Where Is Utopia in the Brain?

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Introduction

The designer of utopian societies, whether fictional or real, often confronts the limits of what is possible for members of our species. But how severe or flexible are those limits? The explosive growth of behavioral neurobiology and experimental psychology in the last decade has produced many results on the biological bases of social interactions. This growth suggests that we can now look to science for some partial answers to the question of limits.

Until recently, the social sciences and the biological sciences have mainly developed separate and disconnected accounts of human behavior. In the “nature/nurture controversy,” for example, anthropology has tended to emphasize cultural influences on human nature whereas behavioral biology has tended to emphasize genetic influences. The journalist Matthew Ridley (Nature via Nurture) provides an accessible account of the intellectual history and rhetoric of these two fields.

Yet an increasing number of scholars in both areas are now realizing that behavioral biology and anthropology are studying the same human phenomena from different viewpoints. This overlap means there should be an underlying reality that is consistent across the different disciplines regardless of any disagreements in terminology. The behavioral biologist Edward O. Wilson calls this type of interdisciplinary commonality consilience, a term coined earlier by the nineteenth-century philosopher William Whewell from the Latin for “jumping together.”

Wilson’s version of consilience, however, is mainly a one-way street. He tends to advocate restructuring the social sciences by breaking social entities down into biological components studied by principles established in the biological sciences: this is an example of what philosophers call reductionism. By contrast, the interdisciplinary social scientist Gerald Cory (The Consilient Brain) has taken steps toward a consilience in which the social and biological sciences are equal partners, each contributing to advances in the other; that is, a theory is developed in which knowledge of economics, political science, and sociology provides insights about brain functions, and vice versa. The
approach to consilience taken in this article is closer to Cory’s than to Wilson’s, despite my own grounding in the natural sciences. Further advances are needed in nonreductionistic partnership between the two sets of disciplines in order to better understand the boundaries of cooperative and competitive behavioral tendencies and the social structures tending to encourage cooperative or competitive patterns.

Evolutionary accounts of behavior have pervaded popular scientific writing (Pinker, *How the Mind Works* and *Blank Slate*) and influenced modern theories of literature (Barash and Barash; Carroll; Gottschall and Wilson; Turner). These accounts have tended to focus on the evolutionary survival or reproduction advantage given to humans by their prevailing behaviours. These accounts thereby provide explanations for dominance hierarchies, wealth inequalities, and gender conflicts both in real life and in literature. Yet evolution is not all survival of the fittest. Many authors (for example Barash and Barash 216–244; Pinker, *How the Mind Works* 402–406 and 502–509) note that an important aspect of evolutionary adaptation is reciprocal exchange with others of one’s species, an exchange which often leads to cooperation.

Hence, each of us carries multiple evolutionary programs, such as cooperation and competition, and sometimes two or more of our evolutionary programs are in conflict. Far from constraining us to act within a narrow genetically determined range of behavior, evolution allows for a range of social arrangements that can selectively enhance or inhibit any one or more of those programs (Wilson, *Evolutionary Social Constructivism*).

**Conflicting Adaptive Behavior Patterns**

A biologically oriented social psychologist, Shelley Taylor, has written several articles and a book about the evolutionary advantages of mutual bonding to both female animals and women. Taylor calls this type of behavior *tend-and-befriend*, and contrasts it with the *fight-or-flight* (response to danger or stress by aggression or escape) that has been central to evolutionary accounts by and about males (Taylor et al., *Biobehavioral Responses*). Tend-and-befriend behaviors include mutual support in friendship, help in rearing offspring, and (for non-human animals) grooming. In response to stressful situations, such mutual support can serve as an alternative to fighting or fleeing.

Yet tend-and-befriend versus fight-or-flight is not a matter only of gender differences. The benefits of social bonding are as important to the
emotional and physical health of men as they are to women. While there
might possibly be statistically significant differences between males and fe-
males in their genetic tendencies toward competition or cooperation, both
competition and cooperation involve separate biological programs present in
all of us (Eisler and Levine). Each of these programs is mediated by a different
set of biochemical pathways in the brain: the stress hormone cortisol and the
neurotransmitter norepinephrine are particularly important for the competi-
tive programs, and the peptide hormones oxytocin and vasopressin for the
cooperative programs. Eisler and Levine mapped out likely brain pathways by
which social influences, such as a pattern of caring or abuse both in the family
and society at large, can bias people toward one or another type of program.
These pathways for social influence involve connection between rational and
emotional regions of the brain through a part of the frontal lobes called the
orbitofrontal cortex that is required for the efficient processing of social and
emotional knowledge. In other words, evolution has selected simultaneously
for two conflicting sets of behaviors. Both fight-or-flight and tend-and-be-
friend have survival value for us in different contexts.

