THEORETICAL PROSPECTS OF SUCCESS OF FOUR PHILOSOPHIC
ETHICAL SYSTEMS AS MODES OF EVOLUTIONARY AND
INDIVIDUAL ADAPTIVE BEHAVIOR

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Introduction

This paper is a discussion and comparison of five models of behavior. The first half of the paper is devoted to the construction of a model for behavior by the author of this paper, while the second half compares this model to four other models which are already existing.

In the first section, the author gathers information from scientists concerning the nature of evolution and adaptation. Through logical arguments, the author then attempts to construct a model of behavior which would maximize the ability of an organism to successfully adapt to the environment. This first section could stand by itself as a finished work. The implications in the conclusion to this section are, in a way, ethical: behave according to the constructed model or you may not adapt successfully. Fortunately the model is abstract enough to be rather impractical; therefore, the author of this paper can not be accused of pretentiously claiming to have found the ultimate philosophy for a successful life.

As a matter of interest, however, this model is then compared to four established ethical philosophies: the Formalism of Kant, Epicureanism of Epicurus, Taoism of Lao Tzu, and Existentialism of Kierkegaard. It is interesting to see how these four models measure up to what the author of this paper claims to be a biological model of ideal adaptive behavior. Out of the comparison of all of these abstract models could and should come some ideas which would be of practical use to the reader.

The conclusion of this paper sums up the major ideas of the text and adds a few ideas concerning the nature of ethics and behavior in general.
Biological Adaptation

In examining the types of behavior which allow an individual to adapt to the environment, and a species to adapt through time, the first step is to try to define the term "adaptation," and to attempt to explain what is meant by the expression "adaptive behavior." Adaptation is an elusive concept in biology, for we have yet to be able to describe adaptation in exact spatio-temporal terms. As a result, arguments concerning adaptation tend to become philosophical in nature.

For instance, as Sommerhoff points out, the behavior of an animal is said to be "adapted" to a given environment when the behavior is directed toward some hypothetical goal. When vital activities are talked about as being purposive, a reference toward some future goal is implied; the argument appears to be quasi-teleological. 1

Hopefully, Tinbergen has the answer to the apparently opposing views of the mechanists and vitalists. He says, "The two ways of studying life processes are not opposed to each other. The adaptiveness or directiveness of many life forces is a matter of fact and can be revealed by objective study; however, a description of the directiveness of life processes is not a solution to the problem of causation. Once the survival value of a process has been recognized and clearly described, the biologist's next task is to find out how its mechanisms work; in other words, on what causal system it is based." 2 Perhaps this explanation does not solve the dilemma completely, but then no philosophic arguments ever can be. We will attempt to stay with as practical a view of adaptation as possible to avoid the difficulties found when one discusses the philosophy of biology.

We still haven't begun to describe a criteria for determining
what types of behavior are adaptive. This will be a major difficulty, for as Williams clearly states, "[there is a] current absence of rigor-our criteria for deciding whether a given character is adaptive, and, if so, to precisely what is it an adaptation." The second part of the last statement, "to precisely what is it an adaptation," is extremely important. An example from Sommerhoff shows how "the 'end' of adaptive changes or adaptive behavior need not necessarily be the ultimate survival of the organism or of the species, but may be a more proximate condition which in certain cases may bear no relationship to the organism's survival and may even be detrimental to it. When a monkey grabs a fruit, this is called an adaptive movement irrespective of whether the fruit is wholesome or poisonous." 

What we find is that, in a sense, all behavior is adaptive. In fact, a common definition of behavior is the way in which an organism adapts to its environment. It would seem that instead of merely asking what adaptive behavior is, it would be better to ask to what and to what degree is the behavior of an organism adapted. For our purposes, adaptive behavior will be applied to mean behavior which enhances survival. Obviously all of the species extant today are sufficiently adapted to maintain themselves, or they would be extinct. What we would like to be able to say, however, is that one set of behavior patterns is more adaptable than another set.

To determine such an ideal set of behavior patterns, we need to establish a definition for a successful adaptation. The first part of the definition of successful adaptation should naturally include the fact that the organism has survived, or that the population has been continued. However, consider the case of two species. One species might successfully dominate all other species for, say, a million years.
This successful species is spread over three continents. It preys upon almost all the other animals, and is bothered by few. At the end of a million years, however, say that the average temperature went up an average of $30^\circ$ F over the earth. The first species depended on a lot of running to catch its prey, but could not run in the increased heat. The species died out.

