
CHAPTER 12

LEVELS OF SELECTION AND THE RISE AND FALL OF CIVILIZATIONS

Abstract

Evolutionists still dispute the relative importance of "group selection" while favoring almost exclusive selection at the level of the gene. There is never a discussion of that in-between level which I shall refer to as "individual selection." This is understandable given that individuals die, whereas genes and groups survive on evolutionary time scales. However, I present a different definition of "selective force" which more directly addresses the factors influencing the fate of genes, permitting the use of the concept "individual selection." With this modified way of viewing causes for gene frequency changes there is a simple way to "partition" causative factors between "levels" that I shall term Gene Selection, Individual Selection and Group Selection (GS, IS, and GrS). The concepts GS and GrS differ somewhat from the traditionally used meanings for gene selection (kin selection) and group selection (multi-level selection). I present an overview perspective for understanding the relative importance of these three levels of influence as they relate to the rise and fall of civilizations. I conclude that civilizations are an anomaly that arise when individuals break loose from the most confining bonds of the genes, as expressed by GrS, and give birth to IS. The creative forces let loose by an era of IS propels the society embracing it to create the thing we call a "civilization."

But history teaches us that civilizations are short-lived. It may be that by its very nature a society constructed upon a base of individual freedom is vulnerable to fanatical attacks by a residual of contemporaneous societies that remain gripped by GrS forces. This may allow us to understand why civilizations have always collapsed, in spite of their being surrounded by social groups with inferior levels of technology and oppressive levels of individual subjugation. It may be theoretically possible for civilizations to endure after the more primitive form of GrS societies are eradicated, but human nature is such that fanatical GrS societies will probably re-form spontaneously. If this occurs, civilizations will be doomed to fall after every rise, unless the long stretch of time somehow leads to the weakening of this impulse for reverting to GrS fanaticism.

The previous chapter got "ahead of itself" somewhat, so before proceeding further with the concept for the rise and fall of civilizations it will be necessary to back up and review some of the past 100,000 years and the rise of the artisan, which set the stage for the rise of civilizations.

Introduction

In my view the sociobiology paradigm is the 20th Century's greatest achievement.

When, for example, a sociobiologist considers observations of Darwin's finches on the Galapagos Islands, and the changes they undergo in response to a year of heavy rainfall that produces foods rewarding a different beak length, the concurrent rapid

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evolution of birds having different beaks is understood using a theoretical paradigm in which genes compete with other genes. Similarly, when prairie dogs warn of predators, and in the process catch the attention of the predator, the altruistic act is understood using the same sociobiology theory ("inclusive fitness") whose mathematics was worked out by William D. Hamilton (1962). Both examples illustrate evolutionary change as a product of competition at the level of the gene.

There is almost a consensus among sociobiologists that any gene frequency change should be viewed as the product of competition and selection occurring at the level of the gene, and not higher. Genes assemble individuals as mere "vehicles" for the genes, and these "lumbering" creations (Dawkins, 1976) compete with each other in order to enhance the competitive prowess of the genes within. This same theory also allows for the perspective that **groups** of individuals can be viewed as "vehicles" for carrying the genes in an even larger arena of gene competition. In other words, the accepted sociobiological theory states that evolution occurs when gene frequencies change in response to competition at the level of the gene, and that it is unnecessary to take explicit account of competition at the level of the individual or the group. Reeve (2000) seems to have shown that the equations of the "standard Hamiltonian inclusive fitness" theory provides for group effects, thus eliminating the need for considering groups as a level for competition.

As much as I like this theory, and in spite of the fact that I will defend it as basically correct for providing a proper account of essentially all evolutionary observations, I shall consider another paradigm for "understanding" gene frequency changes. This other paradigm has the advantage of addressing some observations that the sociobiological paradigm is theoretically incapable of explaining.

I assert that sociobiology's basic task is to explain why the frequency of a gene in a gene pool changes over time. I agree that the first order explanation must be that genes can achieve success by creating individuals who do a better job of reproducing those genes, and those of their kin, thus accounting for a greater representation of these genes in future generations. However, Hamiltonian inclusive fitness theory is an awkward tool for understanding group competition and it seems greatly handicapped in dealing with humans who have partially "liberated" themselves from the genetic grip by employing "logic" to influence decisions. In the next section I present examples of cases that pose difficulties for inclusive fitness theory, and in the sections that follow it I will suggest a different way of viewing the locus of causation for gene frequency changes.

After presenting these humble suggestions for amending sociobiological theory, I shall then march forward into dangerously speculative territory, and address the recurring puzzle of why civilizations rise and fall. In doing this I shall rely on my newly-defined concept for evolution at the Individual Selection level.

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Special Cases That Defy Sociobiological Explanations

Sociobiological theory assumes that physical environments do not undergo drastic changes on time scales shorter than can be accommodated by evolutionary adaptation. For example, if a rare and drastic climate change occurs it is possible that a multitude of adaptations related to earlier climates will be rendered useless and the fate of the species (and the genes that are unique to it) cannot be predicted. This may seem like a trivial "objection" to sociobiological theory, but it serves to illustrate that special cases do exist for which sociobiological theory is helpless. This illustration may not be a trivial exception to sociobiological theory given the ever-increasing evidence in the climate record for drastic and rapid climate changes. For example, Weiss and Bradley (2001) list 7 drought events that led to societal collapse (10,000 BC, 6400 BC, 3100 BC, 2200 BC, 550 AD, 950 AD, 950 AD, and 1280 AD). As an extreme example, climate can lead to the abrupt demise of species, as happened 65 million years ago when an asteroid impact created a "global winter" that exterminated the dinosaurs and allowed mammals to flourish.

