are lower in Extraversion than European cultures, but the evidence that Chinese are less extraverted than Danes is much weaker.

Any discussion of cultural differences must also point out the magnitude of the effects and the range of individual differences within cultures. The factor means in McCrae (2002) have standard deviations ranging from 2.65 to 3.72 *T*-score points, or about one-third the magnitude of individual differences within cultures. Even if our characterizations of cultures' personality profiles were perfectly accurate, knowing a person's culture would tell us rather little about his or her own personality profile. Stereotypes should not be applied to individuals.

Finally, it must be emphasized that behavior, the Objective Biography, is not determined solely or even principally by personality traits. Since the person–situation debate, personality psychologists have been sensitized to the fact that traits typically account for only a small portion of the variance in behaviors. This is *a fortiori* true of aggregate personality traits and the behavior of groups. If we judged Vietnamese Americans by their low *C* scores, we might anticipate poor performance in school and at work; in fact, because of their cultural background, they have succeeded admirably (Leininger, 2002).

4. CHALLENGES TO FIVE-FACTOR THEORY

Not all cross-cultural findings offer clear support to FFT—indeed, some appear flatly to contradict it. An examination of these cases is likely to be particularly informative about FFT and the interpretations of cross-cultural results that it suggests. Two of the most important are cohort effects and secular trends, and effects of acculturation on personality traits. At present, neither line of research provides decisive evidence against FFT, but both pose clear challenges.

4.1. Birth Cohort Effects and Secular Trends

Societies and cultures are not frozen; they continuously change and evolve. For example, in the United States each successive generation during the last fifty years spent less time reading newspapers, working on community projects, and visiting their friends, and more time watching television (Putnam, 2000). Similar changes can be

observed all over the world where people have, in the last few decades, become subjectively happier, less concerned about money, and somewhat less obedient to traditional authorities (Inglehart, 1997; Inglehart & Baker, 2000). Do these global societal changes affect personality traits?

There are some hints that they might. McCrae (2002) reported on the similarity of personality scores across gender and across age groups. Mean levels on the five factors were strongly correlated when men were compared with women of the same age and culture ($r_s = .77$ to $.88$); the correlations were weaker when adults were compared with college-age samples ($r_s = .48$ to $.81$). These smaller correlations might be due to cohort effects that vary by culture.²

Adult developmentalists (Schaie & Labouvie-Vief, 1974) have long been concerned with generational effects, which have been shown to have a powerful influence on cognitive functioning. Until recently, personality traits appeared to be largely immune to cohort effects: Age differences in the mean levels of adult personality traits are small, and can be accounted for by known maturational changes in trait levels (McCrae & Costa, in press). But Twenge (2000, 2001) has recently reported meta-analyses that claim to find dramatic cohort effects on N and E: American college students have increased in both N and E by nearly a full standard deviation over the past half century.

If these findings are not artifactual, they appear to constitute a falsification of the dogma of endogenous influences. Changes in population genetics over the past fifty years are not sufficient to account for such large effects, and it seems unlikely that changes in health or diet would increase N and E (although they have had profound effects on physical characteristics such as stature in the period since the Industrial Revolution; Cavalli-Sforza et al., 1994). The source would seem to be the psychological impact of the environment.

But Twenge's data are puzzling. Cross-sectional studies of adults born in the same time period as the subjects in her analyses ought to show profound age differences: Later-born (and thus younger) men and women ought to be much more extraverted and neurotic. In fact, the differences, although in the right direction, are tiny in magnitude (Costa et al., 1986), and replicate tiny longitudinal increases (Costa, Herbst, McCrae, & Siegler, 2000). If the cohort effects reported by Twenge in college students actually occurred, they seem to have evaporated by the time the students reached adulthood.

Artifactual explanations are also possible. Most of the studies Twenge (2000) reviewed used the Eysenck N scales, which are keyed exclusively in the positive direction. If acquiescence became more widespread over the past half-century, that could account for the findings. Again, changes may have occurred in social desirability. Perhaps admitting to signs of anxiety or depression was less acceptable in the 1950s than in the 1990s. Until all these possibilities are sorted out, the question of cohort effects will remain a mystery.

²However, they might also be due to sampling biases. Men and women were always sampled from the same population (e.g., all were college students, or all were community members), whereas the two age groups might represent somewhat different populations (e.g., students vs. community members).

4.2. *Acculturation Studies*

Most cross-cultural studies cannot shed light on the relative importance of nature and nurture in personality development, because most societies consist of individuals who share both biological ancestry and culture. Acculturation studies, however, offer a way to unconfound these two: Immigrants are often assimilated into a new culture long before they lose their genetic ethnic identity. According to FFT, ancestry ought to be more important than the current social environment in shaping personality dispositions.