Take a second species which lived during the time of the first species. This second species is a small creature and a rather sickly-looking one at that. Its metabolism rate is very slow, and it spends most of its time simply crawling about and grubbing for roots. Being a helpless creature, it is preyed upon by almost all other animals. When the temperature increase arrives after the first million years, however, it doesn't affect the little creature, which continues to survive another half-million years before giving rise to another species.

The question is, which was more successful, the first species, which dominated the earth for a million years, or the second species, which lived a lowly existence for 1.5 million years? The problem almost seems to involve a value judgment such as, would you rather be king for a year or a pauper for 30 years? For our purposes we will pick the organism or species which survives the longest, on the basis of the fact that at least it has the potential and the chance to become a more dominating animal, while the highly successful animal which runs itself to extinction has no chance for anything. Our formal definition for a successful adaptation therefore is the maintenance of the ability to change to a changing environment, for as long a period of time as possible.

Since our definition of successful adaptive behavior is expressed as a kind of potential for change rather than overt behavior, it may be difficult to recognize the better adapted species or individual. For
example, take the picture on page 49 of Hafez's *The Behavior of Domestic Animals*:

\[ A \quad C \quad B \]

Hafez explains, "Natural and domestic habitats may be considered as providing two distinct adaptive peaks representing gene combinations that are especially well suited for that particular habitat. The degree of adaptiveness is shown by the height occupied by a given population. Thus the wild population \([A]\) is well adapted to one peak and the domestic population \([C]\) to another, while the hybrid population \([B]\) in the valley is poorly adapted to either peak."\(^5\)

As long as the hybrid species continues to survive, however, it is the best adapted of all the species. If the natural environment were to be destroyed, the hybrids would continue to live, but the natural species would be too characteristically different to adapt to the domestic environment. The same would be true if the domestic environment would cease to exist. By virtue of the fact that the hybrid population hasn't totally committed itself in either direction, it can survive in either the natural or domestic habitats, whereas the other two populations are doomed at the onset of change.

Of course it should be remembered, as Sommerhoff points out, "that adaptability is never unlimited. It may be very extensive, as in the higher organisms and especially in Man, but no living organism has the power to cope with all the conceivable challenges of its environment."\(^6\) Although it seems intuitively obvious that there will never be a perfectly adaptable organism, this does not prevent us from trying to build a conceptual model that would show the ideal flexibility in an organism's behavioral repertoire.
that would allow it to maintain its existence indefinitely.

Williams notes that the current practice today for estimating fitness or design for success is to find "readily measurable demographic variables that must be imperfectly correlated with long-term survival and extinction." Although Williams agrees with the author of this paper that the important factor involving biotic adaptation is the degree of assurance for long-term survival, he nor any of his contemporaries has come up with a simple formula for measuring fitness. The formula about to be suggested by this author is not simple nor concrete. It is merely a theoretical, conceptual model of the author's own creation.

We must begin by noting that any one instance of adaptive behavior serves a function—long-term survival. What we wish to do is maximize this function. There are two ways in which an optimum maximization can be realized. The first is the zero-infinity optimum. An example would be fleetness in deer. The faster the deer, the more able it would be to escape a predator. A graph of the function would look something like this:

\[
\begin{align*}
\text{prey} & \quad \rightarrow \\
\text{survival} & \quad \searrow
\end{align*}
\]

where the probability for survival approaches 1.0 as the deer becomes infinitely fleet.

This type of optimum is not the type we are interested in, however. Flexibility is the attribute which we are trying to put into a model; the above model shows a maximization in one direction only. If fleetness were to become a disadvantage, an organism which had maximized this attribute would quickly become extinct.

To insure against the obsolescence of any behavioral trait, the
optimum must be created as a mean in the function, as shown by this model:

![Diagram](image)

It must never be assumed that it is always more advantageous to be fast than slow. For an individual, there will be times when it would be more advantageous under a given set of circumstances to move slowly, and vice versa. In certain ages fleet animals might be selected against, and vice versa. When to do which type of behavior is completely another question, as this depends on the unique conditions in the environment at a given time. The genetically or conceptually wise organism will make the proper choice. The wisdom of an organism lies in its openness to all possibilities.