Humans present a special case in two respects. First, they associate in super-tribes that require strict adherence by their individual membership to arbitrary customs. The drive for ever larger super-tribes may have been caused by the winner-take-all nature of warfare that evolved sometime during the past 100,000 years. To maintain the required superiority of numbers, and to enhance the competitive effectiveness of large tribal groups, I suggest that the power of the group over the individual grew to oppressive levels. An individual born into a tribe would have no choice but to adhere to the tribal beliefs and customs and to engage in coordinated warfare with neighboring tribes. The tribes with cultures that evoked a high degree of fanatical loyalty to tribal endeavors would be more successful at surviving and dominating their region. In this setting the individual (and his genes) experience a high degree of "shared fate." The group and its membership would prevail or perish together.

In this setting a novel genetic mutation that began by affecting just one person would be rewarded far less than in a setting where group-imposed behaviors were weaker, or not present. If we ask "what factors affect the fate of genes in the setting where fanatical tribes are in constant conflict, where there is an ever-present risk of the entire tribe's extermination?" we are forced to answer that "the perspective of selection at the level of the group appears to be more useful than selection at the level of the gene." In other words, when individuals are severely subjugated by the imperatives of tribal survival we must reckon with more than just genetic mutation in order to conveniently account for changes in gene frequency over time.

Humans confound sociobiological theory in yet another respect. With the evolution of a "logic using" left cerebral hemisphere, or left brain (LB), some individuals have achieved a modest level of liberation from the influence of the genes. "Rational" decisions are to a large extent "genetically unanticipated," which in some small measure disconnects the fate of the genes, for which the individual is a vehicle, from the ancestral environment selective forces that guided the development toward this wondrous, rational LB. One dramatic and straightforward example is the decision by

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an individual in contemporary society to use birth control measures to limit reproduction. When the genes created smarter brains they had no way of anticipating that those brains would subvert the genetic agenda. The sociobiological literature is inexplicably quiet on this confounding factor.

Before presenting a new way of viewing "selective forces" that incorporate the two anomalous aspects of human evolution described above I want to present a brief history of the changes in thought on where the locus of power for genetic change resides. There has been an active debate over the causes for gene frequency changes, and there have been several shifts in the preferred way of assigning importance to the various levels at which selection can occur.

Brief History of Level of Selection Viewpoints

Before Darwin's 1859 book, *On the Origin of Species*, most people believed that God made humans in such a way that our behavior guaranteed the survival of the species. Darwin displaced God from this throne, and groped to identify what replaced Him. The concept of genes was too vague in Darwin's time to be incorporated by his theory, since Gregor Mendel's article "Experiments With Plant Hybrids" (1866) lay unopened on Darwin's shelf; the rest of the intellectual community also failed to appreciate this work until 1900, 18 years after Darwin's death. For this reason Darwin can be excused for writing in 1859 "natural selection works by and for the good of each being." Nevertheless, with this statement Darwin appears to place the locus of influence at the level of the individual. Later, Darwin shifted toward group selection when he wrote (1871) "primeval man regarded actions as good or bad, solely as they obviously affected the welfare of the tribe, not of the species." Alfred Russell Wallace, who co-discovered natural selection as an explanation for evolution of species, "stressed that group selection ... played an important role..." (see Merlotti, 1986). Darwin, it seems, eventually joined Wallace in giving group selection a leading role in natural selection.

According to Carl Sagan and Ann Druyen (1992, p. 70), "One of Huxley's interests had been the idea that all animals, including us, were 'automata,' carbon-based robots, whose 'states of consciousness... are immediately caused by molecular changes of the brain-substance.' Darwin closed his last letter to him with the words: 'Once again, accept my cordial thanks, my dear old friend. I wish to God there were more automata in the world like you.'" (see also Huxley, 1874). This idea was "ahead of its time" and did not become part of the climate of opinion in the late 19th Century. However, I hope this "reductionist" idea will be resurrected during the 21st Century and will form the basis for understanding all behavior.

By 1950 several writers rediscovered the importance for natural selection of inter-group competition and, hence, intra-group cooperation. Merlotti (1986) summarizes Spencer (1892) as believing "Let enough members of a society disobey the code of amity (for members within the tribe) and the society will fragment; let enough disobey the code of enmity (against neighboring tribes) and the society will be crushed." Merlotti quotes Sumner (1906) "The exigencies of war with outsiders

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are what makes peace inside, lest internal discord should weaken the we-group." Sir Arthur Keith wrote persuasively in the same vein (1946, 1948), as again summarized by Merlotti "the success of the human species had been secured by cooperation within groups and competition between them."

The following table will be useful in seeing how differently thinkers of different periods partitioned the locus of influence for natural selection.

TABLE I
% Importance

	<1859	1859	1950	1962	1966	1994	Present
GOD	100	0	0	0	0	0	0
SPECIES	0	0	0	80	0	0	0
GROUP	0	20	80	15	10	20	10
INDIVIDUAL	0	80	20	0	0	0	10
GENE	n/a	?	?	5	90	80	80

By the mid-20th Century the forces of academic Marxist influence began to take their toll on the quality of anthropology thought. Whereas most previous theory incorporated an inherited predisposition to affiliate with tribes, and to be predisposed from birth to adhere to Spencer's "tribal mentality" (*i.e.*, with amity toward fellow tribesmen and enmity to all others), the climate of opinion shifted during the 20th Century toward a form of "cultural determinism." Biology was "out" and culture was "in." Culture was seen as a guarantee of species survival, and the locus of influence was "whatever is good for the species." The good of the species was such an appealing thought that those who could not relinquish a role for a "species nature" tried to see a pattern of evidence that instincts served species survival goals. Perhaps the most comprehensive expression of this idea is the 1962 book *Animal Dispersion in Relation to Social Behavior* by Wynne-Edwards. It amassed a tremendous amount of data in support of the idea that when a species begins to over-exploit its environment individuals will reduce their rate of reproduction (voluntarily) as if motivated to guarantee that resources will be available for future generations.

