

Chapter 14. External Milieu

Although Chapter 13 made it manifest that psychology's history is shaped by internal forces, that conclusion does not rule out the effects of external forces as well. In this chapter I review what we have learned about how the political, social, cultural, and economic Zeitgeist can impinge on psychological science. Some of these effects are quantitative in that they determine the number of great psychologists that are likely to appear at a given time and place. Other effects are qualitative, that is, they leave an impression on the very content of psychological thought.

Harvey C. Lehman (1947b) conducted a study entitled "National Differences in Creativity" in which he traced the rise and fall of scientific and artistic creativity in dozens of nations across the world (Lehman, 1947b).

Lehman (1947b), like Kroeber (1944), found that the ups and downs in creative activity were not synchronized across the various nations of the world, even when the analysis was confined to Europe.

For example, although Italian thinkers monopolized philosophy in the 16th century, British thinkers dominated philosophy in the first half of the 17th century.

Yet by the second half of the 17th century the hegemony had shifted to the French, only to yield in their turn to the Germans in the first half of the 18th century.

Shifting centers of national activity are also characteristic of science, as demonstrated by another study (Yuasa, 1974).

Looking at Western science from 1501 to 1950, the scientific center was defined "as a period in which the percentage of scientific achievements of a country exceeds 25% of that in the entire world in the same period" (p. 81).

According to this definition, the centers of "scientific prosperity" appeared in the following order: Italy, 1540-1610; Great Britain, 1660-1730; France, 1770-1830; Germany, 1810-1920; and the United States, 1920 on.

This sequence parallels that seen for philosophy, suggesting that certain sociocultural factors stimulate intellectual creativity across the board.

At the same time, the two sequences are not completely synchronous, implying that the ideal milieu for philosophical ferment is not identical to that for scientific activity.

But what are these "factors"?

Hence, the goal of this chapter is to document the external factors that influence intellectual history. These extrinsic influences may operate in two main ways.

First, some factors may affect the *level* of activity displayed by a given nation at a particular time.

Second, other factors may affect the *type* of activity displayed.

The first set of factors exerts quantitative effects, the second set qualitative effects.

QUANTITATIVE EFFECTS

In chapters 9 and 12 I merely mentioned how Galton's (1874) *English Men of Science* was written in response to the work of Alphonse de Candolle (1873), who had taken an environmentalist position opposed to the genetic determinism that Galton (1869) espoused in *Hereditary Genius*.

Candolle's criticism was presented in the book *Histoire des Sciences et des Savants depuis Deux Siècles*. Candolle's book represents the first systematic attempt to examine the circumstances that most strongly favor the emergence of eminent scientists.

To carry out this investigation, Candolle had to measure the comparative scientific activity of various European nations.

This was no easy task, for he realized that such measures could be easily contaminated with two major artifacts.

The first potential artifact was population size.

Accordingly, Candolle calculated scientific activity on a per capita basis.

The second possible artifact is even more troublesome, namely the intrusion of ethnocentric biases.

Unlike Galton (1869), who was quite willing to assess the comparative natural ability of peoples on the basis of reference works published in Great Britain alone, Candolle realized that ethnocentrism could easily invalidate such measures.

He accordingly adopted a most ingenious strategy: Scientists were only considered distinguished if their eminence was truly international, not just national, in scope.

The resulting indicators of national scientific activity appear relatively free of ethnocentrism, unlike what happened under Galton's (1869) methodology. It was Switzerland that ended up supreme among the nations of the world, exceeding France in per capita output of great scientists by a ratio of about 5 to 1.

When these corrected cross-national measurements were compared with other attributes of the corresponding nations, Candolle (1873) was able to characterize the conditions that were most favorable to scientific creativity.

- The nation typically contained a substantial class of persons who do not have to spend most of their time earning a living through manual labor. That is, the nation had a large proportion of persons who displayed both the leisure and the desire to devote themselves to intellectual and cultural activities.
- This attribute was also coupled with a long-standing cultural tradition that emphasized the value of knowing the real world rather than merely focus on otherworldly matters. The general lay public, in particular, demonstrated a substantial curiosity about the material world rather than the imaginary or fictitious. More specifically, public opinion tended to be favorable to science and scientists rather than being anti-scientific in tone.
- This favorable atmosphere tended to take concrete form as an abundant provision of institutions and equipment dedicated to scientific work, such as large libraries, observatories, laboratories, and special collections.
- There would also be an abundance of families that had had a tradition of supporting their member's involvement in scientific or other intellectual activities.
- The nation would allow sufficient freedom of intellectual inquiry so that its citizens felt free to express any opinion, at least with respect to scientific subjects, without fear of severe consequences, such as criminal prosecution.
- Moreover, this freedom was accompanied by the liberty to engage in any lawful profession and to travel freely within and outside the nation's borders.
- The nation's tolerant policies also encouraged the influx of foreign immigrants who were highly educated and who enjoyed intellectual endeavors for their own sake rather than for the income that such activities might bring them.

- Furthermore, the nation usually claimed an educational system that was largely if not entirely independent of political or religious control.
- These institutions also featured the resources and commitment to support intellectual inquiry on the part of both students and teachers.
- In line with these liberties, religious authority tended to play a minor role.
- Whatever religious influence was present was benign, even supportive.
- In addition, the nation tended to be either a relatively small independent country or a country that entailed the union of several independent states – rather than being subordinate to some large imperial system.
- The nation was typically located very close to other highly civilized nations rather than being isolated, and it was most likely to be situated where the climate was moderate rather than excessively cold or hot.
- Last but not least, Candolle observed that certain languages tended to be most favorable to scientific activity, namely, English, French, and German. Because these may be considered the international languages of science, those nations that had one of these as their native tongue, or that widely encouraged their citizens to acquire one of these languages as a second language, would have a definite edge.
- Interestingly, Candolle's complete lack of ethnocentric bias was revealed in his discussion of this factor. On the basis of his analysis of worldwide demographic trends, Candolle argued that English would eventually become the predominant language of scientific communication.