Waddington sums up this idea well in his book on biology and ethics, "I think many people, not especially expert in psychology, have a feeling, which I suspect is rather well justified, that a philosophical discussion which leads to just one precise conclusive belief is to be regarded with some caution. Bateson, in a recent lecture, took as his motto a remark of William Blake:

... May God us Keep

From Single vision and Newton's Sleep!"³

Now that the main point concerning this model for adaptive behavior has been established, it is time to explain further the nature of the physical representation of this function. A graph can be drawn for any behavioral dualism we are interested in. To explain why the graph is drawn as it is, an example will be given of a behavioral dualism; in this case, it will be stimulus-seeking versus stimulus-avoidance:

(see top next page)
First of all it should be noted that although the behavior is expressed as a duality, "seeking-avoidance," it is actually a continuum, as shown by the unbroken line. In this case it is rather obvious that an organism needs to transverse both sides of the continuum; an organism needs to seek some stimulation in order to maintain its vital functions, and sometimes needs to avoid stimulation, in order to sleep, for example. The reason that the extremes should be performed a smaller percentage of the time than those activities toward the mean, is that, at any point in time, extremes tend to be detrimental to the organism. Too many stimuli may lead to "bizarre and anti-adaptive behavior," likewise, understimulation causes a "falling off of mental and physical abilities."

A final point will be made here on this dualistic-continuum model before we look at the specific dimensions. According to Morris, there are two types of animals, the specialists and the opportunists. The specialists have evolved one supreme survival device on which their continued existence depends. An example is the ant-eater. His probability for survival depends entirely on his ant-catching ability. The graph of his behavior is of the zero-infinity type. The opportunists, on the other hand, have no such specializations and are jack-of-all-trades, so to speak. The bell shaped continuum fits their optimal behavior the best. According to Morris, the opportunists include dogs and wolves, raccoons and coatis, and monkeys and apes. Man is an opportunist, thus his behavior must range over the continuum to maximize his success.
Now that the conceptual model of dualistic behavior has been established, an attempt will be made to find some specific dimensions that are of major importance in survival. It would be convenient and orderly if one could list adaptive behavior common to all forms of life, but as Ville, Walker, and Barnes note, "no two species accomplish all these ends [for survival] by the same patterns of behavior."\(^{12}\) An attempt to get around this problem will be made by describing general categories of behavior rather than specific emic units.

Williams suggests that if a list of adaptations is made, it should be arranged in a hierarchical fashion, as in Tinbergen's hierarchical classification of instincts.\(^{13}\) If one looks at Tinbergen's hierarchy, however, he will see that the hierarchies are species-specific.\(^{14}\) Therefore, we will merely list some possible categories of behavior without ranking them in importance. The adaptive aspect of each type of behavior will be explained, so that the reader may organize his own hierarchy if he wishes.

The first duality to be considered concerns the notion of adaptation itself. There are two types of adaptation, short-term and long-term. As Huxley points out, systems may adapt to the immediate situation at the expense of reserve flexibility.\(^{15}\) As much as we are interested in maintaining that reserve flexibility, it is also important to consider the possibility of spreading one's self too thin. A too radical type of behavior, represented by jumping off either end of the bell-shaped graph we constructed, will result in a failure to survive. Waddington expresses it this way: "A similar balance [exists] between a certain degree of flexibility combined with some resistance to change."\(^{16}\) This duality is also expressed by Simpson as stability-change or unity-diversity.\(^{17}\) For our purposes we will summarize these ideas and label the behavior in an adjectival form and call this adaptive dualism novel-traditional behavior.
The next three dualisms are given to us by J.P. Scott. In his article on the effects of early experience, he has constructed a table of nine types of general adaptive behavior. Either consciously or unconsciously, he created a list where each type of behavior has a dualistic opposite (with the exception of sexual behavior, which has no adaptive opposite). The three dualisms that he lists and which we are interested in are investigative-shelter-seeking, epimeletic-et-epimeletic, and allelomimetic-agonistic. The fourth dualism concerns eating and elimination and is not relevant to our discussion. The advantages and disadvantages in each dualism will be discussed to show why a balance must be maintained between the two poles.

Investigative behavior includes exploring the social, biological, and physical environment. The advantages of investigation stem from the fact that there may be a more favorable social, biological, or physical environment for the organism to experience. The danger of extending one's self is the possibility of overstimulation or a novelty that can't be coped with. On the other end of the dualism, shelter-seeking protects the organism from these possible over-stimulating environments, but stagnation and understimulation are distinct possibilities also. Thus, a balance is needed.

