# 6
# Remaining Open to Change

The German nobleman Baron Friedrich von Humboldt was one of the great thinkers and scientists of the late Eighteenth and early Nineteenth Centuries. But there was one occasion when he distinctly didn't act like a model scientist. He was visiting a friend in Paris who was a doctor specializing in mental disorders and expressed a desire to dine with a lunatic. The doctor was happy to oblige him and arranged for the two of them to eat with two other men whom Humboldt had never met. One of the two strangers was polite, aloof, and silent throughout the meal; the second was unkempt, eccentrically dressed, and a nonstop talker. Toward the end of dinner Humboldt whispered to the doctor, his eyes fixed on the unkempt man: "I like your lunatic: he amuses me." The doctor replied, "But it's the other one who's the lunatic. The man you are looking at is [the novelist] Honoré de Balzac."[1]

Humboldt's misperception of who was insane was a classic example of decision making using what the psychologists Amos Tversky and Daniel Kahneman called *representativeness*.[2] That is, people judge a person or object as more likely to be a member of a category if they show characteristics that the person considers representative of the category (in this case, sloppiness and incessant talking as representative of lunacy). Representativeness can be useful because we often need to make quick decisions in complex environments. But relying too much on representativeness can lead us astray and perpetuate common nonsense about particular groups.

Most of us are at times caught making judgments of the sort that Humboldt made. We are usually embarrassed when it happens. We all agree that avoiding narrow stereotypical connections and cultivating mental flexibility is generally a good thing (as long as it doesn't interfere with holding on to a strong set of values). Can neuroscience and neural network theory give us any clues about how to make it happen more easily?

I believe they can. If so, that puts the lie to the common nonsense that deeper scientific — and, especially, mathematical — study of our personalities is inherently dehumanizing.* Many social commentators, such as Theodore Roszak and John Saul, have discussed how the last few centuries in the West have been characterized by an ascent of rational, technical values (in Saul's words, a "dictatorship of reason"). This resulted from a feeling that we have triumphed over superstition and learned to manipulate nature for our benefit.[3] This has led, Roszak and Saul argue, to devaluing everything spiritual or emotional,** which has created the West's current widespread sense of meaninglessness.

I agree with Roszak and Saul, and have no faith that a "technical fix" will lead us out of this pass. But I also agree with Evelyn Fox Keller[4] and some other philosophers of science that a reinvented science can and should play a role in restoring value to the human spirit. In doing so, science should not be a dictator but a partner with the humanities, social sciences, arts, religion, politics, and many other pursuits.

One step toward being able to change society in a spiritually meaningful way is to understand how our brains — including their cognitive categorizing functions — adapt to situations and moods. Neural network models that have been constructed for categorization can be adapted to neural network models of *flexible, context-dependent* categorization. Preliminary examples of such models have already been implemented. One example comes from an unlikely source — an economic model of consumer preference. Specifically, this is a network that the interdisciplinary social scientist Sam Leven and I developed to model the change in soft drink preference that occurred when a new flavor of Coca-Cola was introduced in the mid-1980s[5]. The change in context from controlled taste tests to "the real thing" (the market) led to a change in mood which altered most consumers' preferences.

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* A book by the Unitarian Universalist minister Sarah Voss (*What Number is God?* SUNY Press, Albany, 1995) discusses ways that mathematical concepts can serve as metaphors for the divine. (The book was based on the author's Doctor of Ministry dissertation at Meadville/Lombard Seminary, entitled *Metaphor, Metaphysics, and Metamathematics*.)

** One consequence of this has been devaluing of the feminine, although that started many centuries before the scientific revolution. I believe that gender equality is required to bring about urgently needed global changes in society and consciousness (see Chapters 8, 10, and 12 for more).

## The Lessons of Coke

When the Coca-Cola Company introduced New Coke, it was certain of the flavor's acceptance. Tens of thousands of subjects had been involved in highly controlled taste tests, conducted by leading research firms. The new flavor had outscored Old Coke in a blind taste test by a margin of 2 to 1. This popularity seemed to be based on the fact that New Coke was sweeter than Old Coke and that Old Coke had been losing ground to Pepsi among the younger generation — because Pepsi was sweeter. Further tests suggested that fewer than ten percent of the Old Coke-drinking public would object to the new flavor combined with the old name.

As most Americans know, however, the actual market situation had vastly different results. The new flavor of Coke was so unpopular that, after its introduction, the company had to return Old Coke to the market.[6] What went wrong?