The fundamental flaw in this idea is that organisms are gene-created automata, and they cannot perceive the future, or even care about the future; they behave the way the genes have programmed them to behave, reacting to environments in ways that are programmed, and the genes that constructed them are the ones that have been the most successful proliferators in **past** gene-upon-gene competitions. Culturgens (culture's "memes") are also a factor for human behavior, but even memes cannot be credited with caring about the fate of the species.

Robert Ardrey's writings have withstood the test of time, in spite of the ridicule heaped upon him by those who resented his audacity for having an opinion on anthropology after having established himself in a different field (playwright). From his 1961 *African Genesis* to his 1976 *The Hunting Hypothesis*, the amity-enmity duality was a central theme from which he argued that aggression is a natural human

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instinct, as were within-group cooperation and loyalty. He wrote "If competition takes place not only between individuals but between groups, then the group with greater endowments of loyalty, cooperation, self-sacrifice and altruism concerning social partners will be selection's survivor." Thus, Ardrey tried to keep group selection "alive" during the 1960s and 1970s, but due to his background as a playwright he was not taken seriously by the Marxist anthropologists of that time.

During the first half of the 20th Century the discipline of physics made dramatic advances that captured the imagination of the general public. The climate of thought by mid-century should have been congenial to the notion that physical events at the atomic level dictate all particle motion, and therefore all animal behavior. There is no evidence (that I am aware of) that people were thinking this way by mid-century, even though Huxley had suggested the idea 80 years earlier. With the discovery in 1953 that genes are double-helix DNA molecules the stage was finally set for thinking of gene-assembled organisms as automata. The slowness of the process by which humans approach Truth is best understood by remembering that every creature is a gene-created automaton, and that a human is programmed to think in ways that served the genes that constructed his ancestors. Therefore, if the comprehension of a fundamental truth has never influenced the selection of human ancestors we cannot expect that humans will quickly grasp that truth. The gene-centered perspective requires a difficult leap of imagination for which the human ancestral environment has not prepared us.

William D. Hamilton (1964a,b) was one of the first writers to grasp that evolution should be viewed as occurring at the level of the genes! He created the mathematical foundation for understanding how evolutionary competition at the genetic level can explain such social behaviors as altruism. Hamilton's "intrinsic fitness" theory is a "mechanistic" theory for the evolution of individuals by natural selection that behave "altruistically" toward each other, provided the interactants are close relatives.

The math of Hamilton's derivation is daunting, even for mathematicians, and fortunately George C. Williams came forward with a non-mathematical interpretation of Hamilton's message (plus other implications of the gene-centered view) in a landmark book *Adaptation and Natural Selection* (1966). Williams addressed the issue of levels of natural selection, and allowed for the theoretical possibility that group selection, GrS, could occur when certain conditions existed. He considered conditions that must exist before GrS can occur (my description of this is adapted from Buss, 1999).

According to Williams, for group selection to be important there must be:

- 1) a high degree of "shared fate" of the members of the group,
- 2) low levels of reproductive competition within the group, and
- 3) recurrent patterns of differential growth and extinction of groups.

Williams demolished the old version of group selection, wherein adaptations evolved for the benefit of the species. He was even skeptical that this new version of group

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selection could be found in nature, for he believed that the three conditions he specified were rarely met, especially with humans.

Edward O. Wilson's book *Sociobiology: The New Synthesis* (1975) and Richard Dawkins' popular book *The Selfish Gene* (1976) consolidated the perspectives presented earlier by W. D. Hamilton, G. C. Williams and their lesser-known predecessors (R. A. Fisher, J. B. S. Haldane, S. Wright). The notion that natural selection worked at the level of the genes, and not groups, grew in strength with their writings.

Wilson and Sober (1994) revived group selection theory, and emphasized that groups can be portrayed as "vehicles" for genes, somewhat similar to the way individuals are vehicles for genes. They did not challenge that selection at the level of the genes is important; rather, for social animals it is also necessary to incorporate the effects of groups in order to understand the fate of the genes carried by its members. This version of group selection theory is sometimes referred to as "multilevel selection theory" (MLS). If the idea of multiple levels for viewing selection bothers you, re-read Chapter 1, and Appendix A, where I argue that a proper understanding of reductionism allows for more than one "level of physical explanation."

Even though MLS embraces such levels as the gene, the group, and even the species (and multi-species ecosystems), it excludes the individual. A 1998 book by Sober and D. S. Wilson, *Unto Others: The Evolution of Unselfish Behavior*, endeavors to place group selection on a sound, mathematical footing. Although Sober and Wilson acknowledge that the mathematics of *Unto Others* is "equivalent" to the mathematics of Hamilton's inclusive fitness theory, they claim that the rearrangement of terms in the equations renders it a better tool for understanding the role of competition at the group level. Reeve (2000) argues that the equivalence of the two mathematical formulations renders the group selection arguments in *Unto Others* unnecessary, since both theories are based on competition that ultimately occurs at the level of the genes. The latest version of "group theory" thus portrays the argument as a subjective preference for the mathematical arrangement of terms in an equation.

Overview of Human Evolution

I accept the conventional wisdom that before approximately 125,000 years ago humans lived in tribes of approximately 50 to 150 individuals. Inter-tribal conflicts may have been common, but I am unaware of compelling evidence that tribes exterminated each other before approximately 40,000 years ago (Keeley, 1996). It is not known if individuals were free to switch tribes. The simplest model for human evolution in those times would be to place the bulk of selection pressure at the level of the genes. To the extent that primitive humans lacked "culture," their evolution and the evolution of all other animal and plant life can be explained just as successfully using gene-level sociobiological theory.