A utopian society would be one that increases the bias toward tend-
and-befriend but does not eliminate fight-or-flight. Fight-or-flight is not only
ineradicable but sometimes valuable. It is needed to make us protect against
danger (which can be reduced in day-to-day life but not eliminated) and
stand up for our rights and interests. Fight-or-flight programs may also be
necessary for a sense of adventure, or risk, which is needed for a rewarding
life.

Some of the earlier utopian communities of fiction (e.g., Bellamy,
More, Skinner) and some experimental intentional communities in real life
such as the Kaweah Commonwealth in late-nineteenth-century California
(Fogarty 148–149), sought to eliminate risk and make the government fully
take care of everyone’s needs. What we know about the brain and human
nature suggests that people on the whole do not achieve lasting happiness in
such a society, which on a cosmic scale has been called the “heated swimming
pool of eternal life” (Hendra and Kelly last page). We prefer a different kind
of utopia that includes risk, adventure, and humor. (This article returns later
to differences among types of utopias in literature.)

Because fighting and cooperation are both evolutionarily adaptive
programs, an individual’s choice between them at a given time is not made by
natural selection. It is a choice over which we, as individuals, families, institutions, and societies, have some control.

Motivation to Live and Not Merely Survive

There is another reason that explanations provided by a survival-of-the-fittest evolutionary orientation are incomplete. It is that not all of our behavior is motivated by survival and reproduction (Turner 226–227). The existence of other motivations in addition to survival and reproduction is sometimes dismissed as non-scientific or non-biological. Yet such a complexity of motives does not go against Darwin’s own beliefs (Loye). In fact, Darwin said in his account of human evolution that he did not believe natural selection or survival of the fittest could account for human altruism or self-sacrificing behavior (Descent of Man 163).

Our needs for meaning, bonding, and pleasurable stimulation are just as biologically rooted as our needs for survival. We even partly share these needs with other mammals. The much-studied prairie vole, a Rocky Mountain relative of the mouse, forms stable pair bonds in which both parents nurture offspring (Cho et al.; Insel et al.). Moreover, many cases have been documented of animals seeking, or working for, tickling or other stimulation that gives them pleasure but has no instrumental value for survival or reproduction (Balcombe).

A particularly important blow to “survival and reproduction only” theory was the mid-twentieth-century work of Harry and Margaret Harlow on monkeys (Harlow; Harlow and Harlow). Before then, it was believed that juvenile monkeys were interested in their mothers only as sources of food and protection. But the Harlows took some monkeys away from their mothers and gave them a choice of two artificial surrogate mothers, one made of stiff wire and providing milk, the other made of soft cloth and not providing milk. They found the juveniles spent much more time with the cuddly-cloth mothers; they went to the rough-wire mothers only to be fed. This response suggested that the hugging and pleasurable physical sensations that normal monkeys receive from their real mothers is at least as important as the food those mothers provide.

In humans, there have been many studies of children raised in orphanages, notably the orphanages constructed in Romania during the Ceausescu dictatorship (Iftene and Roberts). From the pure survival viewpoint,
these Romanian children were well treated, with nutritious food, comfortable shelter, and good medical care. However, they were warehoused in an impersonal manner with no adult caretakers showing them affection or playing with them. To the surprise of many, this lack of love and stimulation led to brain development that lagged several years behind their peers raised in homes.

So any utopia that real, biological human beings can live in and enjoy requires social arrangements that optimize fulfillment not only of our survival and reproductive needs but also of our needs for meaning, bonding, personal competence, emotional and physical stimulation, and pleasure. How can we understand the structure and function of our brains in the light of the complexity of our motivations?

The understanding requires a set of quantifiable scientific theories that match the complexity of our neural and behavioral functioning. There has been much recent progress in the development of biologically realistic neural network theories of basic processes such as learning, perception, and categorization (Levine, *Introduction to Neural and Cognitive Modeling*; O’Reilly and Munakata). This type of neural network method has been applied more recently to modeling aspects of human decision making and behavioral rule development (Grossberg; Levine, *Angels, Devils, and Censors*; Levine and Perlovsky). Such models of brain and behavior are not reductive but include theories for how social interactions influence decision making.

Our model building using neural networks is not traditional “value-free science”: it includes a description of what might be a more or a less optimal state, both for an individual and for society. Optimal behaviors involve all three parts of what the neuroscientist Paul MacLean has called the *triune brain*: the instinct-bound areas deep in the midbrain; the emotional areas of the limbic system; and the information processing areas of the cerebral cortex. And they involve all major neurotransmitters and several hormones.

**Brain Pathways and Rules of Behavior**

Because the human brain contains a huge number of partially autonomous subsystems, the brain has been compared to a miniature society (Gazzaniga; Minsky). However, this comparison does not mean our mental life is anarchy. It is more like democracy. Each of the brain’s subsystems has a “voice,” and subsystems often “argue” with each other. Moreover, there is a large brain re-
region functioning more or less as an “arbitrator”: the frontal lobes, sometimes called the executive of the brain (Pribram). Because the frontal lobes can communicate with all three parts of the triune brain (instinctive, emotional, and rational), we can (unfortunately we do not always) make thoughtful decisions that integrate knowledge of both current rewards and preexisting beliefs.