Coca-Cola had asked people to imagine future states of mind. But the influence of emotional states, which are dynamic and depend heavily on contexts, means that mental projections of the future are often inaccurate. Specifically, in the test situation, the public was basing its preferences mostly on the direct appeal of taste. In the actual buying situation, indirect emotional factors, such as the memories associated with the expected taste and its familiarity, became more important than the taste itself.

Moreover, the market situation was different from the test situation in yet another way. In the market situation, *the alternative of Old Coke was unavailable*. The public's reaction against buying New Coke could be seen in psychological terms as a *frustrative rebound*; that is, a feeling of displeasure when an expected pleasant stimulus doesn't arrive.[7] The Coca-Cola label on the product created an expectation of a particular taste, and the secure feeling it evoked. When the expected secure feeling didn't occur, there was a cognitive mismatch and a feeling of frustration. This led in many people to a reaction against Coca-Cola products in general, and in favor of Pepsi and other competitors. Moreover,

experimental psychologists showed this reaction was strongest in those people who had previously been the most enthusiastic Coke drinkers[8]!

Frustrative rebound is an example of comparing current with expected or ongoing reinforcement. Just as removal of a negative reinforcer (e.g., electric shock) is positively reinforcing (provides relief), removal of a positive reinforcer, or its absence when it is expected, is negatively reinforcing (provides frustration).

Sam Leven and I constructed our "Coke-buying" network by interconnecting smaller networks designed to perform simpler functions.* It combines the *gated dipole* network[9] (see Chapter 5) which models pairs of opposites, including positive and negative emotions, with another neural network that models categorization.[10] The larger network includes representations of sensory features, categories of objects, and drives; each one of these and its opposite or absence is coded by its own gated dipole. The attributes of drinks that the network encodes are Coke label; Familiarity; Taste; Pepsi Label.

The theory assumes for simplicity that the consumer's behavior is motivated by two drives — one for pleasant (sweet) taste and one for a sense of familiarity. The network nodes for these drives are assumed to be analogous to actual brain motivational regions. The test and market situations differ in the relative importance of competing drives. In the test situation, the intrinsic (taste-related) attractiveness of the product is important, and the socially learned attractiveness of the product is unimportant. So the Taste attribute plays a larger role in decisions during the test situation than does the Familiarity attribute. The Familiarity attribute, on the other hand, plays a larger role during the market situation, because socially learned attractiveness is more important. For this reason, New Coke, which was attractive in the test situation due to its taste, became unattractive in the actual market due to its sharp contrast with the expected taste of the older flavor.

* A detailed description of the "Coke" network can be found at "Multiattribute Decision Making in Context:..."

## REMAINING OPEN TO CHANGE

What can we learn from the final outcome of the Coke episode, which appears so "common sense" in hindsight but caught the company's executives by surprise? It is above all a lesson on the variability of any person's responses, even his or her memories. This is supported by the work of Gordon Bower, O. K. Tikhomirov and many other psychologists, who have shown that memory is heavily influenced by mood or emotional orientation.[11] Bower hypnotized subjects to be in a happy or sad mood. Subsequently, events learned during one type of mood tended to be remembered while the subject was in the same mood and forgotten in the opposite mood. Tikhomirov gave all of a group of subjects the same mental problem to solve, but divided his subjects into two groups and gave them different background descriptions of the experiment. He told one group the problem was a serious evaluation of their important capabilities, and told another group simply to solve the problem. He found systematic differences in problem solving strategies between the two groups. Subjects told that it was a test of their intellectual abilities acted more motivated than the other subjects: they tended to come up with a greater number and variety of alternative solutions, and to spend less time on a single possible solution.

The ability of people's preferences to change due to context might lead some readers to despair about human emotional stability. But looked at another way, this emotional plasticity provides many reasons to be hopeful about human behavior. It means that how people are acting currently may not represent invariant traits but only the way they act *in the current mood or environment*. That is, "what you get is more than what you see."

Neural network theorists often study a particular, small set of behavioral or cognitive data as a means of understanding a wider class of functions. In the case discussed here, the Coke data provide a window on a range of other context-dependent or mood-dependent mental phenomena. We hope this will help us understand effects of context on beliefs and on some basic personality traits.