Epimeletic behavior can be described as care-giving, while et-epimeletic is care-soliciting behavior. A balance in these behaviors is important in social animals, for the individuals gain strength in diminishing each other's weaknesses. Each behavior is adaptive only when reciprocated. An organism which only gives care without receiving it overextends himself. An organism which only receives care may become dependent and therefore be unable to cope with a change by himself. The behaviors must be balanced.
Alleomimetic behavior refers to mutual imitation, while agonistic behavior includes aggressive and defensive behavior. This pair of behavior patterns incorporates to a certain extent the first dualism of unity-diversity into the social organization of a group of organisms. Alleomimetic behavior creates social solidarity, yet may not leave enough room for variability and flexibility to adapt to change. Agonistic behavior helps to define and protect the individuality of the organism, but must not grow to an extent where it affects social cooperation. Again, a balance must exist between these two types of behavior.

The fifth and final dualism to be offered is a special type, as it applies specifically to the human animal. This dualism is logical-intuitive behavior, offered by Waddington as one of the more important dualisms. Waddington remarks that intuitive insight provides the material for empirical experiment and logical thought, while logic checks or tempers the creative process of intuition. The example he gives of these forces working in harmony is of the scientist who must first come up with a new hunch before he can prove it by empirical or logical means. Thus logical-intuitive behavior exists as a very important dualism in the realm of human existence.

To summarize, we have chosen five pairs of general behavior which become adaptive when followed as shown in the graph:

![Graph showing frequency of behavior vs. type of behavior]

Notice that the graph does not tell exactly which type of behavior should be followed at a given time, but only the relative frequency at which that behavior should be occurring. The success of the individual organism or population depends upon its wisdom in making the right choice.
at the right time. The correct decision is based on the environmental condition at that time, which is always a unique situation and therefore cannot be included in the model. The important idea is that the environment is constantly changing, demanding that the organism be able to move in the proper direction and to the proper degree in any dualism. Once again, the five dualisms for behavior which have been chosen for this study are:

novel-traditional
investigative-shelter-seeking
epimeletic-et-epimeletic
allelomimetic-agonistic
logical-intuitive

This completes the model for ideal biological adaptive behavior.
Introduction to Philosophy Section

While the section on biological adaptation can stand alone as a separate paper, the next four short sections are dependent on the first section and on each other. Each of these sections contains a description of the modes of "proper" or "virtuous" behavior as suggested by a generally accepted outstanding spokesman for each of four philosophic schools—Formalism, Epicureanism, Taoism, and Existentialism. Ideas concerning the biological model for ideal adaptive behavior are interspersed with a discussion of each philosophy's morality, in order to see how each philosophy measures up to the ideal biological standard. The concept of dualisms is the main point for comparison between the biological standard and each philosophy, with the five specific dualisms established in the biology section being of particular importance.

In order to completely understand the discussion in the next four sections, the reader must understand the following ideas from the first section: the meaning and importance of transversing any dualistic continuum, the meaning of each of the five selected dualisms, and the importance of the human species-specific logical-intuitive dualism. If these ideas are not well understood, confusion will follow in the next four sections.

In the event that the reader may not be clear on what the exact purpose of ethics is, we had better explain a few things about ethics. Pure ethics is really nothing more than a theory of knowledge. The knowledge that ethics seeks is the nature and criteria of what is good. The task of ethics is not to establish a morality, although this is usually the result of ethical studies. Perhaps it would be just as valid to place ethics under axiology, the study of value, for "the good" can
be defined as that which has value. In any case, it is important for the reader to remember that there is always a gap between the ideal, theoretical model and any attempt to apply the model to concrete existence.

As this paper is merely a comparison of abstract systems of thought, one can not rightfully draw implications concerning the superiority in applying one philosophy of life over another. There is probably enough of a discrepancy between the model and actual behavior to disallow a philosopher of one school to claim that his actions are more adaptable than another's. Therefore, the comparison between our abstract biological model and the four abstract ethical models is little more than an intellectual exercise. Of course there should arise a practical result from this exercise, mainly a clarification and re-evaluation of the reader's own values and philosophy of life.
Formalism

Formalism is the ethical theory of Immanuel Kant. His views are presented in two books, *Foundations of the Metaphysics of Morals* and *Critique of Practical Reason*. We shall first of all run over the highlights of Kant's moral theory as it is found in these books.