At some time between approximately 70,000 and 12,000 years ago human tribes began to grow in size dramatically, and most humans soon found themselves

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members of "super-tribes" several times larger than the original tribes. The drive toward larger tribes was irresistible when they became more effective in inter-tribal warfare. The super-tribes also could more easily afford to allow a small number of men to specialize in full-time weapon and toolmaking, and other artisan specialties. Whenever inter-tribal warfare began to result in the extermination of the losing tribe, sometime between 70,000 to 12,000 years ago, that was the time when tribal size and tribal loyalty became crucial determinants of the fate of genes. Since the individuals within a tribe had a "shared fate" when tribal decimations began we can begin to consider placing the rise of "group selection" (the modern version of GrS) to this critical time. We may also speculate that tribal rules would grow more restrictive at the same time. Genes for "compliance" would be rewarded, for they would produce individuals who could embrace conformity with a minimum of cognitive dissonance (Lumsden and Wilson, 1981, and Boyd and Richerson 1985).

Super-tribes, and the growth of a tribal culture requiring strict adherence, represent a critical stage for the shift of evolutionary relevance from the genes to the group. Fanaticism, reinforced by tribal custom and religious fervor, reward the genes of individuals within that group, for they make the tribe a more formidable enemy to their neighbors (Kriegman and Kriegman, 1997). Individuals within super-tribes have no viable alternative to membership in their tribal group. After this transition, occurring sometime between 70,000 and 12,000 years ago, the factors that determined the fate of genes would be shared between the level of genes and the group. Prior to this transition most of the factors determining the fate of genes would have been at the level of the genes.

From the time of the transition to super-tribal conflicts to the time of Classical Greece, the factors determining the fate of genes would have been shared between the level of the genes and the level of the group, between GS and GrS. The notion of individual rights, or individual liberation from the oppressions of tribal life, began during the 6th Century BC in the area of northern Greece. It might have had beginnings in the Minoan civilization, but we have no records of what people believed from that far back (ending abruptly when the volcanic island of Thera exploded in 1628 BC). After the slow collapse of the Roman Empire the rights of the individual lost influence and group rule was restored. With the re-discovery of Greek philosophy by the 17th Century Enlightenment *philosophes* it again became fashionable for the individual to assert himself. The church's power was at an all-time low when this 17th Century rebirth of individualism occurred. What is now referred to as Western Civilization is an outgrowth of the ideas originally expressed by the Greek philosophers.

Western societies at the end of the 20th Century gave individuals the freedom to move about, to experiment with alternative cultures, and to think thoughts that contradicted those generally accepted. Tolerance of individual differences and respect for individual freedoms were at an all-time high at this time in the Western world. For example, a person was free to adopt birth control measures to control pregnancy, and many educated and wealthy individuals choose to forego having offspring. The fate of the genes was influenced by individuals who were free to make rational decisions

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that were often dictated by a desire to optimize the welfare of the individual at the expense of genetic propagation. This short-changing of the genes was accompanied by a weakening of the group to which the liberated individuals loosely belong, as will be explained below.

A New Measure for the Strength of Selective Forces

This section may be "tedious" for most readers. I will summarize it in the next paragraph so that you may skip to the next section whenever you think you're encountering more detail than you need.

The task of this section is to assign importance to each of three levels for selection (gene, individual and group) in an account of why genes change their frequency in a gene pool over time. If the gene level is all important, then we will end up stating that: the "force of the genetic level" $FG = 1.00$, the "force at the individual level" $FI = 0.00$, and the "force at the group level" $FGr = 0.00$. However, if group selection is important, there will be a re-partitioning of selection strength so that genes will be a more important explanation for gene frequency changes; for example, we would state that $FG = 0.50$, $FI = 0.0$, and $FGr = 0.5$. Note that the sum of the three forces adds to 1.00, which is a condition I impose for convenience. The task is to "partition importance" among the three candidate levels in order to explain what is causing a gene pool to evolve.

In groping to define a new "measure" for use in explaining changes in gene frequency let us review some of the attributes we expect of it. If this resembles describing the answer, then formulating the solution, it is. Common sense should sometimes guide us.

Consider the situation before there were super-tribes that held individual members captive by inhibiting the full measure of unique individual attributes and inhibiting the free expression of personal aspirations. It should be clear that however this new measure is defined it should assign an almost complete amount of strength to the level of the gene and very little to the group. After super-tribes came into existence, we want this measure to share strength between the level of the genes and the level of groups. After individuals begin to liberate themselves from group-conforming societal pressures, a phenomenon which has occurred most dramatically in Western cultures, we want this measure to assign some strength to the level of the individual. The individual who is free to choose his culture, his role in that culture, and his reproductive lifestyle, warrants a seat at the table of power over gene frequency changes.

The measure I propose is based on asking "What factors affect the fate of the genes? And how are these factors partitioned between the level of the gene, the individual and the group?" If we constrain the three strength values to add up to 1.0, then as individual liberation grows, for example, the strength of the genes and the group diminish. Thus, $FG + GI + FGr = 1.00$, where FG is proportional to the sum of selective forces identified as originating at the Level of the Gene, FI is proportional

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to the sum of selective forces identified as originating at the Level of the Individual, F_{Gr} is proportional to the sum of selective forces identified as originating at the Level of the Group, and the normalizing of the three forces is done so that the sum of forces = 1.

In this treatment I ignore all factors that influence the fate of genes that do not belong to the above three categories. For example, I will exclude from consideration earthquakes, floods, drastic climate changes, asteroid impacts, and all other rare physical environment events, even though they do indeed occasionally affect gene frequencies. By neglecting them in this analysis I am following the precedent of most other evolutionary models, and my treatment merely fails to capture random perturbations which will not affect the conclusions I wish to make. It would be straightforward to formulate a version of this theoretical treatment that includes these environmental catastrophes, but it is not my intention to include them here in order to better emphasize the role of the non-gene levels of selection, GrS and IS.