The frontal executive operates through feedback connections with other brain regions that are “participants” in decisions, especially emotion-related regions. It is the part of the brain that is the “most human.” That is, of all brain regions the frontal lobes are the most different between humans and other mammals as well as the slowest to develop in each individual (Thompson et al.).

While complex cognitive tasks are not restricted to one brain area, recent neuroimaging results suggest broad functions for certain subregions of the frontal lobes. For example, one subregion is involved in processing emotional and social cues; another is devoted to recording ambiguity or conflict; and a third is dedicated to resolving conflicts and linking memories.

The three parts of the frontal lobes devoted to these functions are respectively called the orbital prefrontal cortex (OFC); anterior cingulate cortex (ACC); and dorsolateral prefrontal cortex (DLPFC). These three areas, along with their interactions with both cognitive and emotional regions of the brain, are regarded as the brain’s executive system (Faw, Pribram). The functions of these three parts are summarized here; Levine (How Does the Brain) describes them in more detail.

The OFC’s main functions are mainly social and emotional. A famous nineteenth-century patient, Phineas Gage, changed from a sober foreman to an undependable and irritable person after a railroad accident in which an iron rod went through his skull. Modern reconstruction has determined that his primary area of damage was the OFC, and other patients damaged in that region exhibit similar deficiencies in decision making and in socially appropriate behavior (Damasio). Such clinical observations, along with lesion studies in monkeys, have led neuroscientists to believe that the OFC forms and sustains mental linkages between specific sensory events or behaviors and positive or negative emotional states. By extension, Eisler and Levine (“Nurture, Nature, and Caring”) conjectured that the OFC mediates activation of classes of emotionally significant behaviors, such as tend-and-befriend versus fight-or-flight.
The ACC is activated when a person must select or switch among different interpretations or aspects of a stimulus, as shown by brain-imaging data (Posner and Peterson). Recent theories of ACC function have emphasized its role in detecting either potential response error or conflict between signals promoting competing responses (Brown and Braver).

The DLPFC is the region that manipulates the most complex working memory. It is involved with processing information that may or may not be emotionally loaded, and operates at a higher level of abstraction than does the OFC. The DLPFC creates different possible decision rules whereas OFC emotional circuits filter possible rules based on rewards and punishments received from following these rules (Damasio).

All these three regions of the frontal lobes are extensively interconnected with each other as well as with different parts of the brain. These interconnections allow integration of emotional information and task-relevance information within the brain’s overall executive system. The brain interconnections enable us to decide when to continue fulfilling a task and when to allow urgent task-external considerations to override task fulfillment.

**Utopias and the Compassionate Revolution**

How does all this brain structure relate to utopia? The discussion in the last section suggests that a major role of complex brain-processes is to select and implement rules for what behaviors to perform, in what contexts, and what behaviors to refrain from performing. Societies have rules of behavior just as individuals do; they do so in the form of unofficial social customs as well as laws. The evolution toward a utopian society would be characterized not by abandonment of rules but by a change in the nature of rules; for example, the fictional Ecotopians (Callenbach) had fewer legal restrictions than present-day Americans in some areas (for instance, sex and family) but more restrictions in other areas (for example, economic growth and pollution).

How would rules in a utopian society differ from rules in current societies, or in a dystopian society? For clues we can look to some work of the late population-ecologist John Calhoun on the evolution of human behavior rules over history (*Space and the Strategy of Life; The Population Crisis*). Calhoun explained major revolutions in human thought as adjustments made to cope with the stresses caused by population reaching a certain level of increase. Revolutions lead to changes in the rules for acceptable interpersonal
interactions, and these rule changes reduce the percentage of interactions that are frustrating.

The peak times of the revolutions Calhoun chronicled correspond to successive doublings of the world's population, which grows fast enough that each doubling time is approximately half as long as the preceding one. To the current Communications Revolution, centered on computers and electronics, he assigned a peak date of 1988. Yet that revolution has already brought stresses of its own: information explosion, massive detachment, and loss of social connections. With world population now growing at the fastest rate in human history, Calhoun predicted another revolution peaking between 2018 and 2030. If we act unwisely as a species, he added, this future revolution might entail ecological disaster or cultural quiescence. But if we act wisely, it can instead bring about a much more desirable scenario, which he labeled the Compassionate Revolution.