Leininger (2002) touches on possible acculturation effects in her Vietnamese-American sample, but the design is not ideal. Because data are not available from respondents in Vietnam, the only possible comparisons are between two generations of Vietnamese Americans and between subsamples who live in traditional versus Americanized communities, and these comparisons are complicated by age differences and the possibilities of self-selection.

Although there is a large literature on the psychology of acculturation, there appears to be only a single study in which individuals of the same age but different levels of acculturation are compared on personality traits.³ McCrae, Yik, Trapnell, Bond, and Paulhus (1998) examined personality profiles in Chinese undergraduates in Hong Kong and Vancouver. Recent immigrants to Canada closely resembled their compatriots in Hong Kong. Ethnic Chinese born in Canada also shared many features of the Hong Kong personality profile: Compared to European Canadians, they scored higher on Anxiety, Self-Consciousness, and Vulnerability, and lower on Assertiveness, Activity, and Excitement Seeking. These findings are consistent with FFT and its emphasis on endogenous determinants of personality.

But there were also significant acculturation effects. Canadian-born Chinese were higher than recent immigrants in E, O, and A when self-reports of personality were examined; when rated by Chinese acquaintances, the effects were replicated for E and O, and for the Trust, Altruism, and Tender-Mindedness facets of A.

Analyses of self-report data also suggested acculturation effects for Vulnerability, which was higher for recent immigrants, and Competence, which was lower. That finding was not replicated in peer rating data. The resolution of this discrepancy was found when the data were analyzed by the status of the rater: Peer raters who were recent immigrants from Hong Kong rated targets higher in Vulnerability and lower in Competence regardless of the target's place of birth. It appears that these two facets are susceptible to social judgment effects. Hong Kong residents appear to have a different, and harsher, standard by which to judge Competence. What changes with acculturation is not standing on the real personality trait, but the standards by which it is judged. Social standards are, of course, Characteristic Adaptations, and their modification by culture is understandable within FFT.

The increases in E (especially Warmth, Excitement-Seeking, and Positive Emotions), O, and facets of A cannot be explained by the social judgment mechanism, and constitute a challenge to FFT. If we wish to retain FFT without modification, we would need to interpret these changes as artifacts. One possibility is that the individual items

³Tsai and Pike (2000) examined acculturation effects on MMPI-2 clinical scales, and found that more acculturated Asians more closely resembled Americans.

of the NEO-PI-R have a different significance in different cultural contexts: Perhaps the Characteristic Adaptations we assess do not have quite the same implications for inferring Basic Tendencies in Hong Kong and in Canada. A plausible example of this is altruistic behavior. Being helpful to strangers is a clear indicator of Agreeableness in individualistic cultures, but not in collectivistic cultures (McCrae et al., 1998). There, resources are saved for the family or other in-group members. The same amount of generosity may be present in the two cultures, but it is distributed differently. In this interpretation, Chinese do not become more agreeable with time in Canada; they simply express their Agreeableness in a more Canadian way.

That proposal saves the dogma of endogenous origins, but at the cost of conceding that the personality profiles collected across cultures are subject to distortions.⁴ It is, of course, not surprising that some distortions appear when an instrument is translated and imported into a very different context; the question is, how serious are they? The errors cannot be both large and random, rendering the data meaningless, or else we would not find culture-level correlates. And if the distortions are small, then they can probably be safely disregarded.

It is possible, however, that the distortions are large and systematic, and that culture-level correlates are spurious. What, aside from real differences, could account for the fact that Europeans portray themselves as extraverts, whereas Asians respond like introverts? Perhaps E is more highly valued in individualistic cultures; or perhaps attribution is the mechanism (cf. Costa et al., 2001): Asians living in close social groups may attribute sociability not to themselves, but to their collectivistic circumstances. They may act like extraverts, but believe it is their duty rather than their disposition.

An alternative solution to the problems posed by the McCrae et al. (1998) study is to modify FFT, by acknowledging that some External Influences can affect personality traits. *Culture* in fact refers to a huge class of External Influences that affect every aspect of one's life. It is not implausible to think that so pervasive and powerful an environmental manipulation as acculturation could reshape one's Basic Tendencies. The problem would be to determine which aspects of acculturation are operative. Most of the events one experiences in a lifetime do not appreciably change personality traits (McCrae & Costa, in press)—why would changing cultures?

This chain of speculations illustrates the kind of thinking that must go on as we progress in understanding personality and culture. But it would be absurd to reach any conclusions based on a single study. Acculturation studies are powerful tools, but we will be in a much better position to use them when we have a broad body of research on which to reflect.

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⁴Indeed, from the perspective of a Five-Factor Theory purist, data for different ethnic groups should probably be collected only from third-generation Americans, who would all interpret the items in American fashion.

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