Kant proposes that all good action stems from an *a priori* Moral Law. Thus, the Law can not be proven by experience, only reason. This morality is taken as a fact which applies to everyone. Since this morality is expressed as a categorical imperative, only actions which strive for this standard through the process of reason can be called moral. It is not the result of the action which can be called good, but only the will behind it.

Kant distinguishes between a free will and a will affected by the senses. Any situation in which a person acts toward a tangible goal which is perceived by his senses can be called acting from a hypothetical imperative. These acts can not be described as moral, according to Kant. Only when the will is free of the senses, that is, following reason, is the person following the categorical imperative, the universal *a priori* moral law. All imperatives of duty can be derived from one categorical imperative, and that is: "Act only according to that maxim by which you can at the same time will that it should become a universal law." In this statement it follows that it is vitally important to respect as ultimate the humanity of man, and to always think of man in terms of ends rather than means.

As a moral theory, Kant's categorical imperative may be perfectly sound, but as a framework for adaptive behavior, it fails miserably. One of the principle flaws in the categorical imperative as a determinant
for adaptive behavior is that the imperative defines goodness in terms of motives rather than results. Now adaptive behavior is concerned with resolving incompatibilities between an organism and the environment and therefore is always concerned with results. As we define goodness as a successful adaptation, Kant's ethics and our ethics are not compatible.

Looking specifically at some of our biological dualisms, we can find some more inappropriate ideas in formalism as a mode of adaptive behavior. The most serious of these is Kant's dogmatism concerning reason. Our model calls for a balance between reason and intuition. Kant, however, believes that following a moral law can be done only through reason. He states his point quite clearly, "A mixed theory of morals which is put together both from incentives of feelings and inclinations and from rational concepts must, on the other hand, make the mind vacillate between motives which cannot be brought under any principle and which can lead only accidentally to the good and often to the bad." Because Kant's ethics for behavior cling too tenaciously to one end of the dualistic continuum, we must dismiss the behavior as anti-adaptive.

Another dualism which is violated by Kant's ethics is novel-traditional behavior. Because Kant's Morality Law is a priori and absolute, there is no room for novel behavior. Any new behavior which does not follow the categorical imperative is automatically branded immoral. Thus, flexibility is lost and adaptation is not realized.

Kant's ideas concerning humanity adhere too strongly to the allelopathetic side of the allelopathetic-agonistic dualism. He clearly states, "Act so that you treat humanity, whether in yourself or in that of another, always as an end and never as a means only." Perhaps having all men treating each other humanely will strengthen the human race.
as a whole, but it does this at the sacrifice of the individual; therefore this behavior is not adaptive for the individual. Also, as we mentioned before, stagnation is possible when all the members of a society mimic each other's behavior, even if it is humane behavior. Thus, serious doubts arise concerning the adaptiveness of treating men always as ends and never as means.

Why then, does Kant call for moral action, when it doesn't appear to be adaptive? Kant's major problem seems to be wanting his cake and eating it, too. He assumes that when the will is free of causality (the senses), it is following the perfect, unerring, absolute moral law. He assumes that "no true contradiction will be found between freedom and natural necessity in the same human action."\(^{24}\) Therefore, under his propositions, if men begin to act under pure reason, which is unlikely but conceivable, they will be in perfect accord with Nature and have perfect adaptive fitness, a concept which we showed earlier was not possible. Kant seems to believe that man is a finished species, destined to rule all other forms of life. As evolutionary biologists, we cannot accept this idea of a species as perfect and not subject to the laws of evolution.

Reason, as powerful a tool as it is, must be balanced by periods of emotion and intuition, otherwise the system is non-adaptive.
Epicureanism

Epicureanism was founded, naturally, by Epicurus. True Epicureanism bears only a slight resemblance to the hedonism of today, which it is commonly confused with. Many people are not aware of the differences between hedonism and Epicureanism, so perhaps a discussion of Epicurus' doctrine would be in order here. His theory of ethics can be found in his Letter to Menoeceus.

Epicurus recognized that happiness, or pleasure, is sought for itself and not as a means to something else. Therefore, happiness is the highest good. Since happiness is obviously an individual, subjective experience, it comes into conflict with Kant's objectivity as the basis for morality. Kant speaks out against Epicurus' philosophy, calling it "obviously unfit for being the supreme principle of morality." Because the concept of happiness is not rigid like the principle of obligation, Kant goes as far to say that happiness as a determining ground for the will "is the direct opposite of morality." Kant also states, this time I think downright unfairly, that desire is a "lower faculty" than reason. Emotion and reason are qualitatively different, so that only an aesthetic comparison is possible here. For example, one can say, "I like peaches better than apples," but not, "peaches are, ipso facto, better than apples;" that would be a value judgment.