The method for measuring "Selective force," which I shall describe momentarily, is inherently subjective, and this is the weakest part of my argument. However, it has attributes that make it useful for things that other formalisms do not allow. At any given time many things are happening that may influence subsequent changes in gene frequency in a gene pool. The basic task is to associate changes of gene frequency with causes for those changes. Instead of attempting to ascribe cause and effect through an explicit treatment of each gene's phenotypic expression, and speculating about the implications of that altered phenotype, I propose to employ mathematical tools that are blind to the mechanisms for cause and effect. I propose to perform a multiple regression analysis of all gene frequency changes in a genome, over a specified time, using as independent variables all parameters that can be measured and that describe potentially relevant aspects of the social environment, the genes found in individuals, the milieu of culturgens that individuals are exposed to, "novel thoughts" experienced by individuals, and many other similar properties that could in theory be measured. This item "novel thoughts" may be troubling, but I want to retain it for reasons that will become clear later.

Obviously it is not feasible for anyone to measure all relevant parameters describing the social environment, the genotype of individuals, the cultural milieu, and the thoughts experienced by individuals, but let us suppose for the sake of argument that these parameters nevertheless exist. I make this request of the reader in the same spirit that is required by twin study investigators, for example, who attempt to partition the effects upon individual traits by genetic versus environmental causes. In those studies it is not necessary to identify every factor that influences how a person becomes who they are; rather, it is merely assumed that a myriad of such factors in each category exist, and the investigator proceeds to partition causation of the aggregate of effects by performing correlation analyses. The following paragraphs are the ones the casual reader may wish to skip.

Assume that we create an immense inventory of parameters that describe the state of a "setting" in space and time. Assume further that we assign each parameter to the

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categories G, I, Gr and "other," and reject all parameters belonging to "other," such as natural catastrophes (for the reasons presented above). The number of parameters belonging to G, I and Gr shall be referred to as N. The "state" at any given time is an N-dimensional "state vector," to use mathematical terminology. After choosing a "timescale" for associating the state vector with events of a gene frequency change we can, in theory, perform a multiple regression analysis (MRA) for each gene. Each MRA will use gene frequency as the "dependent variable" and the N-dimensional state vector as elements for N "independent variables." Each MRA will then produce N correlation coefficients, one for each parameter. We now can sum the correlation coefficients in the following way:

FG' = Sum of all correlation coefficients associated with Gene Level parameters,
FI' = Sum of correlation coefficients associated with Individual Level parameters,
FGr'=Sum of all correlation coefficients associated with Group Level parameters.

which are the un-normalized "forces," that are easily normalized by dividing by their sum.

The entire procedure just described is then re-performed for the next gene, and so forth until all genes are thusly treated. Since only a few dozen gene loci have more than one allele (for a given species), this analysis need only be repeated for a few dozen genes. These several dozen results are combined to arrive at an overall score for the relative importance of each of the three levels of selection.

Again, I want to emphasize that it is not necessary for the above procedure to be feasible in order to make use of the concepts that they convey. I only ask that you accept that it is *conceptually* feasible! In some sense I am appealing for a belief in concepts that are just as "real" as the coefficients in Hamilton's horrendously complex mathematical derivations. If we can imagine specific coefficients to exist in a hypothetical world, then they do exist in the real world even though as a practical matter we are limited to only an approximate measure of them.

One further clarification is needed here: there is nothing in my proposed paradigm that is incompatible with present-day sociobiology theory. What I am suggesting is an alternative way of viewing events. This is often done in physics. For example, a physical chemist can, in one situation, treat a salt crystal as a lattice structure held together by electrical forces, while in another situation treat the same salt crystal as a group of sodium and chlorine atoms that can become dislodged for chemical reactions when dissolved in water. The physical chemist knows, during both treatments of the salt crystal, that whatever happens is the result of the four forces of nature acting upon tiny masses, in a way that is too cumbersome for practical use in everyday experiments (the four forces of nature being gravitational, electromagnetic, weak and nuclear). Similarly, the person trying to understand human behavior, or the rise and fall of civilizations should know that every person's actions are dictated by the same four forces of nature acting upon tiny masses. I acknowledge the frequent need to seemingly overlook the inherently reductionist nature of all phenomena in order to advance our "understanding" of the everyday world. Sociobiology and my

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suggested partitioning of influence among three levels is just another example of looking at the same phenomena from different perspectives, and they are NOT contradictory.

Levels of Selection and the Rise and Fall of Civilizations

Consider the following figure, where I have marked off 9 stages, "A" through "I", that I am suggesting typify the evolution of a human civilization.

