Why We Turned Out Like Captain Kirk Instead of Mr. Spock
The Psychodynamics of Genetic Indeterminism

Phil Roberts, Jr.
philrob@ix.netcom.com

Abstract. Based on Hume's observations on how association "facilitates the sympathy", I offer an alternative to the various adaptionist accounts of human benevolence in a natural world presumed to favor selfishness (kin selection, reciprocal altruism, group selection, etc.). In this scenario, the cumulative effect of Hume's logic over millennia of cultural evolution has become sufficient to have overwhelmed nature's incessant culling of the valuatively unfit (benevolent individuals). Although less than optimal, the resulting valuative profile has been tolerated by natural selection as a necessary premium for reaping the adaptive rewards that attend a rational species. Paradoxically, this would also entail the intriguing implication we have become less determined (conatively/valuatively) by natural selection as a result of natural selection.

Keywords: Godel's theorem, natural selection, strategic profile, Hume's valuative logic, genetic indeterminism, valuative flow, the moralization mechanism, free will

1. Minds and Machines

Relying on Kurt Godel's famous incompleteness theorem (Godel, 1962), J. R. Lucas and more recently, Roger Penrose (1989, 1994), have both argued that the human mind can not be explained in mechanical terms:

> *Godel's theorem states that in any consistent system which is strong enough to produce simple arithmetic there are formulae which cannot be proved-in-the-system, but which we* [standing outside the system] *can see to be true.*[1]
>
> *Godel's theorem must apply to cybernetical machines, because it is of the essence of being a machine, that it should be a concrete instantiation of a formal system. It follows that given any machine which is consistent and capable of doing simple arithmetic, there is a formula which it is incapable of producing as being true -- but which we can see to be true. It follows that no machine can be a complete or adequate model of the mind, that minds are essentially different from machines* (Lucas, 1961).

Not only should this come as great news to moralists and libertarians, but it also suggests a way to put the matter to a test. Since the Lucas/Penrose assertion implicitly predicts we should be indetermined (assuming that 'being a machine' is just another way of talking about 'being determined'), demonstrate that this is indeed the case and you empirically demonstrate Lucas and Penrose. Simple, eh?

Not. Demonstrating indeterminism is a notorious party pooper. Even if we grant that rational creatures are aware of more options than non-rational ones, there is no reason to assume the willfulness to pursue those options is not itself determined by factors beyond their control. Those who have placed their intellectual eggs in the determinism basket (functionalists, materialists, computationalists, etc.) would seem to have little to fear. Even so, at the risk of straining credulity, I would like to suggest that certain developments in the philosophy of science may have rendered such a demonstration feasible:

> *Perhaps most fundamental, the new conception rejects the orthodox assumption that "the world is so constituted that there are descriptions such that for every event, the simple formula 'whenever this, then that' applies" (Bhaskar, 1975). This regulative ideal, Laplacean in origin, in turn supports the thesis, derived from Hume, that scientific laws are statements of constant conjunctions between events. But for the new view of science, there may be no description such that for some event the formula, "whenever this, then that" applies. On this view the world is radically open* (Manicas and Secord, 1981).

My take on these authors is that, unlike technology, where a fixation on constant conjunctions is pretty much the rule (e.g., the behavior of 'O' rings below 32 degrees Fahrenheit), science is often more dependent on techniques such as stratification, abstraction, generalization, etc. As such, rather than fixating on constant conjunctions in human behavior, my concern will be with the more abstract determinism of the only relevant scientific hypothesis we currently have to work with, the theory of natural selection. And my quest for evidence of inconsistency with the determinism predicted by this theory will not be at the level of the individual, but rather at the more abstract level of the species.

> *So even if mathematicians are superb cognizers of mathematical truth, and even if there is no algorithm, practical or otherwise, for cognizing mathematical truth, it does not follow that the power of mathematicians to cognize mathematical truth is not entirely explicable in terms of their brain's executing an algorithm. Not an algorithm for intuiting mathematical truth -- we can suppose that Penrose has proved that there could be no such thing. What would the algorithm be for, then? Most plausibly it would be an algorithm -- one of very many -- for trying to stay alive* (D. C. Dennett).

2. The Predicted Profile

Unfortunately**,** it is all too easy to conflate what we observe in our fellow humans with what we have a right to expect based on the science.[2] As such, it will prove helpful to have a means of visualizing what the theory of natural selection actually predicts. And, if this same representation can also be employed to visualize the manner in which an increase in human understanding can result in the transcending of naturally determined objectives in much the manner an increase in mathematical understanding has resulted in the transcending of Peano arithmetic (Godel), so much the better.