Admittedly, because Candolle's (1873) work appeared a couple of decades prior to the introduction of correlational methods, the statistical part of his inquiry falls far short of contemporary standards. Even so, many of his somewhat qualitative generalizations have been replicated in more rigorous research (Szabo, 1985).

Hence, there is ample reason for concluding that cross-national contrasts in aggregate scientific creativity reflect to no small degree a broad sociocultural milieu that is favorable to science.

This conclusion is reinforced by other studies that have unearthed other external factors that influence the magnitude of creativity activity exhibited at a given time and place. These diverse extrinsic effects can be grouped into three categories:

- transient fluctuations,
- inertial movements, and
- developmental influences.

Transient Fluctuations

Anyone who has followed the ups and downs in the stock market knows that the price of stocks and bonds can change rapidly from day to day, and even from one hour to the next.

Creative activity, too, can exhibit short-term fluctuations, albeit not nearly so volatile as seen in the stock market.

Furthermore, these temporal instabilities in creativity may be the direct consequence of underlying external factors that display rapid changes over time.

The transient factor that has received the most attention in empirical research is war (Simonton, 1990h).

This research supports one historian's conclusion that "warfare usually tends to produce cultural and intellectual sterility" (Norling, 1970, p. 248).

This negative consequence has been most extensively demonstrated for scientific and technological creativity.

In one inquiry, Price (1965) examined the citations received by papers published between 1862 and 1961.

Two significant dips occurred in the citation rates, one during World War I and the other during World War II.

In both cases, the citations declined from year of the war's outbreak, reaching a low point the year the war ended – when the citation rate was about 50% below baseline.

Furthermore, for both wars a few years were required before the citation rate fully recovered.

In a second inquiry, Price (1978) scrutinized the annual fluctuations in the number of discoveries and inventions, as listed in several chronologies of science and technology.

Significant downturns in the annual count appeared during major military conflicts, such as the Thirty Years' War, the Napoleonic Wars, and again the two World Wars.

Although Price drew his conclusions from the visual inspection of graphic representations of the transhistorical fluctuations, the same inference obtains when these data are subjected to rigorous multivariate time-series analyses (Simonton, 1980a).

In particular, the number of major discoveries and inventions per annum was negatively affected by

(a) balance-of-power wars among European states, such as the War of Spanish Succession or the Seven Years' War, and

(b) defensive wars in which European civilization defended itself against incursions by non-European civilizations, such as the various wars with the Ottoman Empire.

Even though it is sometimes claimed that "modern wars usually increase medical knowledge" (Norling, 1970, p. 248), that claim does not survive empirical scrutiny (Simonton, 1976e).

War is negatively correlated with the appearance of major discoveries and inventions in medicine as well.

It must be stressed that these effects are indeed temporary.

The negative association between war and scientific creativity is most likely to appear when the two phenomena are tabulated in annual units.

When larger units are used, such as the generations described in chapter 13, the effect tends to vanish (e.g., Simonton, 1975d, 1976b).

That happens, in part, because a modest tendency exists for some compensation to appear in the post-war period (Price, 1964, 1978).

Some of the ideas that failed to appear during wartime will eventually emerge later once peace has become fully established.

With respect to psychology, Samuel W. Fernberger (1946) published a study that directly examined the connection between war and contributions to psychological science.

Fernberger tabulated the number of psychology publications appearing in various languages from 1894 to 1945.

All told, 204,774 articles were thus counted. The time series exhibits depressions during the two World Wars.

The wartime downturns were especially prominent for German-language publications.

During the height of the First World War, for example, the output of German titles decreased by two thirds.

The impact of the Second World War was even more devastating, output almost vanishing altogether by the end of the war, albeit Fernberger noted that much of the additional loss could be attributed to Nazi oppression and the resulting emigration of many distinguished psychologists.

The United States, of course, was one of the primary beneficiaries of this consequence, acquiring an impressive number of psychoanalysts and Gestalt psychologists.

Notably, Fernberger's data show that English-language publications were less affected by World Wars I and II.

Most of the English-speaking countries involved in these two conflicts – the United States and the nations of the British Commonwealth – fought all battles beyond their shores.

In fact, in line with Candolle's (1873) forecast, English titles rose throughout this period, with only minor dips during the two wars, until psychology was almost completely dominated by English-language publications.

Candolle (1873) had also concluded that scientific activity is partially contingent on economic prosperity, an inference drawn by other researchers as well (e.g., Inhaber, 1977; Rainoff, 1929; Schmookler, 1966).

Yet empirical research on this topic has obtained somewhat mixed results (e.g., Naroll et al., 1971). It seems that “a certain minimum of surplus wealth must exist if any society is to support an appreciable number of people who are not economically productive” (Norling, 1970, p. 244), but, as Candolle (1873) perceived, economic prosperity will only stimulate scientific output if the sociocultural system values science.

This necessary stipulation is suggested by an empirical inquiry into the circumstances that are most likely to have produced the top thinkers of Chinese civilization (Kuo, 1986).