The Compassionate Revolution would create societies oriented toward fulfillment of human potential and not merely toward survival. It also means that we would respond to the complexity of society by acting with greater trust of others, including others who differ from us in race, gender, religion, or cultural beliefs. (See also Friedman 320.) Here is Calhoun's partial description of the transition process from the Communications to the Compassionate Revolution:

the present era of radical change will become intensified as the character of roles needed to meet new functions also change[s]. Thus, in the presence of increased exposure to value conflict, there will be required an augmented awareness of the necessity of others to maintain value sets differing from one's own. Furthermore, realizing one's own functional role requires expenditure of considerable effort in assisting others to fulfill the objectives of their value sets. It is this awareness, and participation in, the realization of values held by others which characterizes the compassionate perspective. This perspective also includes an awareness that many individuals will experience difficulty in developing and altering their roles and value sets in accordance with the demands of an
My overall system which is changing and becoming more complex. Holding to this perspective further requires marked attention to assisting others, whom we ourselves might earlier have been, to recoup from this hopefully temporary derailment. (Space and the Strategy of Life 374)

Calhoun (The Transitional Phase) suggested that achieving this desired state would necessitate an ultimate drop in world population combined with technological prostheses that would add to each of our information-processing capacities. Yet he left many details of the revolution’s cultural and social structure to the imagination. Other scientific findings and the work of other social commentators suggest likely implications of the revolution for different areas of life, which we discuss here in the light of published utopian literature. (See also Levine, Explorations in Common Sense and Common Nonsense 255–288.)

The Compassionate Revolution would synthesize individualist and communitarian outlooks. People would follow their individual consciences, but would treat society as an interdependent web and consider other people’s welfare in making their decisions. Children would be raised to feel part of a community and to develop a sense of responsibility toward others, but their membership in the community would not be bought at the price of conformity. More generally, the rules for acceptable conduct between people would be based on mutual trust more than on protection of social hierarchies.

Increased trust and community without conformity are two of the pillars of any society that embodies the Compassionate Revolution. A third pillar is an orientation toward delight; that is, living responsibly but being driven by pleasure rather than mere obligation. As the late feminist Marilyn French put it: “if we want to create a world that can live together without utter uniformity and totalitarianism, we must gear ourselves to cooperate, must teach our young the pleasures of working/playing together,” and “The question that should provide our standard as we make the choices that will lead us to a new vision is what kinds of human behavior bring us delight” (538).

In the next section we look more closely at a few utopian societies in literature that seem to embody the Compassionate Revolution, namely the societies developed by Callenbach, Huxley, and Piercy. We note that those three societies have features in common that support these three pillars of
increased trust, community without conformity, and sense of delight. Among the supporting features are child-rearing based on promoting independence; family units that are larger or more fluid than current nuclear families; increased openness of emotional expression; conflict resolution that emphasizes mediation; gender equality, and strong roles for women; and democracy of creativity (artistic production is spread across many people, talented artists and intellectuals also do manual work, and creativity is encouraged in mundane jobs).

The final sections of this article return to the brain. Based on the brain processes outlined earlier, we explore scientific arguments for the benefits of Compassionate Revolution social structures for optimal mental functioning. Then we return to the limits question posed at the beginning of this article. In the light of recent knowledge in neuroscience, we examine the arguments of other scientists about the feasibility of successful social engineering.

**Decentralized Utopias in Literature**

Which of the societies in widely read utopian novels fit the Compassionate Revolution scenario, and the needs of our brains, most closely? Broadly speaking, the closest fits are mid- to late-twentieth-century fictional utopias that are decentralized and evolved spontaneously across large segments of society, such as Ecotopia (Callenbach), Mattapoisett (Piercy), and Pala (Huxley). Utopias created largely by governmental authority or by the charismatic influence of an individual (such as Bellamy, More, Skinner) fit the Compassionate Revolution less well. Charismatic or externally imposed utopias could last over a long period, as indicated by sociological studies showing that intentional communities with strong religious restrictions tend to survive the longest (Sosis and Alcorta). Yet even if such societies have staying power, they would score less well than decentralized societies on the dimensions of meaning and personal freedom that are part of the usual conceptions of “utopia.”

The distinction drawn in the last paragraph between “imposed” and “evolved” utopias can be criticized as overly sharp. The categories actually overlap to some degree: much of Pala’s social ethos, for example, arose from the work of two nineteenth-century reformers (the Old Raja and Dr. MacPhail), and the economic arrangement in Bellamy’s 2000 was a spontaneous outgrowth of the progress of corporations. In spite of this overlap, though, there is a difference in emphasis and “flavor” between the two types...
of utopias, and the type here labeled “decentralized” is in better harmony with what recent results in psychology and neuroscience tell us about our brains. We now look at several key features of the Compassionate Revolution that can sometimes occur in imposed utopias, but are particularly characteristic of decentralized ones.

**Child Rearing That Promotes Independence**

Particularly instructive is the difference in child-rearing practices between the imposed utopia of Skinner and the decentralized utopia of Huxley. Skinner brought to his fictional society his behaviorist approach to psychology, which relies on control of behavior by positive and negative reinforcement (104–115, 124). Yet many experimental psychologists since Skinner have discovered that relying on external rewards to reinforce an act can actually reduce intrinsic motivation to perform the act for its own sake (Deci and Ryan). By contrast, Huxley’s society relies on intrinsic motivation and encourages children’s sense of delight in the world—and in the complexity of human relations. Huxley’s Palanese also detect children with antisocial and dictatorial tendencies, and do their best to redirect such tendencies to socially useful ends (208–211). Also, they encourage children as well as adults to air personal feelings, for they trust in the natural desire of their people to form positive social bonds.