The Observed Cognitive Profile

alpha configuration beta configuration

Figure 1: Basic configurations

In Figure 1, the alpha configuration represents an understanding (e.g., a network of beliefs) that is relatively correct and complete. Comparatively, and for demonstration purposes only, the beta configuration represents an understanding that is less correct (slanted line) and less complete (missing line).

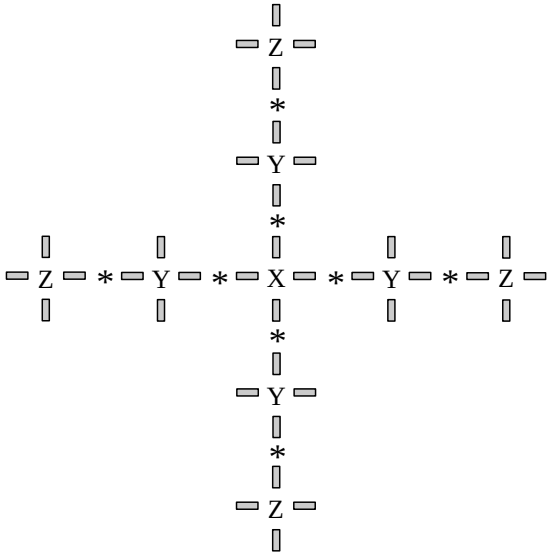


Figure 2: The observed cognitive profile.

Figure 2 is comprised of a number of alpha configurations that have been conjoined to each other with asterisks. The asterisks represent associations.

The configuration in the center of Figure 2, labeled with an 'X', represents someone's relatively correct and complete understanding of their own interests.

The conjoined Y and Z configurations represent this same individual's relatively correct and complete understanding of the interests of others. They have been conjoined to the X configuration

with asterisks to represent the likelihood that this person's understanding of their own interests serves as the basis for much of their understanding of the interests of others.

Given this rationale, Figure 2 can also be construed as a representation of the cognitive profile we find in ourselves in that, where human beings are concerned, it appears nature has been selecting for organisms with beliefs, representations, etc., that are relatively more correct and complete than those found in other species (i.e., an increase in intelligence, rationality, knowledge, understanding, cognitive competence, etc.).[3] Or, if you prefer, Figure 2 represents the assumption that, in man, nature has been selecting for an increase in cognitive objectivity.[4]

The Predicted Strategic Profile

By representing value in terms of the darkness of the various configurations, Figure 2 can also serve as a platform for representing our species' predicted valuative profile.[5] This can be accomplished simply by making the X configuration as dark as possible and the other configurations as light as possible, as represented in Figure 3. That's because, according to our current understanding of how natural selection is supposed to work, we should expect naturally selected creatures to place paramount importance on their own interests and, with the exception of immediate kin, none whatsoever on the interests of others (i.e., no benevolence). Or, if you prefer, Figure 3 represents the assumption that, in man, as with other creatures, nature has been selecting against an increase in valuative objectivity (impartiality).

> *It is extremely doubtful whether the offspring of the more sympathetic and benevolent parents, or those which were the most faithful to their comrades, would be reared in greater number than the children of selfish and treacherous parents of the same tribe. He who was ready to sacrifice his life... rather than betray his comrades, would often leave no offspring to inherit his noble nature* (Charles Darwin).

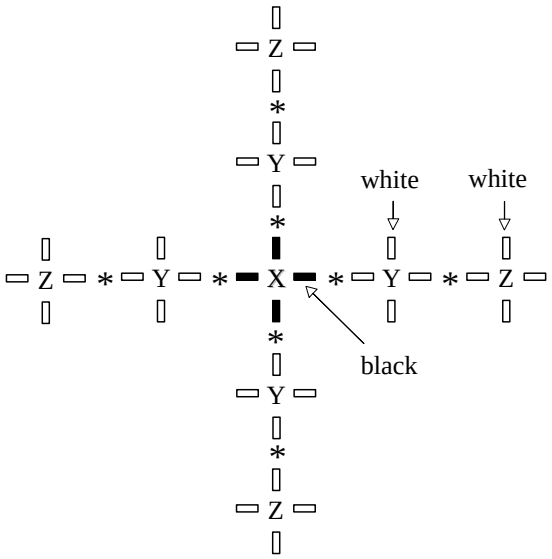


Figure 3: The predicted profile.