These luminaries lived during times that met the following three conditions:

- (a) there was a strong economic base,
- (b) freedom of speech was granted by the political authorities, and
- (c) philosophy was highly valued within the culture.

Unfortunately, I know of only one investigation concerning the correlation between the quantity of contributions to psychology and the economic milieu (Simonton, 1985b).

Using a cross-sectional time-series design, the study examined the careers of 10 distinguished psychologists, among them Gordon Allport, Albert Bandura, J. P. Guilford, Carl Hovland, Carl Rogers, B. F. Skinner, Kenneth Spence, and Edward Tolman.

For those whose careers overlapped the Great Depression, a drop in the quality of their work appeared during those hard times – as gauged by the average number of citations received by their publications.

Yet the decline was too small to attain conventional levels of statistical significance.

A bigger sample is probably required, including a larger number of psychologists who worked before, during, and after the Great Depression.

Inertial Movements

Some external influences on scientific activity change more slowly than do the comings and goings of war and peace, or economic booms and busts.

Several of the factors that Candolle (1873) cited are certainly in this category.

For instance, systems of government, economic production, or education tend to be relatively stable over considerable periods of time.

Despite the great variety of potential inertial factors, I will confine discussion to three effects that have attracted the most empirical research:

- population growth,
- national sovereignty, and
- cultural values.

Population growth.

When Candolle (1873) calculated the national output of great scientists on a per capita basis, he was explicitly assuming that, on the average, the number of scientists should increase with the total number of the nation's citizens.

Because the world's population has tended to grow exponentially, it should be expected that the number of scientists should have expanded exponentially as well.

This is abundantly the case, as was demonstrated by Harvey C. Lehman (1947a).

He tabulated the number of contributions per generation for a large number of creative domains, including several closely affiliated with psychology: genetics from 1600-1925, education from 1000-1900, and philosophy from 1250-1899.

In almost every case the plots revealed an accelerating monotonic growth, and in every single case the curve was closely approximated by an exponential function.

Derek Price (1963) replicated Lehman's (1947a) conclusion.

He noted, for instance, that the numbers of important discoveries and important physicists have doubled every 20 years, the numbers of scientific journals and scientific abstracts have doubled every 15 years, and the numbers of publications on the theory of determinants, on non-Euclidean geometry, or on x-rays have all doubled every 10 years.

Price specifically observed that the literature in experimental psychology has doubled every decade as well.

What is astonishing about these figures is that they exceed the growth rate of the population, which roughly doubles every half-century.

Hence, if the trend continues long enough, every man, woman, and child will be a scientist – publishing research in experimental psychology!

As Price himself pointed out, this accelerated growth cannot last forever, and must soon be tempered by conversion into a logistic function. Yet the main point remains: to some extent the output of great scientists, including great psychologists, must depend on the general size of the population from which those luminaries must be drawn.

National sovereignty.

Candolle (1873) asserted that great scientists are most likely to appear in small independent countries, or at least confederations of small sovereign states.

Stated in an inverse fashion, subordination under large imperial systems appears antithetical to the scientific enterprise.

Actually, several social scientists have suggested that the adverse consequence of empires operates across the board, harming creative activity in almost every domain, with the exception of monumental architecture.

After scrutinizing the various configurations of culture growth, Alfred Kroeber (1944) concluded that “it is certainly true that high achievements by suppressed nationalities are rather rare” (p. 794).

Likewise, Arnold Toynbee (1946), in his magnum opus *A Study of History*, claimed that the emergence of a “universal state” was negatively correlated with the creative activity of a civilization.

Nikolay Danilevsky, the great Russian historical philosopher, even styled this phenomenon the “second law of the dynamics of great cultures,” namely that “in order for the civilization of a potentially creative group to be conceived and developed, the group and its subgroups must be politically independent” (Sorokin, 1947/1969, p. 543).

Empirical evidence provides some endorsement of these intuitive inductions from the historical record.

The first demonstration came a study that took advantage of the lists of eminent creators that Kroeber (1944) had compiled and published (Naroll et al., 1970).

Specifically, the figures were drawn from Chinese, Indian, Middle Eastern, and European civilizations, and then tabulated into century-long periods.

The number of sovereign states was then calculated for each civilization area over the same historical intervals.

The correlation between these two measures was .286, in line with Danilevsky’s Second Law.

I found this result so provocative that I decided to attempt a replication as part of my doctoral theses when I was a graduate student at Harvard University (Simonton, 1974).

After collecting a comprehensive inventory of around 5,000 eminent creators from Western civilization, I tabulated them into 127 consecutive generations, beginning in 700 BC.

Also calculated was the number of independent nations in each 20-year period, a measure that was called “political fragmentation.”

I then conducted a multivariate time-series analysis that included controls for possible contaminating variables.

Political fragmentation emerged as one of the strongest predictors of the degree of creative activity.

Moreover, the positive impact of this political factor was replicated across different types of creativity (e.g., scientific versus artistic) and alternative variable definitions (e.g., weighted versus unweighted counts).

Despite this replication, a qualification must be imposed on this “Second Law.”

More than a decade after I published these results (Simonton, 1975d), one of my graduate students decided to conduct his own replication, with a specific focus on the literary creativity of China; approximately 7,000 writers!

However, the subsequent generational time-series analysis actually found a *negative* relation between the number of literary figures and political fragmentation (Ting, 1986).