For example, stereotyped beliefs and categorizations can change quickly with context, and such a change may or may not be permanent. When whites and blacks have to fight together for survival, as in war, even the most hardened white racists often can work effectively with black fellow soldiers. Similarly,

many sexist men lose their sexism when they have "traditional male" jobs at work that need to be done, when only a woman is available to do them, and she does them well and pleasantly. For another example, it is common for urban drug addicts to be "cured" of their addiction when in a supportive, sheltered environment away from the city, but go back to their addiction when they return to familiar streets and neighborhood friends.[12]

In casual conversation, we like to say that a person at a given time "has" a particular trait or that she or he is "heading" in a particular mental direction. The examples I have discussed of behavior changing with the context suggest that the very idea of "having a trait" or "heading mentally in some direction" may be common nonsense. Often, a person has the potential to go in any of several mental directions at once, and outside influences can selectively encourage any of these directions.

Like individuals, societies often have volatile periods when they can go in more than one possible direction. During the Reagan Presidency of the 1980s, for instance, it was generally believed that the American electorate was heading to the political right. But the socialist leader Michael Harrington disputed this conventional wisdom.[13] On the contrary, Harrington said, the American people were heading "right, left, and center." He meant that the public's preferences, shown by responses to polls about issues, were not globally consistent with any one of the three classical political outlooks of right (conservative), left (liberal), and center (moderate). Moreover, average people's responses had points in common with all of these classical outlooks. They tended to feel strongly about the need to stop crime and community breakdown (right) but also feel that poor people needed a fairer shake (left) and that the economy should reflect a mixture of market and government power (center). Because of their conflicted feelings, suitable leadership could sway the public in any of these three directions.

**Looking the Dragon in the Face**

If contexts don't change, on the other hand, stereotypical beliefs can be hard to dislodge because they set into motion a selective attention toward events which confirm the stereotype. The social psychologist Mark Snyder (see Chapter 1, Case 1) found that if subjects were cued to believe that a person would be an extrovert, they asked that person questions phrased to encourage her or him to respond as an extrovert. He concluded that people develop hypotheses about others, and then engage in "the preferential soliciting of behavioral evidence whose presence would tend to confirm" their theories.[14] We look for information which diagnoses the other person according to the categories we have already established, even after those categories become inappropriate.

The behavior of Snyder's subjects is reminiscent of the "frontally damaged" version of the card sorting network (MART) of Figure 4.2. They develop a nearly unbreakable positive feedback loop between their categorizations and their perceptions, which is analogous to the feedback between categories and habits by frontal lobe patients on the card sorting test.

Stereotypes are tempting because they are usually based on a small core of truth, even if grossly exaggerated or distorted. Recall, for example, the stereotypes of Jews as being dishonestly shrewd and conniving, and of African-Americans as being lazy and happy-go-lucky. These conceptions are of course socially harmful; they blind their believers to the potential contributions of honest Jewish people and hard-working black people, both of which constitute the vast majority of those groups. But try to imagine reversing the two stereotypes, seeing Jews as lazy and blacks as shrewd, in the negative sense: it doesn't seem plausible.

Likewise, the stereotypes of males as aggressive and females as nurturant are based on outward observations of behavior, even if the behavior is sometimes caused by social roles rather than causing them. Moreover, such gender differences appear to be fairly well documented in other animals such as rats,[15] and some biologists have extrapolated them (without complete justification) from other animals to humans.

Stereotypes also sometimes become stronger if contexts do change but *too rapidly*. People confronted with too many situations they don't know how to deal with often cling to "tried and true" ideas,[16] including their prejudices about other people or groups. Later I will discuss the management theories of Chris Argyris which hint that clinging to tried and true responses in such high-risk situations is often maladaptive behavior, because those may actually be the best times for bold experimentation!

Is the situation hopeless? I think not, but combating harmful stereotypes is hard. It depends on careful study of the dynamics of social systems. While social systems are not exactly like the neural systems of individuals (see the discussion of sociology in Chapter 1), societies are constrained by the beliefs and behaviors of the individuals within them.

If we see people engaging in bigoted behavior, the analysis herein suggests that we shouldn't attack their beliefs as totally wrong, at least not to their faces. This is because of the "gated dipole" (see Chapter 5) tendency for people to think in terms of pairs of opposites. Attacking bigots directly is likely to make them dig in their heels and reinforce their bigotry. Rather we should try, if possible, to redefine the issues, to meet the bigots on their own terms, to see what they are trying to accomplish and whether there is partial validity to their complaints. For example, some Americans are drawn to anti-democratic militia groups or restrictive churches because the materialism of American society deprives them of some sources of meaning in their lives, and they are desperate for someone to give them values. Rather than attacking such people with epithets like racist, fascist, or sexist, those of us who believe in democracy should look for ways to reach out to these people by integrating spiritual values into our political and economic systems. (In succeeding chapters I will discuss the *politics of meaning* movement that tries to do this.)