Operating in conjunction, one might reasonably expect the cognitive and valuative profiles represented in Figure 3 to give rise to effective strategies for achieving what might be in one's overall best interest. Not only is there a maximum of resolve (the darkness in configuration X), but there is also an appreciable amount of understanding (the alpha configurations) as to how to best go about achieving that objective. As such, Figure 3 can also be construed as a representation of our species' predicted strategic profile which, in a species which effects its survival from such long range strategies might also be construed as just another way of talking and thinking about 'the will to survive', or at least the one we might expect to find if our current view of natural selection is basically correct.

> *With very few exceptions, the only parts of the theory of natural selection which have been supported by mathematical models admit no possibility of the evolution of any characters which are on average to the disadvantage of the individuals possessing them. If natural selection followed the classical models exclusively, species would not show any behavior more positively social than the coming together of the sexes and parental care* (W. D. Hamilton).

Reciprocal Altruism

Since the alpha configurations in Figure 3 represent the cognitive profile we find in ourselves, they are also taken to represent an appreciable understanding of the self-serving benefits of co-operation and reciprocity and, with it, the presence of any instrumental values necessary for implementing tactics based on that understanding (e.g., social contracts, tit for tat, etc.). In other words, the assumption here is that instrumental values are more a matter of understanding than of valuing in the intrinsic sense, such as when one experiences a genuine (non-self-serving) concern for the suffering of a helpless animal or non-related child, and which would be represented in Figure 3 by simply making one of the Y or Z configurations a bit darker.

This distinction is of some importance in that, in a strategic profile endowed with an appreciable amount of understanding, it is entirely possible to find a vast array of instrumental values manifested in an unending series of outwardly magnanimous deeds which nonetheless conforms to the predicted profile, so long as the benefits can be reasonably expected to outweigh the costs (Trivers, 1971, Axelrod, 1984). Overtly kindly acts can serve as a highly effective means to a ruthlessly selfish end, as many pedophiles will attest.

> *Even with qualifications regarding the possibility of group selection, the portrait of the biologically based social personality that emerges is one of predominantly self-serving opportunism even for the most social species, for all species in which there is genetic competition among the social co-operators, that is, where all members have the chance of parenthood* (Donald Campbell).

3. Problems with the Predicted Profile

The assertion that the logic of natural selection predicts a propensity for "self-serving opportunism" (Campbell) or, less delicately, "ruthless selfishness" (Dawkins), has not been without its critics. And for good reason. With respect to human nature, at least, the prediction has two major shortcomings:

1. Its emotionally repulsive and an affront to our self-esteem.
2. Human nature doesn't conform to the prediction. Rather than ruthlessly selfish, human nature might more aptly be described as benevolently selfish (e.g., Albert Schweitzer, self-endangering Greenpeacers, etc.).

> *By human standards, life in a fish school or a baboon troop is tense and brutal. The sick and injured are ordinarily left where they fall, without so much as a pause in the routine business of feeding, nesting, and mating. The death of a dominant male is usually followed by nothing more than a shift in the dominance hierarchy, perhaps accompanied, as in the case of langurs and lions, by the murder of the leader's youngest offspring* (E. O. Wilson).

Proposed Solutions (Optional)

Group selection. One way to account for the benevolence in human nature is to assume that, in man's ecological niche, in addition to selecting for selfish individuals, nature has also begun to aggressively select for selfish groups (Wilson and Sober, 1998). Although it is possible to see how this might indeed begin to exert a moderating influence on individual selfishness, the hypothesis is problematic in that it is difficult to imagine a scenario in which the culling of valuatively unfit groups would ever become as rapid and prolific as the culling of valuatively unfit individuals. As such, although a factor under certain circumstances, it seems unlikely that group selection will produce discernable effects when in direct competition with individual selection (e.g., Smith, 1998, Nunney, 1998, Hurst, 1998, etc.).

> [Wilson and Sober] *should carry a health warning. Read critically it will stimulate thought about important issues. Swallowed whole, its effects would be disastrous* (Maynard Smith).

Kin selection. On the other hand, if one moves, not up to the level of the group, but rather down to the level of the replicating mechanism or "gene" (Hamilton, 1964), much of the problematic altruism in nature can be addressed as a manifestation of the "selfishness" (in the

biological sense) inherent in an organism's genes (e.g., a worker bee sacrificing itself to preserve its replicating machinery located in the body of the queen). More importantly for our present purposes, however, is that this same theory, particularly when modeled mathematically, also predicts where non-self-serving concern should not occur. And, with the exception of immediate kin, where it should not occur turns out to be almost everywhere, just as you might expect:

> *I think 'nature red in tooth and claw' sums up our modern understanding of natural selection admirably… I shall argue that a predominant quality to be expected in a successful gene is ruthless selfishness. This gene selfishness will usually give rise to selfishness in individual behavior... Much as we might wish to believe otherwise, universal love and the welfare of the species as a whole are concepts which simply do not make evolutionary sense* (Dawkins, 1976).