Just because Epicurus believes that pleasure is the highest good, that doesn't make him an indulgent person. He recognizes the fact that some pleasures bring pain; this fact must be taken under consideration when choosing between pleasures. Prudence or practical wisdom is the guide for choosing, for Epicurus realizes that prudence and pleasure may exist independently, although they should not. The result of these
choices should find a man who leads a simple life, free from anxiety, and with his normal, natural needs satisfied. 29

It appears then, that Epicurus' system shows much more flexibility than Kant's. The principle in Epicurus' philosophy may be subjective, but it is also stated that the desires should be tempered by reason. This fulfills the requirements of what was described in the first section of this paper as the most important dualism for human beings, logical-intuitive behavior. As far as the other dualisms go, the rein is pretty much left free. Since happiness is subjective, both ends of each dualism may be transversed, but following happiness does not require the person to travel the continuum of each dualism, so that we can not really say that happiness or pleasure itself provides a directive which is in harmony with our model of ideal adaptive behavior, although it certainly does not conflict with it. Perhaps we should look at pleasure itself as a possible motive for adaptive behavior.

There is much to be said for the adaptive value of pleasurable acts. To begin with, reinforcement theory would say that an animal would only continue to make responses that were positively reinforced, or, in other words, gave him pleasure. Natural selection would then weed out the non-adaptive responses, leaving only the "tried and true" adaptive pleasurable responses. Thus, Tiger says, "A species tends to 'enjoy' doing what has been important to its survival: sex and eating are the two most obvious examples." 30 Notice, however, the context of what Tiger says: "has been doing" refers to the past, so that we can not be certain about the adaptiveness of pleasure, since adaptation is concerned with the future.

The pleasure principle can backfire, as in the following example: It is hypothesized that man developed a desire for sweet food, because
a piece of fruit which is sweet is less likely to be rotten and harmful than a piece of fruit which isn't sweet. This enjoyment of sweets backfired; the results can be seen today in obesity and tooth decay from a craving for candy. Of course the prudence and tempering of desires should prevent a disaster like this. The stoic part of Epicureanism is just as important as the hedonistic part.

So, although the philosophy of Epicurus doesn't demand all of the qualities found in our model for adaptive behavior, it certainly allows for them, and therefore can probably be accepted as a good mode of adaptation.
Taoism

Taoism is the philosophy of the semi-legendary Lao Tzu. Lao Tzu was supposedly an older contemporary of Confucius. It is really irrelevant whether Lao Tzu existed or not; his philosophy does exist without a doubt and has greatly affected Chinese thought. The entire philosophy of Lao Tzu is contained in one book, which is called either the Lao Tzu or Tao Teh Ching.

Lao Tzu is more difficult to understand than most Western philosophers, for as Waddington notes, "[his approach to ethical problems] is on a different plane of rational thought." The familiar Eastern mystique surrounds Lao Tzu; his wisdom always appears mystical, esoteric, and sometimes irrational and nonsensical. This is because of the style of the Tao Teh Ching, which consists only of images and paradoxes. It is this use of paradoxes, we will find later on, that builds the crux of Lao Tzu's moral philosophy.

Before we go into Lao Tzu's moral philosophy, it is important to note that Lao Tzu seems to be aware of the dynamic, cyclic changes found in Nature. The Tao Teh Ching has many examples: "Yield and overcome; bend and be straight; empty and be full; wear out and be new; have little and gain." The heavy is the root of the light; the still is the master of the unrest. That which shrinks must first expand. That which fails must first be strong. That which is cast down must first be raised. Before receiving there must be giving. This is called perception of the nature of things."

It is because of these cyclic changes in Nature that we constructed a certain type of model for adaptive behavior in the first section of this paper. Now that we see that Lao Tzu recognizes the cyclic dualisms in
Nature, we will take a break from his philosophy to review how dualistic behavior is most adaptive to a dualistic Nature.