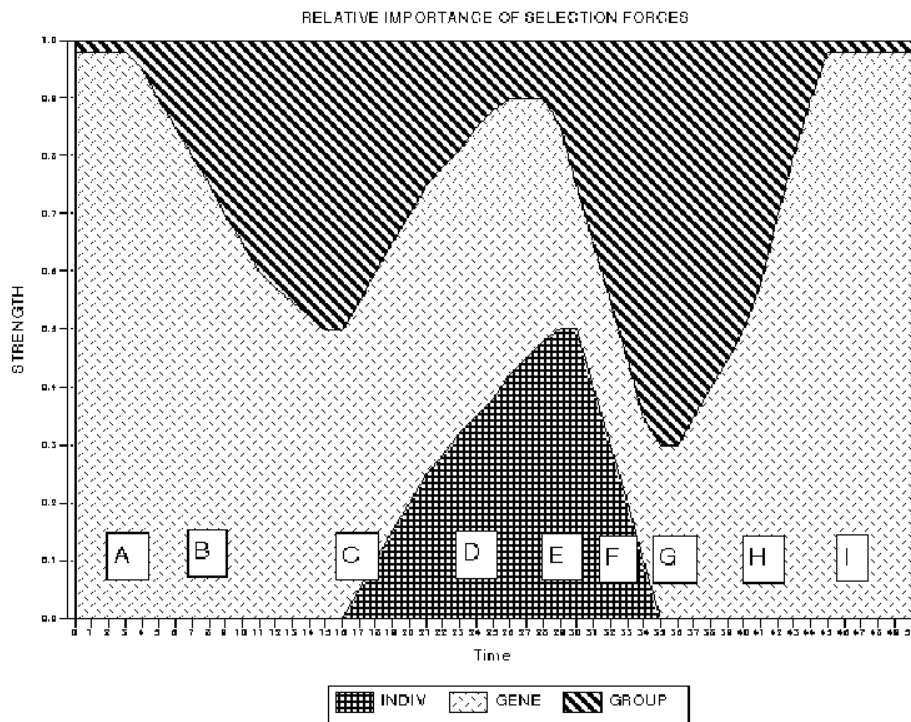


Figure 12.01. Hypothetical allocation of "selection strength" for the three levels Genes, Individual and Group.

At stage "A" we are to imagine that mostly the gene level of selection is important in determining the fate of genes. At this stage the individual does not assert himself, he does not make birth control decisions, or decide to walk away from the tribe and live alone. Also at this stage there are no super-tribes, and tribal conflicts are not all-or-nothing group exterminations. Consequently, the strength of group selection pressures is very small. It is only non-zero because I assume that the fate of individual social alliances has some effect upon the survival of the individual and his reproductive outcome.

At stage "B" we have super-tribes exterminating each other, rewarding the super-tribes that enforce conformity among its membership. The fate of the genes within an individual are less affected by the individual phenotypic expression of them, for some of the individual's destiny is beyond his control by virtue of the fact that he

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belongs to a tribe that will survive or be extinguished on the basis of how well the tribal membership works together. It will matter only slightly that a particular individual is greatly endowed by his genes if the tribe he belongs to is ineffective in combat with its rivals.

By stage "C" the group has become oppressive in its restriction of individual members. Any deviation from the cultural norm will be punished, so any differences in individual genetic profile, any outstanding abilities for example, are ignored and each individual is subservient to the dictates of group needs. This stage is marked by devotion to tribal rituals, unquestioned loyalty, fervent religious devotion, fanatical fighting and a readiness to sacrifice the self for the greater glory of the group. For a modern Westerner this stage is the most difficult to like. Kriegman and Kriegman (1997) suggest that religion was an invention that enhanced the fighting competitiveness of a group because it provided a "rationale" for fanatical behaviors; any groups not having a religion to motivate fanatical adherence to the group's destiny would be handicapped during warfare. I incorporate this thought as a crucial component of my argument that civilizations are destined to be short lived in a world where fanatical societies exist.

Stage "C" represents the "birth of individualism." It is no coincidence that the Olympic games, which emphasize individual as opposed to team competition, originated in a region that gave birth to the notion of celebrating the individual. The Greek philosophers discussed the proper relationship between the individual and society, and the proper role of a government. Democracy as a form of government is an outgrowth of a shifting of power from a "tribal leader with group support" to the individual. When the individual is set free to achieve, and receive credit for his achievements, it should be no surprise that more achievements per capita should result. Commerce and technology should develop faster, and more economic niches should be created. In a society where the individual has government sanctioned rights, as in a democracy and free-enterprise economy, there should develop a greater tolerance for people having new ideas. Productivity should rise in not only the commercial sector of the society, but also the intellectual. Literature, the arts, and philosophy are individual endeavors that attest to a vibrant social order that rewards individual initiative. These are the conditions that lead to what we call a "civilization."

But as the individual thinks for himself, he exerts an influence over gene frequency changes as well as the shape of society, and by the zero-sum nature of my proposed partitioning of the forces of selection we must see a decline in the influence at the level of either the genes or the group. I suggest that the group is the big loser, and perhaps its losses are so great that even the genes are winners. During the rise of a civilization, when more power flows to the individual, the genes can still be winners because an individual with a new mutation has the potential for prospering more than the average of his society. Even today the extremes of personal wealth continue to widen. Bill Gates has more wealth than 1 million average people in the Western World, and his wealth is based on genetic intelligence and business savvy (and, yes,

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the luck of an opportunist); at least you will agree that it is not based upon inheritance or acquisition through plunder.

It should be pointed out that Stage "C" appears to be driven by a bold assertion of a growing minority of people with "strong" left brains! Any neuropsychologist would agree that the manner of discourse exhibited by Socrates, Plato and most other philosophers of that time can be explained by invoking a leading role for styles of thought that only the left cerebral cortex is capable of performing. Elsewhere I have written that during the past 70,000 years, at least, there was a growing place for artisans within tribes, and these artisans could perform their work most effectively if they had well-functioning left brains. I have also argued that the left brain, as well as the frontal lobes, have undergone the greatest amount of evolutionary change in recent times, and that this is due to the need for full-time artisans for the support of tribal endeavors, and that this has grown in importance during the past 70,000 years.

Stage "D" is a growth of what was started in Stage "C." During this stage individual liberation, made possible by the influence of people with left brain styles of thinking, enjoys a toleration from society at large that is unprecedented. Tolerance for new ideas, new customs, and challenges to old ideas and customs becomes acceptable and expected. The lifting of group oppressions allows a release of unprecedented creativity and productivity, and this energizes commerce, technology and government efficiency, which leads to a spread of greater material wealth throughout most of the population. Excesses of wealth, found in both successful individuals and a bountiful government, benefit the arts. Stage "D" meets the dictionary definition for civilization, as "An advanced state of intellectual, cultural, and material development in human society, marked by progress in the arts and sciences, the extensive use of writing, and the appearance of complex political and social institutions."