Memetics. Far from resolving the enigma of human benevolence, the gene-centric model has only served to deepen the mystery. Indeed, Richard Dawkins, the author of the above passage and one of the most visible authors in the field, has gone so far as to suggest that the explanatory gap is of sufficient magnitude to warrant a full-fledged addendum to the theory of natural selection:

> *The argument I shall advance, surprising as it may seem coming from the author of the earlier chapters, is that, for an understanding of the evolution of modern man, we must begin by throwing out the gene as the sole basis of our ideas on evolution… The new* [primeval] *soup is the soup of human culture. We need a name for the new replicator… I hope my classicist friends will forgive me if I abbreviate mimeme to meme* (ibid.).

Interestingly enough, when construed simply as a place marker for a theory capable of ameliorating the naturalistic quandary of human benevolence, memetics is perhaps as old as psychology itself.

4. Hume's Valuative Logic

> *The idea of a disinterested defense of one's conduct grew out of self-interest, but in the thought of reasoning beings, it takes on a logic of its own which leads to its extension beyond the bounds of the group* (Peter Singer).

Based on his identification of "the qualities by which the mind is convey'd from one idea to another, viz. resemblance, contiguity in time or place and cause and effect", the venerable David Hume (1739) has already managed to decipher some of the logic alluded to by Singer:

Resemblance

> *Now 'tis obvious, that nature has preserv'd a great resemblance amongst all human creatures... and this resemblance must very much contribute to make us enter into the sentiments of others and embrace them with facility and pleasure. Accordingly we find, that where, beside the general resemblance of our natures, there is any peculiar similarity in our manners, or character, or country, or language, it facilitates the sympathy* (*Treatise*, II, I, XI).

Assuming that Hume's expression "facilitates the sympathy" can be reasonably represented in terms of the intrinsic value (non-self-serving concern) one might attach to the interests of others, this first correlation or propensity can be visually represented in terms of modifications to Figure 3 (the predicted profile) as follows:

1. Replace the asterisks with a symbol that represents associations based specifically on the quality of resemblance.
2. Assume that the spatial proximity of a configuration to the X configuration correlates with its proximity to the self according to the quality of resemblance. For example, the X configuration might represent a typical human's understanding of their own interests, the Y configurations this same individual's understanding of the interests of those of a somewhat different ethnicity or race, and the Z configurations this same individual's understanding of the interests of those of a significantly different ethnicity or race.
3. Represent value in terms of the darkness of the configurations, with the X configuration as dark as possible, but with a graduated transition to lighter configurations as one approaches the periphery of the diagram. This

will be in contrast to the abrupt transition found in Figure 3 (the predicted profile).

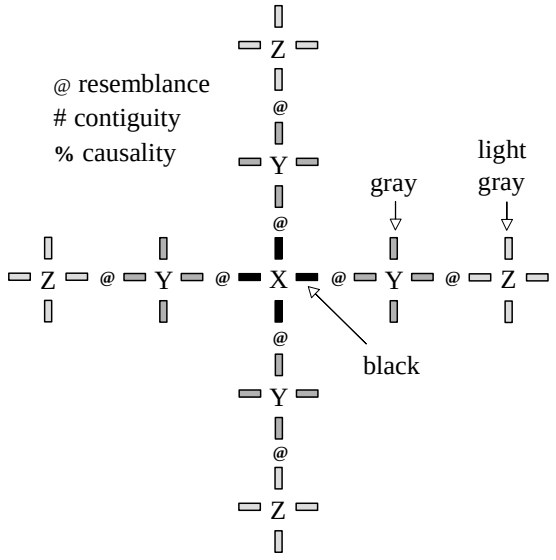


Figure 4: Hume's valuative logic (resemblance)

Not only do these adjustments result in a representation in which there is a significant increase in non-self-serving concern relative to the predicted profile, but the manner in which that concern is allocated appears to correspond well with a number of enduring features of human nature such as racism, nationalism, xenophobia, male chauvinism, homophobia, etc. (Figure 4). It is also interesting to note that the dominant negative connotations associated with these enduring features are represented, not in terms of their positive presence, but rather as resulting from the residue of the predicted norm (an absence of positive concern) in regions of the profile most remote from the self in terms of the quality of resemblance.