One effective method for negotiating with bigots is illustrated by a passage from a modern American political novel, *The Wanting of Levine* by Michael Halberstam.[17] The title character of this novel is a Jew who is running for President. The passage recalled an incident long before the campaign, when he coveted a piece of land in Vermont that was for sale, but was told the owner was anti-Semitic and would never sell to a Jew. After he got there, Levine sized up the situation and realized that the owner was a traditional

New England Protestant who placed a large value on keeping up the land and house. The owner held a negative stereotype of Jews as aggressive city people who don't value rural tradition. So Levine engaged in a leisurely conversation with the man, in which he promised to restore certain nice old parts of the house that had fallen into disrepair. He won the "anti-Semite's" confidence and the sale was his. Some fictional utopian societies, such as Aldous Huxley's *Island*,[18] use similar gentle techniques to correct children who are seen to have the potential for later anti-social behavior (which, in their system of values, includes the potential for becoming dictators.)

Sometimes, "bigot" or "racist" or "sexist" is unfairly used to describe someone who really isn't prejudiced but has an agenda of his or her own that's not directly related to the object of prejudice. People interested in social change hurt their own cause by being too quick to use nasty words for such a person.

For instance, the 1994 elections for the United States Congress were distinguished by a mass movement of white male voters toward the Republican Party, whose candidates were mainly opposed to government social programs designed to help the poor and minorities and women. Many liberals were quick to label this voter revolt as "racist" and "sexist," thereby writing off the potential future support of a large part of the electorate. But the revolt was not really anti-black or anti-woman or anti-gay so much as pro-white heterosexual male. As a white heterosexual male who is also a social progressive, I had been uncomfortable with parts of the prevailing progressive rhetoric and could empathize with the revolt, though I wasn't part of it. The liberal rhetoric, in focusing on the needs of blacks, women, and gays, had developed its own common nonsense that white male heterosexuals were oppressors *by nature*. This neglected the fact that the majority of straight white men were, and still are, struggling with economic and spiritual insecurity like everyone else. Some liberals had unconsciously acted as if just because the majority of the very rich and powerful are white, heterosexual, and male, the reverse is true and the majority of white heterosexual males are rich and powerful (an error that anybody versed in symbolic logic should catch immediately!) Since these white male voters perceived, probably wrongly, that progressives had nothing

to offer them, the reactionaries were able to step into a vacuum that should never have been there in the first place.

Another case of people unfairly being labeled as bigots was the Boston school busing crisis of the mid-1970s.[19] The city was segregated by both race and ethnicity, so Boston Irish-Americans, like most white Americans, had some degree of racism. Then a judge imposed a busing plan requiring white children from many ethnic enclaves to travel to currently segregated schools in black neighborhoods. Most Boston Irish objected to busing for appropriate reasons: they didn't want their children to travel far from home, nor to attend schools in unsafe areas. When the media and academicians accused them of racism, the Irish denied any anti-black sentiment. As accusations persisted, however, they became publicly hostile to blacks. The stands taken by the Boston Irish, some of them as poor as the blacks, led many liberals to write off an entire group of people as racist. Here, as elsewhere in the country, these liberals lost many potential allies, which was one of the main causes of the Democratic Party's decline in the 1980s.[20] It would have been wiser for liberals to publicly empathize with the motivations of the Irish that were based on community and family pride.

The effects of beliefs were included in yet another neural network model, a model by Samuel Leven and Wesley Elsberry of negotiation between two trading partners.[21] Each agent's decision making is composed of and influenced by emotional, automatic/instinctive, and semantic/cognitive components, in a manner reminiscent of the triune brain of Paul MacLean;[22] see Figure 6.1. Context sensitivity and emotional response in this network are modeled by a variant of the adaptive resonance theory model of categorization (see Chapter 4). During the negotiation process in this network, each agent sets up expectations, based on its own past experience, of the other agent's likely response to its actions. Then, the other agent's actual responses occur and are compared with expectations via a mechanism similar to the gated dipole (see above), a network which models effects of novelty and expectation.