This negative result must be interpreted in light of the following two considerations:

1. Chinese history is highly distinctive in that it almost entirely represents the record of a coherent nation, culture, and a civilization. Most cultural minorities in the territorial core of China – as distinguished from those in peripheral areas like Tibet – all but vanished early in the emergence of Chinese civilization. As a consequence, an increase in the number of independent states is not strongly associated with nationalistic movements. On the contrary, often the emergence of new states would sometimes represent the conquest of Chinese peoples by invading non-Chinese “barbarians.” This situation contrasts greatly with what tended to happen in the civilizations of India, Europe, and Islam. In the latter cultures, imperial expansion often meant the oppression of cultures sometimes quite different from those of the conquerors. The Mogul conquest of India in the 16th and 17th centuries, for example, entailed the submission of indigenous Hindu peoples to alien Islamic invaders descended from Mongolians of Central Asia.
2. Chinese literature is also highly distinctive in its use of a writing system that transcends the spoken language. Chinese is actually a collection of mutually unintelligible languages (sometimes incorrectly called “dialects”). Although the differences among these languages are comparable to those that separate the Romance languages of Europe, the Chinese languages are all written in the same way. As a result, any tendencies toward nationalism could not take voice in a corresponding literary movement, unlike what happens in other civilization areas. When the Roman Empire began to fall apart, various vernaculars began to rival the Latin language. As nationalism increased, these vernaculars could become independent languages of new nations. With this emergence would invariably come a new national literature, beginning with epics like *The Cid* and the *Song of Roland* and eventually culminating in the masterpieces of Dante, Rabelais, Camões, and Cervantes.

It is also conceivable that the relation between political fragmentation and creativity might have been different had my graduate student examined generational fluctuations in the appearance of major Chinese philosophers.

The Golden Age of Chinese philosophy took place during the Zhou Dynasty, after it had disintegrated into numerous independent states.

It was then that all of the indigenous schools of thought emerged, including Taoism, Confucianism, Mohism, and Legalism.

Furthermore, Chinese imperial systems displayed a distinct inclination toward imposing ideological conformity.

When Shi Huangdi, the founder of the Qin dynasty, finally unified China, he immediately ordered the burning of all books that were not to his liking, thereby incurring the eternal enmity of all subsequent Confucian scholars.

Cultural values.

In explaining why some nations displayed more scientific activity than others, Candolle (1873) placed great emphasis on whether the society had pro-scientific attitudes.

The cultural antagonism between scientific and religious values can be demonstrated more systematically.

As part of my Harvard doctoral dissertation, I conducted a subsidiary study of how various creative activities were interrelated across the course of Western civilization (Simonton, 1975b).

After the more than 5,000 historic figures were divided into 15 different kinds of creative achievement, each figure was also assigned to one of 130 consecutive generations, spanning from 700 BC to AD 1899.

Once general historical trends were removed, the 15 generational time series were subjected to a *P*-technique factor analysis.

The first two factors consisted of (a) scientists, philosophers, literary figures, and composers and (b) painters, sculptors, and architects. More interesting was the third, bipolar factor, which opposed physical scientists and general philosophers against religious figures.

In concrete terms, those generations that featured the most religious activity were least likely to harbor great physicists and secular thinkers.

This inverse association was later corroborated using the Sorokin data (1937-1941) mentioned in chapter 13.

Sorokin argued that sociocultural systems tend to be dominated by one of two “culture mentalities” – the Sensate and the Ideational.

Each mentality corresponds to a specific set of cultural values that determine the nature of the creativity displayed by the civilization during the corresponding era.

In particular, the Sensate mentality favors scientific discovery and technological invention, whereas the Ideational mentality diverts creative energies towards more religious, even mystical forms of expression.

Each mentality is associated with a unique set of philosophical beliefs.

Sensate culture links with empiricism, materialism, temporalism, nominalism, singularism, determinism, and the ethics of happiness, while Ideational culture binds with rationalism, mysticism, idealism, eternalism, realism, universalism, indeterminism, the ethics of principles, and of love.

Hence, composite measures of the two alternative mentalities can be created by combining the generational time series for their corresponding philosophical positions.

After making appropriate adjustments for very long-term trends, the resulting Sensate and Ideational measures can be correlated with the generational times series assessing scientific and religious activity.

The results fall right in line with both Sorokin’s theory and Candolle’s cross-national investigation:

The Sensate mentality correlated .37 ($p < .01$) with scientific creativity but .04 (n.s.) with religious creativity, whereas the Ideational mentality correlated .20 ($p < .05$) with religious creativity but .02 (n.s.) with scientific creativity (Simonton, 1976c).

What makes this empirical outcome especially pertinent to the current discussion is the fact that the philosophical positions that dominate a given civilization change very slowly over time.

Part of this inertial movement can be ascribed to the role-modeling effects discussed in the previous chapter, which are responsible for the high autocorrelations for the generational time series (Simonton, 1976g).

But another part of this inertia may result from what Sorokin (1937-1941) theorized about the very nature of the two cultural value systems.

He claimed that the Sensate and Ideational mentalities embody solutions to fundamental issues of human existence – most notably how best to obtain happiness.

The Sensate solution is that a person should maximize personal pleasure by individualistic control over the material world, whereas the Ideational solution is that a person should minimize personal desires by subordination to a world more spiritual and communal.

It takes time for those residing in a Sensate culture to realize the inadequacies of the first solution, and so by a slow dialectic process the Sensate mentality gives way to the Ideational.

Yet the Ideational mentality contains the seeds of its own destruction, as increasingly more denizens of a civilization become dissatisfied with the constraints on sensual gratification and sensory curiosity.