Contiguity and Causation

> *Nor is resemblance the only relation, which has this effect, but receives new force from other relations, that may accompany it. The sentiments of others have little influence, when far remov'd from us, and require the relation of contiguity, to make them communicate themselves entirely. The relations of blood, being a species of causation, may sometimes contribute to the same effect* (ibid.).

These other two correlations or propensities can be represented in a similar fashion by simply employing the corresponding symbol for the type of association under consideration (contiguity or causation) and, once again, by supposing that the spatial proximity of a configuration to the X configuration correlates with its proximity to the self, according to the criterion of the type of association employed. And, as before, the X configuration will be as dark as possible, but with a graduated transition to lighter configurations as one approaches the periphery of the diagram.

> ...*All these relations, when united together,* [Figure 5] *convey the impression or consciousness of our own person to the idea of the sentiments or passions of others, and makes us conceive them in the strongest and most lively manner*…(ibid.).

Kin Concern (Optional)

While Hume's contention that we care more about those who are spatially and temporally proximal to ourselves strikes me as relatively uncontroversial, his contention that concern for kin should also be viewed as more a matter of valuative logic than arising from an innate instinct or desire seems a little more problematic. However, in Hume's defense:

1. Mother and child separated at birth will often instantaneously form the mother child bond, even fifty years later, based on nothing other than the knowledge of the causal relationship that exists between them.
2. Parents who have little if any concern for their offspring often have children who exhibit this same lack of concern for their own offspring, suggesting kin concern is a cognitively transmitted norm.
3. The greater strength of the maternal bond compared to the paternal bond (as a general rule, of course) can be explained in Hume's terms as the result of the mother's greater proximity to the fetus causally, spatially, and in terms of the nine month duration of these proximity extremes.

Self-Worth

Although egregiously under-appreciated by natural scientists, our species is also afflicted with a disturbing volatility in self-worth, at least to the extent that my own mind (and apparently that of Mr. Hume's) is not atypical.[6] Not infrequently, this volatility manifests itself in a life threatening deficiency in physical self-interest (apathy, recklessness, suicide, etc.). As such, this naturalistically bizarre feature of human nature can readily be accommodated in our representation by simply making the X configuration in Figure 3 (the predicted profile) less dark, as represented in Figure 5.

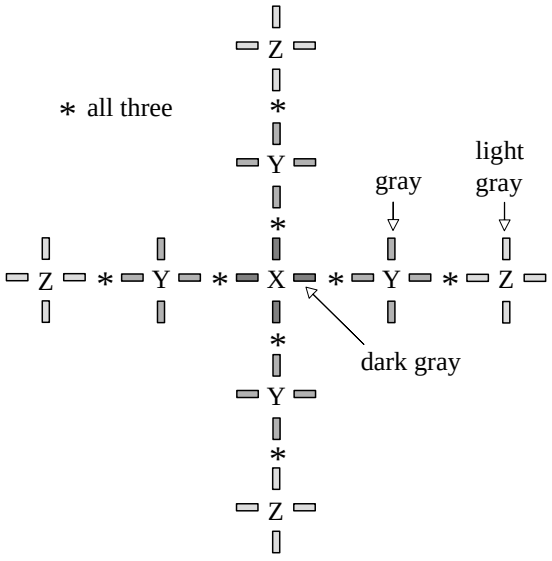


Figure 5: Hume's valuative logic (self-worth)

And, once again we find Mr. Hume offering his insight into the etiology of the anomaly:

> *Tis now time to turn our view from the general consideration of sympathy, to its influence on pride and humility … Now nothing is more natural than for us to embrace the opinions of others in this particular; both from sympathy, which renders all their sentiments intimately present to us; and from reasoning, which makes us regard their judgment, as a kind of argument for what they affirm. These two principles of authority and sympathy influence almost all our opinions; but must have a peculiar influence, when we judge of our own worth and character*... (ibid)

5. Genetic Indeterminism

The Moralization Mechanism

In Figures 4 and 5, I have represented Hume's logic in terms of adjustments to Figure 3 (the predicted profile) to represent the assumption that, in man, psychodynamic factors have ameliorated the customary effects of natural selection. And, because this has resulted in configurations that are more equal in darkness, it is apparent that the effects those adjustments represent are simply different manifestations of an increase in valuative objectivity (impartiality).

It is also interesting to note that, according to Hume's analysis, the increased volatility in self-worth is a secondary effect produced by an increase in sympathy. That's because it quite readily lends itself to the view that an increase in value in one region of our valuative profile can be construed as the "cause" of a corresponding decrease in value (in the form of an increased volatility) in another one of its regions. In other words, it lends itself to the interpretation that value behaves in a certain fashion.