Palanese children are raised to function as independent adults not to conform to a narrow set of predetermined social expectations. The same is true in Callenbach’s Ecotopia and Piercy’s Mattapoissett, and is particularly noticeable in their schools. Callenbach’s visiting outside narrator, Will Weston, notes with astonishment that the Ecotopians shunned behavior-control drugs, so “unable to make difficult children adapt to the schools, they had to adapt the schools to the children!” (*Ecotopia* 123). Ecotopian and Mattapoissett school children both spend relatively little time in classrooms and more time applying their classroom-acquired knowledge to actual productive enterprises such as farms, gardens, and even factories.

**Fluid Family Units**

The independence children develop in decentralized utopias is enhanced by their exposure to the influence of multiple adults, not just a nuclear family or even a biological extended family. Innovations in family structure in these
novels take on multiple forms, perhaps the most radical being in Piercy’s society where each child has two mothers in addition to his or her biological mother, and those mothers can be male as well as female. In Huxley’s society, children are free to escape from their parents at any age and migrate into another home belonging to a member of what Palanese call a Mutual Adoption Club. In one passage in *Ecotopia*, the narrator asks a boy whose mother was gone for a week if this made him lonely, and the child answers, with surprise, “Why should I be lonely? Everybody else is here” (101–102).

The Ecotopian fluid-family structure extends into adulthood. Like-minded groups of adults that are not biologically related but share a common enterprise, such as journalism in Will Weston’s case, live together in units that they call “families.”

Emotional Openness

Each of the three utopian societies in the novels of Callenbach, Piercy, and Huxley contrasts sharply with outside societies in how much it accepts open expression of anger, sadness, and joy. In each novel, the outside visitor (Will Weston in *Ecotopia*, Connie Ramos in *Woman on the Edge of Time*, or Will Farnaby in *Island*) experiences culture shock on his or her first encounter with intense emotional expression. Farnaby feels particularly strange because the first member of the society he meets (the child Mary Sarojini) talks intimately to him by asking him to remember and mentally work through his feelings about an encounter with a snake (11–13).

In all three of those novels, however, as the visitor becomes more acclimated he or she gradually learns to appreciate the emotional intensity. The visitor finds it refreshing that conflicts come out in the open and can be resolved in ways that are likely to satisfy all people involved.

Mediation of Conflicts

A dramatic example of conflict resolution with emotional openness is the Ecotopian practice of *cooperative criticism* (*Ecotopia* 53–55). The narrator witnesses an episode in a restaurant wherein a customer complains that his scrambled eggs are overcooked. The woman who cooked the eggs is a valued employee and appreciated by other customers. So a discussion ensues about her workload and some customers offer to help her in the kitchen, so everyone is made happy including the original complainer.
In Piercy’s future Cape Cod society, this same manner of listening to everyone’s viewpoint is applied to a political assembly (142–145). At this assembly, a dispute occurs about whether to use scarce iron ore for repair of a pretty bridge or for weapons needed to defend their freedom, and one participant suggests use of a different (biological) material for the bridge so the ore can be available for weapons. Such disputes may end up with winners and losers, but the loser’s face and sense of equality are preserved by having the winner treat the loser.

Some conflicts do not involve substantive issues but simply result from individual emotional strains leading to potentially destructive forms of anger and frustration. In utopian societies dangerous emotions are often discharged by means of physical release not directed at the object of the emotion, such as the Palanese Rakshasi Hornpipe (Huxley 228), named after a Hindu demon, and the Ecotopian war games, resulting in injuries that are usually minor and seldom life-threatening (*Ecotopia* 173–177).

**Gender Equality**

Imposed and decentralized utopias often differ sharply in their gender roles. More’s utopia, as befits his time period, is clearly male-dominated, and Bellamy’s and Skinner’s include long preachy pronouncements by male leaders. In more recent utopian novels, whether the authors are female (Piercy) or male (Huxley or Callenbach), the role of explaining the utopia’s social mores to the outsiders is taken by both male and female characters who are more concise than Bellamy’s Dr. Leete or Skinner’s Frazier. Fittingly, the nineteenth-century utopia with perhaps the strongest decentralized flavor is Charlotte Perkins Gilman’s *Herland*, a society composed of women.¹

In the novels of Callenbach, Huxley, and Piercy, women exert more power and gender roles are less rigidly defined than in most current societies. Women perform hard physical work, and men openly express emotions, including feelings of weakness. The caring values traditionally associated with females are blended in both sexes with the assertive values traditionally associated with males. In Piercy’s society, this blending leads to some blurring of gender distinctions (for example, men nursing children at their breasts) but not in the other two: in fact, the narrator in *Ecotopia* remarks about how feminine the women are and how masculine the men in spite of the role changes (42). In all these societies, equality of power also enhances sexual pleasure.
Democracy of Creativity

Nowhere is the democracy of decentralized utopian societies more manifested than in the creative aspects of work. This principle has many implications not only for the classic creative pursuits in the arts and sciences, but for increasing fulfillment in the performance of other jobs including those of farm and factory workers and telephone operators.