But a curious thing happens during the progress toward a more extreme development of Stage "D" civilization, as we are now experiencing in Western Civilization. The recipient of civilization's bounty, the individual, turns inward, and becomes absorbed with personal, individual well-being. Beyond the boundaries of civilization's campfire exist uncivilized societies that have not absorbed the values of their more successful cousins. These societies are on the fringes of the fountain of wealth, and they feel "used" and left behind, as they pick up the crumbs that fall their way. Instead of wanting to emulate those better off, they resent them, and they wish to defeat their well-off neighbors, and perhaps plunder the fruits of other men's labors. They are moved by the ancient and primitive tradition of seizing what one wants instead of producing it.

While resentment grows among those relegated to being spectators of the civilized, and while the numbers of those lucky civilized members grow, another unexpected force gathers strength from within the civilization: it is a curious cadre of "cultural enforcers." These people are a residual of past episodes of boom and bust, and their ancestors have saved their kin from the excesses of success. The cultural enforcers (religious fundamentalists) wish to curb the undisciplined pursuit of civilization's glitter by re-instituting some old fashioned values. They can be likened to a

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well-meaning friend trying to sober-up a hung-over celebrant, as if the celebrant was merely preparing himself for the next day's battle. For there is always a next day's battle, and every civilization must be ready for it, or perish.

Stage "E" is the turn-around, a reckoning with the consequences of success. The cultural forces from within are creating a "group mentality" in readiness for battle, and the forces beyond civilized borders are probing their enemy for weaknesses. Both sides silently gather strength, like the quiet before a storm.

The Stage "F" collapse will be faster than the rise, for destruction is always easier than production. Fanatics chip away at the existing structure by attacking places that are most vulnerable; but just as important, they inexorably reduce public confidence in the existing order. For those at ground level, measuring change by moments of a lifetime, the changes may not be apparent and their significance will not be appreciated. Someone still drives the trucks, repairs the streets, and constructs the houses, though it is a different person and he worships differently. Traditional battle lines will not exist, as the war is one of skirmishes by well-organized, small groups of fanatics, as they erode a structure built by processes that are quietly disappearing. Instead of energies being focused on new and more glorious projects for the future, energies are focused on repairing crumbling social structures that directly impact personal well-being and on protecting society from random terrorist attacks. The "vision" of future things is replaced by a need to make concrete repairs and protect the security that was taken for granted in the past. There is no time or energy for the arts, for music, or new ideas. As civilization dissolves and eventually evaporates, it leaves a residue of useless scum.

Few people will recognize their loss as a loss, for by then most people will have turned over their left brains to the control of their rights. Part of the war effort, waged by the attackers and the attacked, is a covert campaign to discredit left brain styles of thought and left brain values. The attackers do it because they've never known the left brain's ways. The attacked do it because priorities now require that everyone become engaged in only essential endeavors. The essential endeavor is defense, and defense is most effective when the postures of fanaticism are adopted. And the retransformation to fanatic postures requires that the left brain style of thinking be abandoned.

Stage "G" is a complete deliverance of the once victorious civilization to the leaders of the group mentality. The tolerance for new ideas is lower than at any previous stage, and the individual expression of anything new and potentially upsetting to the grip of the group is unthinkable. Religion's job is to enforce this policy, to keep individual thoughts suppressed in order to preserve the status quo. The individual is not the only loser, for the fate of genes is even more strongly influenced by the vagaries of group culture. Whatever preserves group survival and dominance defines the way things are. Genetic mutations that in prior times would have brought their lucky individual vehicle to a winning place, thanks to their individual creations being inclined to be creative or productive, now produce individuals who are burdened by their superior creativity and individual passions. The newly strengthened group

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selection forces inhibit what we now call progress, for groups reward things that lead to Dark Ages. Where Group Memes Rule, the genes are in repose, and the individual is in eclipse.

Stage "H" and its eventual deliverance of its victims to stage "I" (equivalent to Stage "A") is a slow process, much slower than indicated by the figure. During this stage there is a lessening "need" for oppressing those who threaten stability by wanting to be progressive. The need to suppress individuality at this late stage is less than before because few people remain who remember how to assert one's individuality. Individualism during the Dark Ages is publicly non-existent. It may exist, but only furtively. Individuals who show more initiative, and who are motivated to achieve, slowly infiltrate the positions of power, and through a neglect of enforcing the culture of oppression they allow increments of change to erode the power of group culture. Perhaps we are lucky that it only took one millennium for the Dark Ages that followed the fall of the Roman Empire to give way to a rebirth of individualism. Part of the credit for the weakening of group culture goes to the plague of the Black Death, which so dispirited the populace, and so undermined the credibility of religion, that an opening appeared for individual voices to speak out in favor of ideals that had not been publicly uttered for 1000 years (Cartwright and Biddiss, 1972).

The longer Stage "H" endures, the more likely it is to be replaced by changes brought about by the voice of individuals. Evolution has produced brains that will not stay quiet forever, and this restless energy will break through religion's oppressive "blanket" eventually. A millennium or more may be required for this recovery.

The current episode of civilization shows signs of decline, amidst isolated surges of forward growth. If the Western World's civilization reached its peak in the early 20th Century (see Chapter 26), then the complete cycle, from Stage "A" to its repeat as Stage "H," requires approximately 2500 years. The previous cycle may have been interrupted by the volcanic eruption of Thera, destroying the Minoan civilization in 1628 BC - which had many of the features of the later Greek civilization. If the Minoan civilization had unfolded naturally, and had undergone a decline caused by a human restoration of group culture enforced by religious oppression, then the human spirit might have lain fallow for longer than the 1000 years that in fact was required for the resurgence of an individual-based culture, as occurred with the Golden Age of Greece. Thus, our present knowledge of the human record denies us the opportunity of knowing whether a 2500 year cycle is typical. Most of the time of our most recent cycle was spent in the Dark Ages mode. We do not know if this was true of the previous cycle, or if it will be true of any future cycles.