Construed as a mechanism (in the scientific sense) in the manner in which value behaves, the foregoing simply amounts to a conjectured scenario in which, in spite of nature's incessant culling of the valuatively unfit (deviations from the predicted profile), the cumulative effect of Hume's logic over millennia of cultural evolution has resulted in a transfer of some of the value in the X configuration into the Y and Z configurations via the conduits of the associative junctures (Figure 6). As such, in addition to the contingencies already identified by Hume (associative proximity to the self), the effects of the mechanism should also be found to correlate with an increase in the richness of the associations, which itself can be construed as already implicitly represented by the use of alpha configurations in lieu of beta configurations (Figure 1) to represent the cognitive profile we find in ourselves

Allowing for the individuality extremes encountered both in individuals (e.g., Theodore Bundy) and in cultures (e.g., the Nazi regime), this addendum to Hume simply amounts to the supposition that an increase in cognitive objectivity (understanding) "facilitates" an

increase in valuative objectivity (impartiality).[7] And since it is easy to appreciate how this would lead, not only to an increase in non-self-serving concern for others, but also to the increased volatility in self-worth underlying the emotion of guilt, in Figure 6 I have labeled the dynamics of this postulated effect, 'the moralization mechanism'.

> A*ny animal whatever, endowed with well-marked social instincts, the parental and filial affections being here included, would inevitably acquire a moral sense or conscience, as soon as its intellectual powers had become as well developed… as in man* (Charles Darwin).

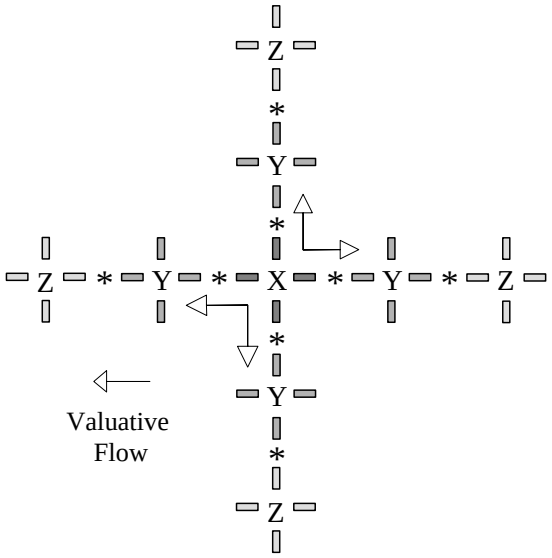


Figure 6: The moralization mechanism

It should also be understood that the foregoing synthesis of Hume's valuative logic with the theory of natural selection and the resultant theory of how value behaves within the environment of belief over the course of cultural evolution actually constitutes a considerable departure from Hume's own emotivist theory of the moral sentiments. A central tenet of Hume's philosophy is that cognition (reason) is strictly a matter of truth and falsehood and, as such, incapable of producing or dissipating intrinsic values and their associated passions:

> *Reason is wholly inactive, and can never be the source of so active a principle as conscience, or a sense of morals* (*Treatise*, III, I, I).

Free Will

Evidence suggesting that at least some of the cognitively induced deviation from the predicted profile (Figure 3) might actually be maladaptive can be found in (a.) nature's co-opting (exapting) of a number of biological impulses to assist in the shepherding of self-worth (e.g., fear of giving a speech or asking for a date, anger over an insult, sex as a basis for endearment) and (b.) in our insatiable appetite for self-worth enhancing experience (needs for love, attention, purpose, meaning, moral integrity, etc.), represented in Figure 7 in terms of a valuative flow from the S configurations (representing the interests of significant others) into the X configuration.