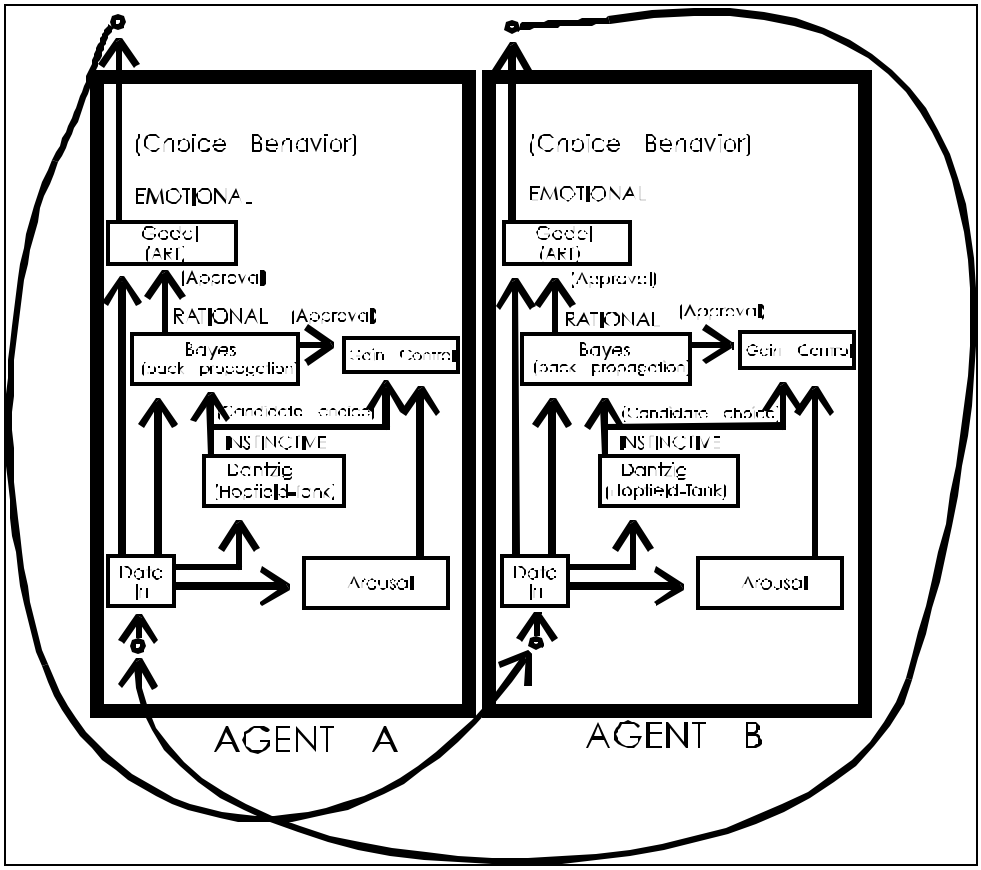


Figure 6.1. Multiagent neural network. Each large box contains an "agent" with automatic, affective, and reasoning components. These components are named respectively after three famous mathematicians (Dantzig, Gödel, and Bayes) whose main scientific contributions can be considered analogous to these capabilities (see the text for an explanation). Back propagation, ART (link to ART Networks), and Hopfield-Tank are the three common neural network architectures used for these components and are not shown in full here. Gain control and arousal are two ART network parameters that regulate the network's tolerance for deviation from expected or desired results. (Adapted from Leven and Elsberry, 1990, copyright © IEEE; reprinted by permission of the publishers.)

The three parts of the Leven and Elsberry's neural network are named after mathematicians whose names Leven had previously borrowed to represent three different human decision styles.[23] The automatic component was named after George Dantzig, the founder of the mechanistic method of linear programming, after whom Leven had named the style that involves solving a problem by the same method repeatedly.

The semantic component was named after Thomas Bayes, developer of some rules for conditional probability, after whom had been named the style of "playing the percentages," that is, optimizing among a fixed set of alternatives. Finally, the emotional component was named after the maverick logician Kurt Gödel of Gödel/Escher/Bach fame, who lent his name to the style that values creative leaps, innovation, and intuition.

Leven and Elsberry suggested that their multiagent, multimodule expectation-comparison mechanism could mimic interactions between principals in international trade. The composition of each agent in their network, consisting of three modules with separate functions, emulates some of the processes that affect bargaining responses, such as acculturation/socialization, accommodation to the environment, and effects of education on beliefs. A classic example is the interactions between the United States and Third World oil-producing countries (OPEC). From the 1920s to 1973, growing American control of the oil market, combined with a Western sense of technological superiority, made Americans assume that Arabs and other OPEC producers were less competent and sophisticated than themselves. In 1973, though, the Arabs reduced the amount of oil available on the world market, inducing a panic in the "sophisticated," "competent" nations. Like the gated dipole neural network (Chapter 5) that responds selectively to surprising events, Americans responded to the element of surprise in the Arabs' new assertion of control by exaggerating their perceptions of the Arabs' power of the Arabs and diminishing their perception of their own power. The Americans started acting in a manner analogous to the behavior of experimental animals who learn to feel helpless in controlling their environments.[24] The decrease in American economic power spread quickly from the oil industry to a variety of other industries.[25]