Developmental Influences

On the basis of the theory and data presented in his *Social and Cultural Dynamics*, Sorokin (1937-1941) argued that the current hegemony of Sensate mentality was showing signs of decay.

In time, a new Ideational age would emerge, and the great age of science terminated.

It must be recognized that Sorokin's thesis suffers from several logical and empirical flaws (e.g., L. Schneider, 1964).

The most serious is the fact that Sensate and Ideational mentalities do not constitute opposite ends of a bipolar dimension (Simonton, 1976c).

In particular, the philosophical positions that define the Sensate orientation are not negatively correlated with the positions that define the Ideational orientation.

Indeed, the two sets of positions are positively correlated across the course of Western civilization (at least from 540 BC to AD 1900).

What this means is that thinkers who advocate Sensate beliefs on the seven philosophical issues have a tendency to appear in the same generations as those thinkers who advocate Ideational beliefs.

By the same token, some generations, such as those in the middle of the European "Dark Ages," contain few thinkers at all, whether Sensate or Ideational.

This is not to say that there do not appear periods where one or the other mentality predominates. Even so, the association means that at times the intellectual Zeitgeist may be rich in opposing viewpoints.

These are often Golden Ages of philosophical ferment, when great thinkers debate epistemology, ontology, ethics, and other key issues.

What sociocultural milieu supports such phenomenal displays of ideological diversity?

One answer may be found in my earlier comments about the intellectual activity that characterized the late Zhou Dynasty of ancient China.

The greatest profusion of schools appeared when China was subjected to exceptional political fragmentation.

A similar pattern is seen in the Western world, the greatest proliferation of new schools of thought occurred in when Greek civilization was divided into numerous countries, whether the poli of Classical Greece or the Hellenistic states that emerged after the disintegration of Alexander the Great's transient empire.

In fact, these instances embody specific cases of a general statistical association, for generational fluctuations in political fragmentation across 122 generations of Western civilization are positively associated with ideological diversity (Simonton, 1976d).

The political fragmentation measure in this empirical study was adopted unchanged from the data I had collected for my doctoral dissertation (Simonton, 1974), while the measure of ideological diversity was based on Sorokin's (1937-1941) data.

Specifically, ideological diversity was taken as a count of the total number of philosophical positions represented each generation, regardless of how many thinkers advocated each position.

When this measure was cross-correlated with the previously defined measure of political fragmentation, a positive relation obtained.

The more independent states in a given generation, the greater was the number if distinct philosophical positions represented.

Curiously, this positive association increased if the cross-correlation was lagged one generation.

To be more precise, the amount of ideological diversity at generation g correlated most strongly with the amount of political fragmentation in generation $g - 1$ (Simonton, 1976d).

According to the principles of generational time-series analysis outlined in the previous chapter, and schematically represented in Figure 13.1, this cross-lagged correlation implies that the number of independent states operates as a developmental-period influence.

Growing up in an environment characterized by a diversity of independent states may better encourage the development of personal independence.

Large imperial systems, in contrast, may nurture the development of individuals who are more disposed toward conformity to whatever ideas are most fashionable at the time.

Whatever the substantive interpretation, this long-term repercussion has defined implications for the general level of creative activity displayed over the same time periods.

The amount of ideological diversity in generation g is positively associated with the number of eminent creators in the same generation.

The lagged relation between political fragmentation and ideological diversity does not by any means constitute the only instance of a developmental influence.

Generational time-series analyses have revealed other sociocultural conditions that have developmental consequences.

Three such factors are especially noteworthy:

- political anarchy,
- imperial instability, and
- foreign influence.

Political anarchy.

Sometimes political systems succumb to anarchy – to frequent coups d'etat, political assassinations, conspiracies, military revolts, and the like.

Those who make up the “power elite” would rather engage in internecine struggles for supremacy rather than govern their nation wisely.

Such political instability has a devastating effect on the creative development of the youths who are exposed to these events (Simonton, 1975d).

Expressed more precisely, the number of eminent creators in such fields as science, philosophy, literature, and music during generation g is a negative function of the number of instances of political anarchy in generation $g - 1$.

These negative developmental influences must also contribute to any explanation of why the Roman Empire failed to match Classical Greece in the output figures who have earned a notable place in the annals of psychology.

Imperial instability.

Sometimes political violence would originate not in the power elite, but rather it would emerge from the populace.

In other words, the ruled rather than the rulers would engage in revolts, revolutions, and rebellions.

Especially commonplace in a culturally heterogeneous empire like the Roman were various nationalistic revolts.

Often oppressed peoples would attempt to throw off the imperial yoke.

Yet unlike the episodes of political anarchy, these civil disturbances have a beneficial effect on subsequent creativity (Simonton, 1975d).

The number of creative geniuses in generation g tends to be a positive function of the intensity and frequency of popular revolts, revolutions, and rebellions in generation $g - 1$.

Why should these violent civil protests against imperial rule have a positive effect on creative development while violent dissent involving the imperial rulers has a negative effect?

Certainly the former events challenge the very political and cultural foundation of the empire in a manner that the latter events do not.

The populace engaged in civil disturbances hope to overthrow or dismantle the empire, whereas the power elite is using violent means to decide who will stand at the apex of that empire.

Furthermore, those participating in such civil unrest will be less likely to subscribe to the values of the power elite, for the participants will often be drawn from the lower classes, minority groups, and oppressed nationalities.

This means that civil disturbances can serve to undermine the imperial pressure toward a homogenous culture.

By reviving suppressed beliefs, customs, and mores, these events mix up the cultural broth, and thereby resuscitate the cultural heterogeneity so vital to continued creative activity.