The societies in Callenbach, Huxley’s, and Piercy’s books all contain artists and intellectuals who are exceptionally good and whose work is widely known and respected. Yet people also respect the artistic and intellectual work of amateurs. The narrator in Ecotopia notes that participation of the young in the arts is nearly universal, that every farm, factory, or extended family has a musical group, and that average people successfully design many of the buildings they live in or use (170–171). A nurse in Pala notes wryly that her society is “the place for stupid people,” and that the intelligence of ordinary people (in which she includes herself) is as important to the society as the intelligence of exceptionally bright people (Huxley 190). In future-Mattapoisett, Connie from the present is astonished by the profusion of art appearing all over the translucent panels in a room she visits, and even more astonished to learn the art was created by average people and not professional artists (Piercy 67).

The lack of a sharp boundary in these three societies between “creative” people and “ordinary” people also means that the best artists (such as Jackrabbit in Woman on the Edge of Time) and scientists (such as Ranga in Island) are not, and do not expect to be, exempted from such tasks as farm work and cooking. In Looking Backward, by contrast, “brain workers” and “hand workers” are largely separate categories (Bellamy 137–138) and book authors get furloughs from the industrial army (Bellamy 200). (Walden Two is closer in this regard to the decentralized utopias, expecting physical labor from creative scientists [Skinner 56–57]).

Conversely, the decentralized societies ascribe dignity and creative potential to paid jobs that current Western societies regard as menial. For example, the Ecotopian wire service clerk Jerry at first annoys the American reporter Will by reading and commenting on his dispatches instead of simply “doing his job” by sending them out quickly (Ecotopia 27). But later Will’s attitude changes: he has a dream about trying unsuccessfully to telephone his Ecotopian lover from New York, and wakes up appreciating Jerry who would
make the effort to complete the call “even if it had to go via Timbuktu, because he could tell it mattered” (Ibid. 208).

**Brain Pathways for Utopian Functioning**

What can be said about the impact on brain function of human interactions shaped by the Compassionate Revolution? In particular, how are the features of that revolution and of decentralized utopias—Independence-based child-rearing, fluid families, emotional openness, mediation-based conflict resolution, gender equality, and democracy of creativity—manifested in brain processes? This section explores evidence from cognitive neuroscience suggesting that those features of interpersonal social interaction foster optimal brain functioning. The available knowledge from brain-behavior interactions is sketchy enough not to constitute definitive proof but extensive enough to generate plausible arguments. The arguments will be strengthened when future results emerge from the novel but growing field of social neuroscience, which describes interactions between the brain and social systems (Cacioppo and Berntson).

**Child Rearing and Fluid Family Units**

Childhood patterns of good or ill treatment have effects on the brain that last through adulthood (Eisler and Levine; Perry et al.). The wiring in the frontal lobes, the key part of the brain for our character and moral development, is not fully developed until a person is in her or his mid-20s (Thompson et al.). Social influences on brain development partly explain why children raised in a caring manner tend to become caring adults (Eisenberg 64–131), and therefore able to encode behavior rules appropriate for living in a utopia. Also, critical thinking skills are most likely to last through adult life if those skills are taught early in childhood. Exposure to influence from multiple adults should enhance the development of both cognitive and moral skills because cognitive psychologists have shown that a skill is typically learned best when it is learned from more than one source (Schmidt and Bjork).

**Emotional Openness**

Recent findings in neuroscience have increasingly pointed to the important role of emotions in human decision-processes. Antonio Damasio ran tests on several patients who were damaged in the orbitofrontal cortex, the area of
the frontal lobes that processes emotional and social stimuli. He found those patients were terrible decision makers even if their cognitive abilities were largely intact (34–51). The decision-making deficit occurs because lacking emotional involvement in the possible outcome of a decision, the patients have no basis for deciding on one reasonable course of action over another. Damasio concluded that effective decisions require strong connections between emotional and rational parts of the brain. This finding suggests that social mores that encourage people to be honest in showing their emotions to others indirectly enhance the accuracy of communication of all types of information.