**Taming the Dragon**

The analysis of OPEC in the model of Leven and Elsberry includes formation, development, and crumbling of a stereotype held by one group about another.[26] It shows that the positive feedback loop

between categorizations and behavior can be broken. Breaking the loop requires a change in context, particularly a change created by a newly significant need (see also the Coke model above).

Sometimes beliefs change faster when the context catches people by surprise. An example is the experimental study by Robert Rosenthal and Lenore Jacobson (see Chapter 1, Case 1) of grade school students in South San Francisco who were randomly divided into two groups that were roughly comparable in performance on intelligence tests.[27] When the teachers gave more encouragement to the students they believed had more ability, the students' performance reflected this encouragement.

Combating common nonsense involves challenging conventional wisdom even as one understands it deeply. This suggests cultivating the habit of seeing events from several different perspectives at once. The philosopher and semanticist S. I. Hayakawa called this capacity an *extensional orientation.*[28] Mark Twain said that "travel is the enemy of bigotry, narrow-mindedness, and prejudice." His statement could be interpreted as referring not just to physical travel to different countries but also to "travel" in conceptual space. That means sometimes making a deliberate change of context: taking on a different job or hobby, for example, or trying to see things from another person's viewpoint. This is not a grim moralistic prescription but one that makes the life of the mind more fun.

Nonstereotyped thinking can have good consequences in many areas of life. One of these areas is job structures and images of professions. In industrial labor unions this is pointed up by the distinction between the original American Federation of Labor (AF of L) and its younger partner, the Congress of Industrial Organizations (CIO), founded by John L. Lewis in the 1930s. By and large, AF of L unions are distinguished by the type of job the person performs (e.g., electricians, machinists, carpenters), whereas CIO unions are distinguished by the type of industry the person is affiliated with (e.g., mine workers, automobile workers). Lewis' innovation allowed for more coherent organization among employees who toil side by side in the same work place. In academic professions, the traditional categories (e.g., psychologist, historian, mathematician) are analogous to AF of L trades. The last twenty to thirty years have seen a growth of new interdisciplinary categories (e.g., neuroscientist, neural network theorist, cognitive scientist,

materials scientist, environmental scientist, partnership theorist, decision theorist) that are analogous to CIO trades. These interdisciplinary areas are where some of the more exciting advances in knowledge are now being made.

One of the best ways to overcome stereotyped thinking is to judge groups of people not by their most typical members but by members who exhibit the most desirable traits. For example, in looking at the majority of American professors, it is easy to fall into statements that academic people are stuffy, are uninterested in the social relevance of their work, are engaged in trivial and esoteric research, and so forth. But if one looks at the most forward-looking people *within* the academic profession, it is much easier to feel more hopeful, since significant minority groups of professors are deeply devoted both to pursuing "big ideas" and using them to promote positive social change. Ideas on reinventing the image of groups appear in S. I. Hayakawa's book, which used psychology and cognitive science to help form guides for day-to-day actions. Hayakawa reminded us that "No Word Ever Has Exactly the Same Meaning Twice,"[29] or more specifically, "$\text{Cow}_1$ is *not* $\text{Cow}_2$ ... $\text{Jew}_1$ is *not* $\text{Jew}_2$ ... $\text{Smith}_{1939}$ is *not* $\text{Smith}_{1940}$ ... ."[30] This same sentiment is symbolically, if graphically, expressed by the God of the ancient Hebrews: "If I find at Sodom fifty righteous in the city, I will spare the whole place for their sake" (*Genesis* 18:26).

This type of flexibility in categorization is at the heart of our abilities to empathize with other people, to see them as individuals and members of categories but not as stereotypes. And such flexibility is enhanced by positive moods, as the experimental psychologist Alice Isen has shown.[31] This has been the subject of a primitive neural network model, including the effects of dopamine, the neurotransmitter most prominent in the brain's reward systems.[32]

Flexibility of category formation in neural network models can be taken even further. I have worked on some preliminary models in which context can not only change the boundaries of categories but can change the *level of complexity* of categorization. The ability to change levels enables novel syntheses of apparently conflicting ideas such as power and generosity. This type of synthesis is a basic prerequisite for self-actualization.