Take as an example of a cyclic dualism in Nature a change from a rainy to a dry climate:

As we showed before, there are two possible models of behavior for adapting to the change, the zero-infinity model and the ranging dualistic model. Say a species arose in the cycle just after the wettest, rainiest period, and this species used the zero-infinity model to adapt to the change. Since the climate is getting drier and drier, the species locks into a behavioral repertoire that expects a continued drying out; that is, the species specializes to dryness. The graph looks like this:

This adaptation continues to work fine until after five million years, when the climate begins to become increasingly moister. The species which specialized in only one direction cannot adapt to this new change and becomes extinct. If the species had used the ranging dualistic model of behavior, it could have moved in either direction, toward the exploitation of a dry climate or the exploitation of a wet climate. Thus, the dualistic model of behavior which we constructed in the first section of this paper is the best adaptation to the changes found in Nature.

Apparently Lao Tzu was aware of these cyclic changes, now the question is how he handles the dualisms. His ethical philosophy is stated in just
one sentence, "The greatest Virtue is to follow the Tao and the Tao alone." The best explanation of what Tao is can be found in chapter 47: "The Tao begot one. One begot two. Two begot three. And three begot the ten thousand things." The word "two" here refers to the concept of a dualism, while the three's, four's, etc., refer to the other concepts, names, and abstractions which arise from dualisms. This world we live in is perceived by most of us as a dualistic world. Before the two, however, Lao Tzu says there was one. "One" refers to Nature, God, or Brahman, depending on your religion. And Tao, which came before one, is so primordial that very few of us could ever really fathom it.

Lao Tzu doesn't bother with concepts of good and bad on the dualistic level of thinking. That is why, as we mentioned earlier, Waddington says Lao Tzu thinks on a different plane of rational thought. As the sage says, "All can know good as good only because there is evil." Lao Tzu wishes to transcend the world of dualisms and embrace the Primal Unity. That is why he uses paradoxes, or kōans, as they are called in Zen Buddhism. The reasoning behind concentrating on a kōan or paradox is that one does not want to give up either side of the argument; both sides are equally valid, yet they contradict each other. The only solution to the problem is to transcend the dualism completely and move on to the Tao.

One who is able to do this is said to have attained satori, a Zen Buddhist term which means enlightenment. Other expressions for satori include: knowing Brahman, realizing God, and becoming one with Nature.

The last expression is the one we are interested in. To be one with Nature means that as Nature goes through her cyclic changes, as person changes with her. A Taoist may have transcended the world of dualisms in his mind, yet he still lives in that world. From his enlightened viewpoint he sees no need to fight or struggle, he simply allows himself
to change with the changes in Nature. Although we can not prove that these enlightened states are indeed real and possible, if they are they create a set of behavior patterns which allows for good adaptability.
Existentialism

Kierkegaard is often said to be the outstanding spokesman for existentialism. Although existentialism is not exactly a theory of morality, ideals for behavior still can be derived from it. Existentialism is opposed to the idea of philosophy as a logical system of thought. Existentialism is more concerned with each individual's determination of his own essence through free choices. The theme of choosing is the basis of the philosophy of existentialism; this is apparent even in the title of the work of Kierkegaard that we will discuss: Either/Or.

Either/Or is a two-volume work, in which the first volume describes the life of an aesthete, while the second volume describes the life of an ethicist. It is generally assumed that Kierkegaard went through a period of life while he was studying at the university which would be described as an aesthetic existence, and as he matured he became an ethical person. However, one still can not be sure whether he favors the ethical or aesthetic existence, but that is the whole point; each individual must choose for himself. In order to clarify Kierkegaard's position, we must define what he means by ethical and aesthetic.

The basic difference between the two types of persons is that the ethical person chooses himself; that is, he lets his choices rule his actions, while the aesthetic person makes no choices and lets the environment dictate his life. The aesthete enjoys the immediate aspects of life while remaining morally neutral. As Kierkegaard puts it, aestheticism is Epicureanism without reflection. Looking back to our section on Epicureanism, the Epicurean does what he enjoys, but not without prudent consideration of all the possibilities. The aesthetic person does what he enjoys, but reacts without reflection to the immediate situation.
The basis for the ethical, on the other hand, is reflection and choice.

Kierkegaard defines ethical as "that by which a man becomes what he becomes." In other words, a man determines his essence by his choices. While many men may see the ideal, universal model as something outside of themselves which they try to emulate, Kierkegaard believes that the ideal exists inside of man and only needs to be discovered and chosen.