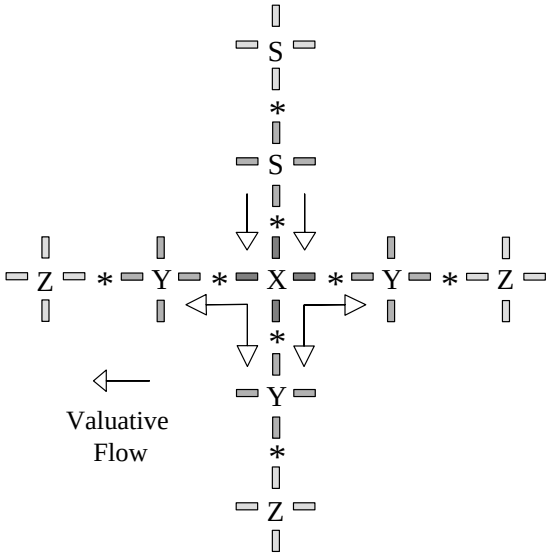


Figure 7: Free will

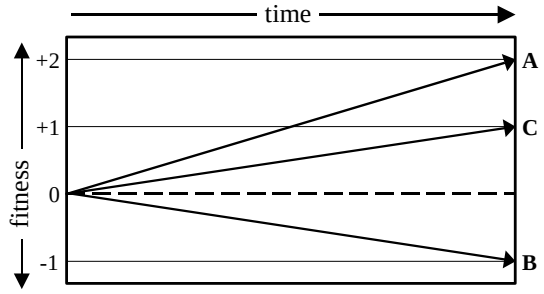
From the perspective of this representation, avoiding the life threatening manifestations of low self-esteem (anxiety, recklessness, addiction, depression, suicide, etc.) is presumed to be a simple matter of maintaining sufficient valuative flow into the X configuration to compensate for the dissipating effects of the moralization mechanism. The explanatory payoff is that this, in turn, allows one to account for the innumerable occasions in which humans have been observed to sacrifice physical, reproductive, and social interests simply to "do the right thing", while at the same time, given the ongoing (non-episodic) nature of our need for self-worth, and its omnipresence in everything we think and do

(Branden, 1969), perhaps obtaining a bit of insight into the psychodynamics underlying our impression of free will.[8]

> *I have often felt as though I had inherited all the defiance and all the passions with which our ancestors defended their Temple and could gladly sacrifice my life for one great moment in history* (Sigmund Freud).

Sustaining the Mechanism

In its most simplistic formulation,[9] accounting for the sustained presence of a mechanism presumed to produce maladaptive values (deviations from the predicted profile) is simply a matter of assuming that developments in our cognitive profile have enhanced our ability to survive to such a degree that it more than compensates for the dissipation in the resolve to do so (Figure 8).



A = benefits of cognitive developments
B = costs of ensuing valuative developments
C = net gain in strategic fitness

Figure 8: Sustaining the mechanism

In other words, the less than optimal valuative profile has simply been tolerated by natural selection as a necessary premium for reaping the adaptive rewards that attend a rational species. Paradoxically, this would also entail the intriguing implication that, conatively and valuatively at least, we have become less determined by natural selection as a result of natural selection. Or, if you prefer, the reason we turned out like Captain Kirk (emotional) instead of Mr. Spock, or more like Mother Teresa (altruistic) than Joseph Stalin, has been more a matter of psychodynamic necessity than of adaptive utility.

> *No longer on this count will it be incumbent on the natural philosopher to deny freedom in the name of science: no longer will the moralist feel the urge to abolish knowledge to make room for faith. We can even begin to see how there could be room for morality, without its being necessary to abolish or even to circumscribe the province of science* (J. R. Lucas).

Footnotes

1. This is not strictly accurate but close enough for the purposes of the argument.

2. Kim Sterelny has criticized an earlier version of this paper for ignoring several adaptionist accounts of man's moral sentiments (Frank, 1988, Katz, 2000, etc). But in offering a theory of how nature has rendered us less determined by natural selection I assumed it obvious I share a perspective expressed most eloquently by Gould and Lewontin (1979) and perhaps most succinctly by Richard Dawkins (1976):

   > *These ideas are plausible as far as they go, but I find they do not begin to square up to the formidable challenge of explaining culture, cultural evolution, and the immense differences between human cultures around the world, from the utter selfishness of the Ik of Uganda, as described by Colin Turnbull, to the gentle altruism of Margaret Mead's Arapesh* (p. 191).

3. This assumption has been challenged from time to time (e.g., Stich, 1985, Downes, 2000), although I have always found it hard to take these challenges seriously. Let me put it this way. Faced with betting on a competition between two individuals with similar physical attributes, one who is smart and one who is stupid, who would you want to put your money on?

4. There are well known perplexities associated with ascertaining the correctness, completeness, veracity, rationality, justification, etc. of one's beliefs. None of this is at issue here. I am merely proposing that an increase in the correctness and completeness of one's beliefs, representations, knowledge, understanding, etc. can reasonably be construed as just another way of talking and thinking about an increase in one's cognitive or epistemic objectivity as the notion of objectivity is customarily employed.