"What you get is more than what you see" applies not only to people's views of others but to their views of themselves! Those who stereotype others often have constrained views of their own personalities, and those who categorize others more flexibly often have flexible views of their own personalities.

**The Psychology of Role Playing and Role Breaking**

Constrained thinking often leads people within groups, families, or societies to play interacting and complementary, but each quite restricted, roles. Sometimes people defend the complementary roles as necessary to hold a family or society together. But the results of doing this often look uncomfortably like the fictional, dysfunctional Caribbean republic of San Lorenzo in Kurt Vonnegut's novel, *Cat's Cradle*.[33] That country's regime was founded by two men who had been close friends and collaborators, McCabe and Bokonon. Then McCabe became President and Bokonon his opponent. Bokonon hid out in the jungle and delivered periodic religious prophecies and philosophical insights. He became the persecuted holy man whom the people secretly revered, with McCabe (and later his successor, Papa Monzano) being the persecuting tyrant. But as average people were not told, McCabe and Monzano themselves revered the holy man just as much as anyone else did. They deliberately set up Bokonon's opposition to create a "dynamic tension" that made average people tolerate their own poverty and powerlessness, and prevented any real change in their unproductive society. Not only did ordinary citizens suffer, but McCabe and Bokonon themselves each paid a severe psychic price, one losing touch with his gentleness and the other with his aggressiveness.

We need not look further than modern American society for similar, if less extreme, rigidity. The black power activist Eldridge Cleaver devoted a chapter of his book to the four separate roles into which our capitalist system has tended to place white men, white women, black men, and black women. These roles can be summed up, respectively, as unemotional masters, artificial beauty objects, disposable gladiators, and images of sin.[34] The situation has improved somewhat since Cleaver wrote in 1968,

because more women and blacks have entered well-paying occupations previously reserved for white men. But the psychic scars from role limitations, on all races and both sexes, are still largely present.

The same kind of rigid role complementarity can also occur within single families. The maverick psychiatrist R. D. Laing, studying schizophrenic behavior in several young women, regarded such behavior as a response to intolerable and mutually contradictory demands on the patient by her family of origin.[35] In Laing's view these families themselves are pathological, but label the individual (the "indicated patient") as "sick" in order to be able to call other family members "healthy." Even in less pathological families, roles are often divided among siblings or spouses; one could be, say, the "brainy one" and the other the "popular one."

This insight has informed one of more popular techniques of psychotherapy, *role reversal* (as developed, for example, by Jacob and Zelda Moreno[36]). This is a part of psychodrama, done mainly in group therapy sessions, whereby a person literally acts out roles of significant other people in her or his life, such as parents or marital partners. The people she or he imitates might or might not be present for the drama. People performing role reversals are often initially nervous, but if their character structure is reasonably strong to start with, they can find acting in an unfamiliar role both absorbing and refreshing. (If their character structure is weak, the technique isn't recommended at all.) Ultimately, they benefit by being able to see things from the other person's viewpoint and empathize better with the other person in the relationship.

More globally, the person acting out the role of a parent, spouse, friend, or even the President of the United States, can become liberated by expanding his or her horizons. The actor can now see possibilities in her or his own self that weren't previously apparent. This freedom arising from capacity to "be" different people mentally has been celebrated by many poets, most notably Walt Whitman:

> A learner with the simplest, a teacher of the thoughtfullest,
> A novice beginning yet experient of myriads of seasons,

> Of every hue and caste am I, of every rank and religion,
> A farmer, mechanic, artist, gentleman, sailor, quaker,
> Prisoner, fancy-man, rowdy, lawyer, physician, priest.
> I resist any thing better than my own diversity,
> Breathe the air but leave plenty after me,
> And am not stuck up, and am in my place.[37]

The poetic capacity to change roles, as the Whitman scholar Henry Alonzo Myers noted, promotes a healthy democracy, not only between different individuals but between different aspects of personality *within* the individual.[38]

**Unfreezing Our Neural Networks**

A peculiar thing tends to happen within a society or family when rigid roles have set in. People start experiencing these roles as things in themselves, as uncontrollable forces of nature; sociologists call this process *reification*.[39] Eventually, the roles may affect people's competence and self-esteem so much that these people can only behave in ways that fit their assigned roles. Their behavior, in turn, is used as an argument to justify continuing the role constraints.