Mediation of Conflicts

Brain functioning is likely to be enhanced, on the cognitive as well as the emotional level, if conflicts are regarded as situations where all parties are likely to gain something. Mediated conflicts are less likely than adversarial conflicts to generate high levels of brain-stress hormones such as cortisol that are involved in fight-or-flight responses. While cortisol is useful in responding to emergency situations, chronic high cortisol levels are harmful to both cognitive and emotional functioning by putting strains on the frontal-lobe executive system. In extreme cases, this stress accounts for enduring brain deficiencies in adults who were chronically abused as children (Perry et al.). In less extreme cases, chronic or severe stress tends to reduce the flexibility of neural connections in the hippocampus, the brain area involved in consolidating memories, and thereby impairs cognitive functioning for a short time after the stressful event (Sapolsky). By contrast, successful conflict resolution often generates positive affect, and positive affect can enhance cognitive functioning by a mechanism involving dopamine, the neurotransmitter associated with rewards (Ashby, Turken, and Isen).

Gender Equality

Female influences enhance the likelihood of tend-and-befriend responses to social conflicts (Taylor et al.). Taylor and her colleagues note that such responses, including mutual grooming in female animals and supportive social bonding in women, are mediated by the hormone oxytocin, which was first observed in connection with lactation. Bonding has been studied in two species of rodents that are closely related but have radically different social or-
ganization: the *prairie vole*, which is monogamous with strong male-female pair bonding and both parents involved in care of young, and the *montane vole*, which is promiscuous with fathers uninvolved with young (Insel et al.). Oxytocin attaches to reward-related brain areas in the pair-bonding prairie vole but not in the promiscuous montane vole.

In male prairie voles, a different hormone (vasopressin, associated with protective behavior) plays a stronger role than oxytocin in promoting pair bonding. Yet this does not mean that oxytocin and its stress-reducing effects are for females only. In prairie voles, partner preference development in either sex requires intact brain-receptor molecules for both oxytocin and vasopressin (Cho et al.), and in humans, oxytocin administered through the nose induces trust in both sexes (Kosfeld et al.). All this evidence is still circumstantial, but suggests that an overall decrease across society in levels of stress hormones and situational increases in levels of oxytocin (a hormone which only lasts a short time in the body) are part of the neurological basis for healthy social functioning. Such an outcome is likely to involve empowerment of women and reduction of social stress for both women and men (Eisler and Levine 41–46).

**Democracy of Creativity**

Future developments in social neuroscience are needed to provide coherent theories of differences between societies where everyone is encouraged to be creative but also asked to do menial tasks and societies where a few are creative while the majority do mostly menial tasks. The knowledge we have now, though, suggests that expressing creativity is closely tied to the universal human need for exploration to make sense of one’s environment (Deci and Ryan; Harlow and Harlow). Behavioral studies of group creativity on mundane problems show that encouraging the capacity for exploration enhances the ability to arrive at solutions that are both novel and effective (Rietzschel, Nijstad, and Stroebe).

**How Far Can Social Engineering Go?**

Are our brains powerful and flexible enough to work together in creating and maintaining a society incorporating principles of the Compassionate Revolution? Or are there inherent limitations in human nature that doom us to fall short of the possibilities embodied in decentralized utopias such as those of
Callenbach, Huxley, and Piercy?

We cannot answer this question with complete confidence. Yet the more we learn about our brains, the richer becomes the range of imaginable possibilities for the types of behaviors and cognitions that our brains can encode—specifically, for the types of rules we can incorporate about what actions to perform, and what actions to refrain from performing, in what contexts (Bunge and Wallis). Again, growth of knowledge in the area of social neuroscience will provide more answers in the near future.

Recall the three large regions of the frontal lobes involved in rule setting: one region processes emotional and social cues; another detects errors or conflicts; and a third resolves conflicts and links working memories. A fanciful analogy has been made between these three brain regions and the three branches (legislative, judicial, and executive) of the United States government (Levine, *How Does the Brain* 171). The emotional/social processor (orbitofrontal cortex) is legislative: it judges appropriateness of actions using the “pulse of the people” (the “people” being the brain’s emotional regions). The error detector (anterior cingulate) is judicial: it reins in neural patterns of the other two areas that stray too far from principles of effective behavior. The working memory region (dorsolateral prefrontal cortex) is executive: it has the specialized expertise required to create and try out significant behavioral “policies.”

Connections of all these regions with each other and with the brain’s sensory, motor, and emotional regions seem to be heavily influenced by learning, particularly from childhood development but also from adult experience. Continuing the governmental analogy, the plasticity of brain connections enables a range of possible outlooks from “ultra-liberal” to “ultra-conservative.”

Levine (*Angels, Devils, and Censors*) reviewed brain interactions involving all three regions of the frontal lobes discussed here and several other regions, which could mediate an individual’s gradual transition from more restrictive to more fulfilling rules of behavior. The research psychiatrist Robert Cloninger defined such growth in terms of development along three character dimensions: *self-directedness* (relating to acceptance of the individual self); *cooperativeness* (relating to acceptance of other people); and *self-transcendence* (relating to acceptance of nature in general). He emphasized that levels of these dimensions were largely determined by development not by genetic differences between individuals. This finding suggests that most normal in-
individuals are open to developing a considerable range of possible rules of behavior. In particular, most normal people probably have the capacity for a range of social interactions from utopian to dystopian.