Cross-fertilization.

The interpretation just given fits well with the third and last developmental influence.

According to Sorokin (1947/1969), the creativity is enhanced when individuals reside

at the point of intersection of cross-currents of various appropriate or relevant systems of meanings and values. Since any new system of meanings is a blend of two or more existing systems, such a union occurs more naturally amidst several crosscurrents of different ideas, beliefs, and patterns. Such a milieu contains richer material for a new synthesis or creative combination than a cultural milieu of monotonous stereotypes. The point of junction of various cultural streams supplies a larger number of the elements necessary for a new creation. (p. 542)

Most psychologists who study creativity would probably endorse this assertion.

Thus, one creativity researcher identified “creativogenic factors” such as “exposure to different and even contrasting cultural stimuli” (Arieti, 1976, p. 320, italics removed).

Now there are several ways of obtaining this desideratum, some of which have already been mentioned.

Hence, as just observed in the preceding section, insofar as civil disturbances involve oppressed minorities, nationalities, or other subcultures, such events can expose all members of the society to a broader range of cultural material.

Furthermore, in chapter 9 I noted the strong tendency for immigrants or the descendents of immigrants to exhibit creative genius, as discerned by Francis Galton (1869). Candolle (1873), too, saw this as an important factor underlying the scientific activity, the more creative nations being those that promoted immigration.

Besides these factors, cultural cross-fertilization may be elicited when the milieu encourages individuals to study under foreign masters.

As mentioned in chapter 9, one common means of accomplish this is for persons to study abroad. Many of those who did not earn their PhDs abroad did the next best thing, namely study under foreigners who had immigrated to the United States.

The group-level repercussions of cultural cross-fertilization has been demonstrated using generational time-series analysis (Simonton, 1997a).

The historiometric study examined the configurations of culture growth for 14 domains of national achievement.

More specifically, the clustering of 1,803 eminent Japanese was assessed across 68 consecutive 20-year intervals from 580 to 1939 AD.

Japanese civilization was selected because its history has shown unusual variation in the degree to which its culture has been open to foreign influences.

At one extreme, Japan has sometimes opened the floodgates to the onrush of alien ideas, such as Chinese culture, Buddhism, and, most recently, modern Western civilization.

At the other extreme, Japan has sometimes totally shut its doors to the outside world, occasionally imposing the death penalty on those who violated its policy of deliberate cultural isolation.

Three alternative measures of Japanese openness to foreign influences were defined:

- (a) the number of foreign immigrants who left a mark on Japanese history, such as Chinese Buddhist monks, Korean artists, and Christian missionaries;
- (b) the number of eminent Japanese who traveled abroad, that is, who left the main islands of Japan to visit civilized regions like China, Korea, Europe, or the United States; and
- (c) outside influences in which native Japanese studied under foreigners, went abroad to study, or admired, developed, or imitated the style or ideas of foreigners – the most inclusive of the three measures.

Several significant cross-lagged correlations emerged.

For instance, the number of eminent medical figures in generation g was a positive function of the frequency of foreign travel in generation $g - 2$.

The two-generation lag was typical.

The influx of outside ideas must be first assimilated by one generation before it can exert a developmental impact on the next generation.

Notice that this influence provides an explanation for how nascent civilizations can get a jumpstart on the path to a Golden Age.

If the development of genius depends on the presence of suitable role models and mentors, then how does a cultural configuration even start in the first place?

Who stimulated the development of the first representative of a given domain of creative activity?

Most often the answer is that the culture first went through a formative period in which it was highly receptive to foreign ideas.

Indeed, when Kroeber (1944) traced the course of cultural configurations, he would often link their onset with some outside influence.

Of course, the same cross-fertilization process can facilitate a civilization's creative revival after it has exhausted its initial cultural patterns.

Although the national benefits of cross-fertilization have only been tested on Japanese history, the results are certainly compatible with the other empirical relations that point to the value of cultural diversity in stimulating creative activity.

Furthermore, the advantages of cross-fertilization are implied by two other sets of empirical findings.

First, the presence of dissenting minorities has been shown to increase group-level creativity (see, e.g., Nemeth & Kwan, 1985, 1987; Nemeth & Wachtler, 1983). Second, bilingualism tends to be positively associated with the capacity for creative thinking (Carringer, 1974; Lambert, Tucker & d'Anglejan 1973; Landry 1972; Lopez, Esquivel, & Houtz 1993).

QUALITATIVE EFFECTS

Despite all their differences in data and theory, Galton (1869, 1874), Candolle (1873), and Kroeber (1944) were largely preoccupied with the same fundamental question:

What factors determine the supply of creative genius at a particular time and place?

None expressed any profound interest in the nature of the creator's contribution, such as the artist's specific style or the philosopher's particular ethical stance.

I must add that not all historians agree that psychological ideas are always so intimately tied to external conditions.

Occasionally, concepts and orientations may emerge that seem decoupled from the milieu.

The existence of such exceptions means that it is necessary to document what external factors do and do not influence the nature of psychological ideas at a particular time and place.

As earlier in this chapter, these effects may be classed into three categories:

- transient fluctuations,
- inertial movements, and
- developmental influences.

Transient Fluctuations

Just as war exerts a temporary impact on the quantity of scientific output, so may it influence the qualitative nature of that output – a connection frequently mentioned by historians.

Some repercussions of war are psychologically interesting.

For instance, during wartime conditions people tend to exhibit declines in the sophistication of their thinking, as assessed by the measure of integrative complexity discussed in chapter 6 (e.g., Porter & Suedfeld, 1981).