For example, in American culture the constraints of role rigidities have been felt times by disadvantaged segments such as women, African-Americans, Irish-Americans, and many other groups. This has even happened internationally to Third World countries in relation to First World countries. That was aggravated by the Nineteenth Century economist David Ricardo's theory of *comparative advantage*.[40] Ricardo said the "natural" role of Asia, Africa, and Latin America was to be producers of raw materials for the more industrialized West. Following this prescription, under pressure from the West,

kept many Third World nations in an economically dependent and depressed position from which they haven't yet recovered.

In the short run, such role rigidities provide continuity and certainty for society, a sense that everyone "knows his or her place." Even some visions of paradise, such as Dante's, are based on unchanging roles at a cosmic level.[41] In the long run, role rigidity can sap a society's creative energy, as happened in Pharaonic Egypt and Ming China (see Chapter 1, Case 2). When our computer network models of whole societies become sophisticated enough, I believe models of this phenomenon will look much like the perseverative feedback (denoted by dark lines) in the frontal lobe-damaged neural network (the "MART" network) of Figure 4.2. The existence of a system creates positive feedback that tends to justify the system using apparent rationality. The internal "noise" of the system tends to drown out the call of intrinsic human values, which are analogous to the positive or negative reinforcement node in Figure 4.2. In extreme cases, the internal logic of the existing order leads some of us to "call evil good and good evil" (*Isaiah* 5:20).

This chapter, and the neural network models it describes, partly answer the question of how to make categorizations more flexible, and thereby overcome the inertia of social roles. If we want to expand our capabilities, these theories suggest, we can't do it by intellect alone or by emotion alone. Our intellect must be engaged to cut through self-justifying rhetoric, to realize that just because a way of doing things has endured for so long doesn't mean that it's right, or even that it's the only way things can work. The final section of this book will discuss possible alternatives to some of the unthinking basic assumptions behind Western society. But our emotions must be engaged just as much, to keep us clear as to what we mean by "right." As we understand better the interplay of reason, emotion, habit, and novelty in the brain, I believe that a basis for describing a few universal values will emerge.[42]

It may sound paradoxical to advocate more flexibility in social and personal organization while arguing the existence of universal values. The next two chapters, which focus on self-actualization, may help to make this paradox more understandable. We will see that self-actualization, the highest possible

level of human mental functioning, involves a great many syntheses between apparent opposites. It requires transcending the "gated dipole" pairs of opposites in George Kelly's personal constructs (see Chapter 5). In many cases, it even requires standing outside the original belief system to generate novel methods of synthesis. I will relate all this to a primitive neural network theory of self-actualization. This theory engages several neurotransmitter substances in complex feedback between the cerebral cortex ("thinking cap") and many subcortical ("emotional" and "instinctive") brain regions.

## Chapter 6: Remaining Open to Change

1 Fadiman, 1985, 292.

2 Tversky and Kahneman, 1974, 1124.

3 Roszak, 1972; Saul, 1992.

4 Keller, 1985.

5 Leven and Levine, 1996.

6 For a detailed history, see Oliver, 1986.

7 Amsel, 1962.

8 Pierce, 1987.

9 Grossberg, 1972a, 1972b.

10 Carpenter and Grossberg, 1987

11 Bower, 1981; Tikhomirov, 1985.

12 Jerome Lettvin, personal communication, from a lecture at Massachusetts Institute of Technology, January, 1974.

13 Michael Harrington, speech at national convention of Democratic Socialist Organizing Committee, New York, February, 1983.

14 Snyder, 1983, 281.

15 Bleier, 1984.

16 For examples in economic behavior, see Heiner, 1983, 1985.

17 Halberstam, 1979.

18 Huxley, 1962.

19 Levine and Leven, 1995.

20 Dionne, 1991.

21 Leven and Elsberry, 1990.

22 MacLean, 1970.

23 Leven, 1987.

24 A neural network model of learned helplessness appears in Leven, 1992.

25 Carter, 1977.

26 Leven and Elsberry, 1990.

27 Rosenthal and Jacobson, 1968.

28 Hayakawa, 1942.

29 Ibid., 195.

30 Idem.

31 Isen, 1993

32 Ashby and Isen, 1997.

33 Vonnegut, 1963.

34 Cleaver, 1968.

35 Laing, 1967.

36 Moreno, 1975; Moreno and Moreno, 1959.

37 Whitman, 1949.

38 Myers, 1949.

39 Berger and Luckmann, 1966.

40 Ricardo, 1817/1971.

41 Dante, 1302?/1962.

42 See Loye, 1990, 1994, for a theory of different types of values and how the brain may be related to them.