Kierkegaard emphasizes the individual's knowing himself and acting through his own free choices. The result of "knowing one's self" can also be thought of in the biblical sense, according to Kierkegaard: "By the individual's intercourse with himself he impregnates himself and brings himself to birth. This self which the individual knows is at once the actual self and the ideal self which the individual has outside himself as the picture in likeness to which he has to form himself and which, on the other hand, he nevertheless has in him since it is the self."40

In another view of the aesthetic versus the ethical, one might look at the argument as one of Epicurean pleasure versus Kantian duty, especially when Kierkegaard goes into a long polemic about duty as expressed in work and marriage.41 It must be remembered, however, that this duty of which Kierkegaard speaks is not an external universal law, but an internal force. The emphasis remains upon the individual's choice.

How does this theory of choice fit in with our model of ideal biological adaptive behavior? The author of this paper would say that Kierkegaard's ideas embrace the model and go beyond it. As you remember, the point of our model was that choices must be continuously make between two alternatives, or, in other words, any dualism must be transversed. It is important to remember, however, that, due to the uniqueness of an environmental situation, we had no way of telling exactly which choice should be
made and when it should be made. This has become the important topic for consideration in Kierkegaard's writings. He realizes that the necessity of choice is the basis of human anguish. That is why so much of his work is so somber, because he expresses the anguish which accompanies human choice.

There is no doubt that Kierkegaard's philosophy fits our model of behavior by calling for the choosing of possibilities; in fact it goes even farther than our model in that it considers a concrete application of our model to human existence.
Conclusion

The purpose of ethical standards is to tell us how we ought to act. The question is why nobody acts exactly in accordance with the ethical models. The answer seems to be fairly simple: no one can consciously and continually follow a model of behavior which is simply set before him. Modern psychology will tell us that the determinants of any individual's behavior include his genetic predisposition, his past experience, and the present physical environment. Perhaps a model of ethical behavior could be present in someone's past experience, but the model can not exclude the other factors.

Of what use then is an ethical system? Although ethical controls are not absolutely stringent, they do temper each individual's actions such that the formation of societies is possible. It was this formation of societies which gave man a selective advantage over the other creatures when he first emerged. Although man is still subject to the laws of natural selection, his ethical systems have allowed him to determine his own behavior, and, in a sense, control his destiny.

Of course man's ethical systems can never force him outside of the natural laws without consequences. To take an obvious example, if the conception of children were deemed immoral, the race would die out. Ethics can only guide man, not rule him absolutely.

We have shown that the best model for adaptive behavior is one in which flexibility is maintained in order to change with the cyclic changes in nature. Our position could be defined as moral relativism, that is, we accept no absolutes. That is why we had to dismiss Kant's categorical imperative. The other three philosophies could be acceptable, depending on what kind of person you are. If you are the type who deliberates among
pleasures, Epicureanism is for you. If you are agonized by your awareness of the necessity of decisions, you are an existentialist type. If you are of exceptional spiritual prowess, then perhaps some sort of transceedental philosophy is for you.

The author of this paper did not mean to slight the other philosophies which were not included in this paper. As far as the author is concerned, any philosophy which has flexibility and allows for choice can be considered a valid model for adaptation.

The final words of biological wisdom are: as rich and complex the ethical constructs of an individual may be, this individual will never be able to compete in terms of adaptability with another individual who simply keeps an open mind and carefully considers the options available before choosing. To adapt to a change in nature, one must always be ready to change one's self in any manner which is necessitated by the change in the environment. And,

"... May God us keep

From Single vision and Newton's Sleep!"
Footnotes

2. Tinbergen, p. 152.
3. Williams, p. 4.
4. Sommerhoff, p. 15.
5. Hale, p. 49.
7. Williams, p. 106.
10. Toffler, p. 344.
12. Ville, Walker, & Barnes, p. 768.
13. Williams, p. 263.
16. Waddington, p. 120.
23. Kant (b), p. 47.
24. Kant (b), p. 75.
25. Epicurus, pp. 55-56.
27. Kant (a), p. 36.
30. Tiger, p. 5.
32. Lao Tzu, ch. 22.
34. Lao Tzu, ch. 36.
35. Lao Tzu, ch. 21.
36. Lao Tzu, ch. 42.
37. Lao Tzu, ch. 2.
40. Kierkegaard (b), p. 263.

Complete publication information of these authors is included in the bibliography.
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(a) Kant, I. Critique of practical reason. (Translated by Beck, L.) Indianapolis: Bobbs-Merrill, 1956.

(b) Kant, I. Foundations of the metaphysics of morals. (Translated by Beck, L.) Indianapolis: Bobbs-Merrill, 1959.


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