Peter Suedfeld (1985) showed that this effect even holds for great psychologists.

The sample consisted of 85 presidents of the American Psychological Association whose addresses were published from 1894 to 1981 in the *Psychological Review*, the *Psychological Bulletin*, or the *American Psychologist*.

Some of these presidential addresses were delivered during peacetime, whereas others were delivered during the Spanish-American War, one of the two World Wars, the Korean War, or the Vietnam War.

The speeches were content analyzed for integrative complexity, and a consistent pattern emerged.

Cognition was much more complex in those addresses given during times of peace.

Another transient external event has an even more powerful and provocative impact on psychological science: economic threat.

Research on this consequence was inspired by the findings reported in *The Authoritarian Personality*, by Theodor W. Adorno, Else Frenkel-Brunswik, Daniel J. Levinson, and Nevitt R. Sanford (1950).

In this classic work, the investigators tried to fathom the psychodynamic roots of fascism and its various manifestations, such as anti-Semitism, ethnocentrism, and politico-economic conservatism.

One important finding to emerge out of this inquiry was that the authoritarian personality belongs to individuals who feel threatened by powerful forces beyond their control.

Subordination of their personal will to conventional authority is seen as a means to reduce the ambiguities and uncertainties elicited by those threats.

Hence, authoritarianism is not only a lasting trait, a bona fide personality characteristic, but also a state – a temporary response to threatening external conditions.

In particular, when a nation finds itself under extremely threatening conditions, the modal personality of its citizens will shift toward more authoritarian beliefs and behaviors (e.g., Jorgenson, 1975; McCann & Stewin, 1987).

The external menace may be political, such as war looming on the horizon. Or it may be economic, such as the onset of a major depression that threatens the very livelihood of the average citizen (e.g., increased unemployment or lowered disposable income).

Whatever the source, threatening circumstances can have consequences that impinge on psychology's own history, whether indirectly or directly.

Among the indirect repercussions is an increased involvement in more dogmatic religions (McCann, 1999; Sales, 1972).

Certain churches demand strict adherence to a well-defined set of beliefs and practices, and those members who do not conform to these expectations will be ostracized or excommunicated from the congregation.

Other churches have much more liberal attitudes, and will tolerate an exceptional variety of behaviors and attitudes among their fold.

When times are threatening, whether economically, politically, or socially, membership in the former churches tends to increase.

For instance, when the unemployment rates go up, so does the religious "market share" of the most authoritarian churches.

Yet, as discussed in earlier chapters, scientific creativity is more strongly associated with affiliation with less dogmatic faiths – or with no religious allegiance at all.

Consistent with this statement, threatening circumstances are positively associated with the emergence of attitudes that can be considered anti-scientific, such as increased interest in astrology, mysticism, and the occult (Padgett & Jorgenson, 1982; Sales, 1973; cf. Doty, Peterson, & Winter, 1991).

The direct effects of threatening conditions upon psychology are twofold.

First, because authoritarians are more superstitious and believe that human beings are subject to mysterious forces, times of threat help make parapsychology more prominent as a research topic in the psychological literature (McCann & Stewin, 1984). Here the measures of threatening circumstances included declines in per capita disposable income, increases in the unemployment rate, and the subjective assessments of historians and social critics.

Second, because the symptoms of the authoritarian personality include anti-intraception, popular books magazine articles on intraceptive topics like psychoanalysis and psychotherapy decline during threatening times (Sales, 1973).

The authoritarian bias against intraception is also apparent in changes in divisional membership of the American Psychological Association (Doty, Peterson, & Winter, 1991).

APA Divisions 12 (clinical), 17 (counseling), 29 (psychotherapy), and 32 (humanistic) have a strong intraceptive orientation, whereas Divisions 3 (experimental), 6 (physiological and comparative), 25 (experimental analysis of behavior), and 21 (applied experimental and engineering) are more nonintraceptive in nature.

The relative membership growth of these two division categories corresponds to whether the times are non-threatening or threatening.

In a kind of curious twist of fate, the repercussions of a threatening milieu puts into larger context the very events that lead to the research on the authoritarian personality in the first place.

One investigation concentrated on economic threat in Germany between 1918 and 1940 (Padgett & Jorgenson, 1982).

Inertial Movements

Other aspects of the sociocultural milieu leave a more long-term impression on the qualitative features of creativity displayed by a civilization.

Political, economic, social, and cultural systems, in particular, change only very slowly, and the creative activities they influence will tag along at a similarly glacial pace.

Earlier I described a measure of political fragmentation spanned Western civilization from the ancient Greeks to the 20th century (Simonton, 1974, 1975d).

I also mentioned more than once Sorokin's (1937-1941) indicators of fluctuations in the positions that over 2,000 thinkers took on seven major philosophical issues.

The number of independent states in a particular generation was positively correlated with the appearance of the following eight stances: empiricism, skepticism, fideism, materialism, temporalism, nominalism, singularism, and the ethics of happiness (Simonton, 1976g).

In other words, political fragmentation is associated with an increase in the number of thinkers who advocate: (a) that all knowledge comes via the sense organs (or else that no secure knowledge can be acquired or that it can only be obtained through faith), (b) that the basis of reality is matter rather than spirit, soul, or mind, (c) that reality is constantly changing or evolving rather than eternal, (d) that abstract ideas are nothing but words to label collections of particulars, (e) that individuals have primacy over the social system, and (f) that pleasure provides the proper criterion of right and wrong.