5. I am construing value as content that in some fashion occupies or is constrained by the form of belief, and therefore operating on the assumption that belief is both the prerequisite and environment of value. As to the ontic status of the these entities, I suspect they are based on the

identification of pertinent features of nature in much the way the entities postulated by physical scientists are, but with the advantage that it is perhaps a bit easier to remain in touch with the fact that they are, in the final analysis, constructs of human imagination.

6. Like David Hume and Karl Zener (1962), I see no reason why a scientist of the mind should not feel free to refer to features of the only mind he has immediate access to so long as those reports are restricted to features likely to be found in other minds. From this perspective, psychology might be viewed as the poor man's science in that everyone already possesses the finest psychical laboratory money can buy.

7. This is analogous to the thesis developed in Kohlberg, 1981, only postulated to transpire in cultures in much the manner Kohlberg has postulated moral maturity as a function of cognitive development in the individual.

8. While what others think of us is important, the ultimate arbiter of emotional well-being is what we think of ourselves. As such, it seems unlikely that the self-worth complex can be dismissed as little more than a fitness maximizing instinct for social status, particularly given the likelihood that dominance hierarchies can be maintained in a more biologically expedient manner (e.g., animal appetites counter-valenced by fear).

9. Although some of the maladaptiveness to the individual might be offset by the benefits of being a member of a more cohesive group, I suspect a more crucial determinant has been nature's inability to fine tune the mechanism to exclude sympathy in the case of others while simultaneously including sympathy for one's own future well-being. Corroborating empirical evidence can be found in Chapter 8 of Arnhart, 1998.

References

Arnhart, Larry (1998). *Darwinian Natural Right*. Albany, New York: State University of New York Press.

Axelrod, Robert (1984). *The Evolution of Cooperation*, New York: Basic Books Inc.

Bhaskar, Roy (1975). *A Realistic Theory of Science.* Brighton: Leeds.

Branden, Nathaniel (1969). *The Psychology of Self-esteem*. New York: Nash Publishing Corporation.

Dawkins, Richard (1976). *The Selfish Gene*. New York and Oxford: Oxford University Press.

Downes, Stephan (2000), 'Truth, Selection and Scientific Inquiry', *Biology and Philosophy*, 15, pp. 425-442.

Frank, Robert (1988). *Passions Within Reason: The Strategic Role of the Emotions*. New York: W. W. Norton.

Godel, Kurt (1962). *On Formally Undecidable Propositions*, New York: Basic Books.

Gould, S. J., and Lewontin, R (1979). 'The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptionist Programme'. *Proceedings of the Royal Society*, Vol. B205, pp. 581-98.

Hamilton, W. D. (1964). 'The Genetic Evolution of Social Behavior'. *The Journal of Theoretical Biology*, 7, pp. 1-16.

Hume, David (1739). *A Treatise of Human Nature*. New York: Viking Penguin Inc.

Hurst, Laurence (1998). 'You Scratch my back'. *New scientist*, Sept. 12, pp 44-45.

Katz, Leonard D. (2000). *Evolutionary Origins of Morality*. Thorverton, UK: Imprint Academic.

Kohlberg, Laurence (1981). *Essays on Moral Development*: Vol. I. New York: Harper and Row.

Lucas, J. R. (1961). Minds, Machines and Godel. *Philosophy*, 36, pp. 112-27.

Manicas, Peter and Secord, Paul F. (1981). 'Implications of the New Philosophy of Science: A Topology for Psychology'. Seventh annual meeting of the *Society for Philosophy and Psychology*, University of Chicago. Available at: http://www.geocities.com/Athens/5476/N_T_abs.htm

Nunney, Leonard (1998). 'Are We Selfish, Are We Nice, or Are We Nice Because We Are Selfish' *Science*, 281, pp. 1619-21.

Penrose, Roger (1989). *The Emperor's New Mind: Concerning Computers, Minds and the Laws of Physics.* Oxford University Press.

Penrose, Roger (1994). *Shadows of the Mind: A Search for the Missing Science of Consciousness.* Oxford University Press.

Smith, Maynard (1998). 'The Origin of Altruism'. *Nature*, 393, pp. 639-40.

Stich, Stephen P. (1985). 'Could Man Be an Irrational Animal'. *Synthese*, 64, pp. 115-135.

Trivers, R. L. (1971). 'The Evolution of Reciprocal Altruism'. *Quarterly Review of Biology*, 46, pp 35-57.

Wilson, David Sloan and Sober, Elliot (1998). *Unto Others.* Harvard University Press.

Zener, Karl (1962). 'The Significance of Experience of the Individual for the Science of Psychology'. *Minnesota Studies in the Philosophy of Science*, Vol. II. Minneapolis: University of Minnesota Press.