Interactions between brains and society are not understood well enough for us to draw firm conclusions about the range of social arrangements possible with the brains we have. Yet the large body of data we already have about brain connections suggests no inherent limitations that make the Compassionate Revolution or decentralized utopian societies impossible.

Sociologists sometimes argue that societies have dynamics of their own that cannot be reduced to the dynamics of their individual members (Durkheim). Yet the current mainstream in sociology believes there is constant mutual influence between individuals and societies. Societal norms for behavior constrain the possible actions of each individual whereas individual needs constrain the possible structures and customs of society (Giddens; Habermas).

A belief in strong societal influences on character does not imply that each human being is a “blank slate” at birth (Pinker, Blank Slate). While Cloninger noted learned aspects of character, many other important aspects of human personality are believed to have a strong genetic component. Yet genetically influenced personality traits can also be strengthened or weakened by social interactions and customs. One such trait is need for cognition (Cacioppo and Petty), defined as the motivation to enjoy effortful cognitive activity and to analyze arguments deeply. Another is need for closure (Webster and Kruglanski), defined as the motivation to come to decisions and opinions quickly, often without having thought through the relevant issues. The decentralized utopias of Callenbach, Huxley, and Piercy tend to enhance and fulfill their citizens’ needs for cognition. By contrast, the imposed utopias of Bellamy, More, and Skinner tend to provide their citizens conceptual closure at the sacrifice of optimal cognition.

Yet some neuroscientists remain skeptical about how much human behavior can be changed by social arrangements. One of them is Michael Gazzaniga, a pioneer in “left and right brain” research who was a member of President George W. Bush’s ethics panel. Gazzaniga contrasted two common views of human nature and society. One view, which he called externalist, is that society should set up structures, agencies, institutions to help manage the individual’s affairs (Gazzaniga 191). The other view, which he called internal-
Gazzaniga argued in favor of the internalist view, based on results from psychological experiments showing that external rewards have little effect on people’s beliefs. In one experiment, Yale students who disapproved of the police’s handling of a riot were asked to go against their beliefs by writing an essay in support of the police, and were offered varying amounts of money to write this essay (Cohen). After writing, these students were again asked their opinions about the riot. Those students offered the most money changed their beliefs the least after writing the essay. Gazzaniga explained the Yale results using the brain’s organization into distinct subsystems. If one subsystem generates behaviors in response to rewards or punishments, it can remain largely separate from another subsystem that generates beliefs. The greater the rewards for an action, the more the person can attribute the action to the reward and not to his or her own beliefs. He used the separateness of behavior and beliefs to explain why externalist social programs often reduce individual initiative and fail to reach their goals.

Yet government social programs can facilitate responsible actions by individuals who are already motivated toward those actions. In the 1970s, for example, my mother’s father was over eighty years old and could no longer care for himself. He lived in Toronto but wanted to move to California to be with my mother. She wanted to move him into a managed apartment or retirement home in her area, but he stayed in Toronto because the Ontario provincial health insurance system paid for ninety percent of his care at a high-quality retirement center. If the United States or the state of California had also provided a comprehensive government health insurance system, my grandfather would have been able to get the same care in California, and my mother could then have been more actively involved in seeing to his day-to-day welfare.

In the decentralized utopias of Callenbach, Huxley, and Piercy, governments enact enough laws and programs to ensure fairness, prevent poverty, and facilitate personal creativity—including entrepreneurship in the case of Ecotopia. However, those governments do not run the economy or make most major decisions, as they do in the societies of More, Bellamy, and Skinner.

The internalist outlook Gazzaniga favors sounds hostile to utopian
social visions. However, the data he cited can be interpreted as favoring decentralized but not imposed utopias. They suggest that individual initiative would be reduced in an imposed utopia, but not in a decentralized utopia with a less intrusive form of activist government.

Conclusions

The biological processes we have discussed here are manifestations of the brain’s overarching function, which is to mediate between the rest of the body and the environment. In order to perform its function, it must be open to virtually any type of powerful influence from the environment, including influences from cultural customs and official institutions. That means that the brain regions discussed in this article have the potential to be involved in creating either a utopia or dystopia, or anything in between. So the answer to “where is utopia in the brain?” is “everywhere, and so is its opposite.”

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Endnote

1 Feminist influence is also notable in Ursula Le Guin’s cooperative society of Anarres, which had arisen out of a female-led rebellion against another society. However, Anarres is rule-bound and hostile to the individual freedom of the male protagonist and his female partner, both of them creative scientists.

Works Cited


Cloninger, Robert. “A New Conceptual Paradigm from Genetics and Psychobiology for the Science of Mental Health.” *Australia and New Zealand
Levine  Where Is Utopia in the Brain?


___.* Introduction to Neural and Cognitive Modeling*. 2nd ed. Mahwah, NJ:
Levine Where Is Utopia in the Brain?


Sapolsky, Robert. “Stress and Plasticity in the Limbic System.” Neurochemical