Conversely, the rise of large imperial states would be antithetical to the emergence of these same philosophical positions.

This result has three valuable implications:

1. Just as Candolle (1873) had concluded, division into small independent states seems again conducive to the emergence of science, albeit by a more indirect route. The epistemology of the scientific enterprise is manifestly empirical (viz., experimentation), and the ontology tends to be materialistic (e.g., atoms). Moreover, nominalism bears a close relation with the notion of operational definitions – the idea that the names given to concepts are very much matters of convention. Finally, temporalism has a strong affinity with evolutionary theories, whether biological, geological, or cosmological.
2. The obvious connection between psychology and singularism implies that political fragmentation contributed to the appearance of psychological science as well. Psychologists study individuals, not the sociological or cultural collectives favored by universalists. In a sense, the interest in the singular individuals is nurtured when a civilization is highly individualistic in its political structure.
3. The ethics of happiness is linked not only with hedonism and utilitarianism, but also with all systems of psychology that posit a pleasure principle, such as Freud's psychoanalytic theory, Hull's drive-reduction principle, and Skinner's concept of positive reinforcers. Hence, political fragmentation may be viewed as a factor underlying the emergence of these psychological ideas.

These three implications together should help us appreciate why the first naturalistic psychologies first appeared in ancient Greece and then reappeared in modern Europe. Although these statistical associations were based on Western civilization, it is possible that the same findings apply to other world cultures.

Developmental Influences

A qualification must be introduced regarding the foregoing conclusion.

If a cross-lagged correlation analysis is done on these generational data, the correlation between political fragmentation and the eight philosophical positions turns out to be highest after a one-generation delay (Simonton, 1976g).

That is, the number of representatives of these positions in generation g is more strongly related to the number of sovereign nations in generation $g - 1$ than in generation g .

The reason why both cross-lagged and synchronous correlations are significant is that political fragmentation – like a true inertial factor – is highly autocorrelated.

Even after extracting a third-order polynomial time trend, the count of independent states in generation g correlates .77 with the count in generation $g - 1$.

This autocorrelation is sufficiently high that the synchronous correlation can be said to serve as a proxy for the cross-lagged correlation.

Accordingly, it is more precise to conclude that political fragmentation operates as a developmental influence – albeit one that does not fluctuate much from generation to generation.

Growing up in a milieu in which many separate nations thrive is conducive to developing ideas like empiricism, skepticism, fideism, materialism, temporalism, nominalism, singularism, and the ethics of happiness.

Nor is this the sole developmental influence demonstrated in empirical research.

In fact, two other factors have much less ambiguous relationships with the ideas that appear in a given generation of thinkers: international war and civil disturbances.

International war.

Because war and peace are much more volatile over time than are governments or dynasties, the autocorrelation for generational time series is essentially zero (Simonton, 1976g).

Moreover, the amount of war in generation $g - 1$ is negatively related to the representation of several important beliefs in generation g , namely, empiricism, temporalism, nominalism, singularism, and the ethics of happiness.

In other words, those future thinkers who spent their youth in a world plagued by warfare are less likely to advocate these positions – positions that are favored by political fragmentation!

It is possible that wartime conditions, including the associated propaganda and restrictions on civil liberties, discourage the development of these attitudes.

The individual's perceptions, beliefs, and needs, after all, must yield to the urgency of national survival.

Civil disturbances.

Like war, civil unrest is more randomly distributed over time.

That is, generational time series that record counts of popular revolts, revolutions, and rebellions are not autocorrelated (Simonton, 1976g).

Hence, unlike political fragmentation, there is less uncertainty about whether this external circumstance operates as an inertial or developmental factor.

An intriguing conjecture is that turbulent times might exert a polarizing influence on the course of intellectual history.

Sorokin (1947/1969) called this the “law of polarization,” which he described thus:

The overwhelming majority of the population in normal times is neither distinctly bad nor conspicuously virtuous, neither very socially-minded nor extremely antisocial, neither markedly religious nor highly irreligious. In times of revolution this indifferent majority tends to split, the segments shifting to opposite poles and yielding a greater number of sinners and saints, social altruists and antisocial egoists, devout religious believers and militant atheists. The “balanced majority” tend to decrease in favor of extreme polar factions in the ethical, religious, intellectual, and other fields. This polarization is generated by revolutions in all fields of social and cultural life. (p. 487)

Sorokin (1937-1941) never actually tested this ideas, despite having collected data on both civil unrest and philosophical change for his *Social and Cultural Dynamics*.

When the test is conducted using the generational time series that I can independently collected for my doctoral dissertation (Simonton, 1974, 1975d), the outcome is most provocative (Simonton, 1976g).

The representation of almost every philosophical position increased one generation after a period of major civil disturbances.

More specifically, the number of popular revolts, revolutions, and rebellions in generation $g - 1$ is positively related to generation g 's representation of (a) empiricists, rationalists, and mystics, (b) materialists and idealists, (c) eternalists and temporalists, (d) nominalists and realists, (e) singularists and universalists, (f) determinists and indeterminists, and (g) advocates of the ethics of happiness and advocates of the ethics of principles or love.

In short, the political conflicts that thinkers experienced when young become translated into adulthood the intellectual conflicts.

These effects provide a useful context for understanding what happened in certain periods of psychology's history.

For instance, one historian, in discussing the political chaos that followed the dissolution of Alexander the Great's empire, observed that “in reaction to this time of crisis, of ambiguity, and of anxiety, two opposite philosophical movements sprang up, Epicureanism and Stoicism” (Wertheimer, 1987, p. 17).