The dynamic just described occurs at lesser levels when regions are isolated for long periods. Thus, there are other examples to learn from of the exchange of power between the levels of the group and the individual (always at the expense of the gene). Asian history might be revealing in this regard.

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Oscillations as a Transitional Mode

Before 11,600 years ago, when the transition to our present interglacial was complete, the oscillations between Group and Individual power, each borrowing from Gene power, probably did not exist. It is a property of some physical systems that they undergo a transitional mode of oscillation during their shift from one mode to another. Before the Holocene (*i.e.*, our present interglacial), human societies were probably exclusively tribal, and super-tribal, corresponding to Stage "A" in the above figure. It is natural to ask "Will humans some day be exclusively civilized, remaining so for long periods?"

For this to happen, according to the ideas of this chapter, it would be necessary for a civilization to "include" the entire world's people in the benefits of being civilized. Such a condition would remove one of the energizing motives for fanatical attacks upon civilization's structure. To be sure, some people can be counted upon to hate the established order, no matter how beneficial it is to its individual membership. But there must be a critical amount of discontent for it to become a serious threat to the majority. This should be the hope of every civilization, that it can share the benefits broadly enough that the number of malcontents will not find each other in sufficient numbers to constitute a serious threat to maintaining the civilization.

Alternatively, those wishing for the longevity of civilizations may hope that the genes for malcontent will diminish during a civilization's existence. Clearly, it is too much to hope that a civilization will pro-actively alter the genetic composition of its citizenry. Unless, that is, the civilization is small in numbers, serious about survival, and physically isolated from its neighbors - as might occur some day when settlements exist in space.

If civilizations are to avoid falling soon after rising, they must confront both challenges: 1) attack from uncivilized, group culture societies that feel threatened by civilization's presence, and 2) the ever-present threat of indigenous malcontents coming together to form fanatical cadres bent upon destroying the civilization from within. I take an agnostic stance on the likelihood of either condition being met someday. The human species is an experiment, and it's not over yet!

Acknowledgement For This Chapter

I want to thank Dr. Daniel Kriegman and Orion Kriegman for letting me read their unpublished manuscript that expands upon their 1997 HBES Conference presentation. My thinking was helped by their idea that religion's proclivity for producing fanatic proselytizers and defenders gives religious societies an advantage in prevailing over neighboring societies with non-religious beliefs.

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APPENDIX TO THIS CHAPTER

A Fuller Explanation of Group Selection

How might GrS be measured? In the body of this essay I presented a conceptual version of a multiple regression analysis procedure for measuring the "force of group selection," FGr. That derivation was meant to illustrate a concept, and not meant for use in any specific situation. However, it may be possible to crudely measure FGr at a specific location and time. Imagine the existence of a questionnaire with weighted scores that probe key aspects of the setting in question. Although I leave the task of creating such a questionnaire to someone else, I shall hint at it with the following examples.

- 1) How often do individuals suffer from their affiliation with a specific group ("shared fate")?
- 2) How often do individuals publicly question beliefs that are held by the majority of group members ("compliance")?
- 3) Are individuals free to change group affiliation without sanction; may they have more than one group affiliation at the same time ("membership enforcement")?
- 4) Is an individual free to leave the group and live without any group affiliation (relating to the threat of a group to punish individuals by "banishment")?

Scoring societies using such a test might be useful in studying the "civilization's evolution." If Western Civilization can postpone that "rounding the corner" from Stage E to Stage F during the 21st Century, such studies might actually be conducted.

A Fuller Explanation of Individual Selection

It's easy to make the case that walking sticks and spiders that exhibit "male sacrifice" during procreation are enslaved to their genes (male sacrifice is when the female literally begins eating the male's head and other body parts after copulation has begun, partly to better nourish the development of eggs but also to assure that other males will not fertilize the female's eggs). With humans, the case is more difficult to make, but an earnest effort will be repaid. At the present time the sociobiological literature merely hints at this fact, for the field could lose public funds if it pushes forward too fast. Let us be bold, and accept the notion that humans in all societies are to some extent "used" by their genes, that emotional payoffs are meant to encourage individual performance of the most essential if not dangerous, laborious and illogical of tasks needed by our genes for gene survival. This book issues a "call to arms" for individuals to liberate themselves from genetic enslavement. Imagine that another book exists that calls for the individual to also free himself from the grip of "the group" (using whatever definition one likes for "group"). For now let us just assume that the individual is to some extent in the grip of both the genes and the group. In what ways are individuals now liberating themselves from these twin enslavements?

An individual asserts his "rights" when, for example, birth control measures are used. An individual asserts his rights when he argues for peace over war, and avoids

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being drafted into non-defensive, aggressive wars. An individual aspires to liberation from the genes when he thinks critically of conventional beliefs and pursues thoughts freely - as a "free thinker" does. These few examples reveal the possibilities for individual liberation from the grip of the genes and the group.

It is a novel situation when individuals achieve some degree of liberation from their genetic and group enslavements, and freely make personal decisions that can affect the fate of the genes for which they have become "newly uncooperative" vehicles. Because such individuals are less likely to produce their quota of offspring, or to nurture their nieces and nephews, these individuals would be viewed by the genes, if they had a view, as "freeloaders." They are not paying the price for admission to Life!

To the extent that other individuals remain enslaved, and to the extent that the inclination to liberate oneself is influenced by the individual's genetic makeup, the existence of liberated individuals will alter the fate of genes. The present time, as we approach the Stage "E" crest of Western Civilization, is an ongoing experiment. Let us hope that insulated communities will form and pursue the dreams of individualism for many more decades - before they are snuffed out by an encroaching reversion to primitive tribalism.

[Note: Most of this chapter was written during the 1990s, before Islamic extremists toppled the World Trade Centers on September 11, 2001.]