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Human Behavior: Self-Discrepancy Reduction

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Abstract

The need for an overarching theory or model is discussed with integrated ideas and reasoning of past philosophers and scholars. The proposed theory of self-regulation as a discrepancy-reducing feedback loop that encompasses all aspects of psychological study is described and elaborated on with past work from Carver and Scheier and Powers. The formation of an elaborate model that accounts for all behavior is recognized as daunting though not unattainable. It is suggested that all behavior can be viewed as discrepancy-reducing; this idea could serve as the foundation for the construction of a broader and more elaborate model.

Pragmatic Psychology

“Her [pragmatism’s] only test of probable truth is what works best in the way of leading us, what fits every part of life best and combines with the collectivity of experience’s demands, nothing being omitted.” ~ William James, 1997, p. 111

The quote above came from an American philosopher almost a century ago. In the search for truth there are many roadblocks within psychology as the subject it studies is vast in complexity and substance. Within this complexity and substance there must be something that unites it all, a principle or law that is relevant to all aspects of behavior. As the philosophical study of symbolic logic lays the foundation for basic algebraic mathematics, the American philosophical movement of pragmatism may lay out the foundation for an approach to study psychology.

In the quote above James is not talking about psychology but personal beliefs that a person lives by. But as a personal belief may guide an individual concerning the goals, values, and attitudes they might have, psychology is absent of such a belief to guide experimentation and explanations. Mathematics depends on the valid logical structure of sound arguments and premises, such as $1 = 1$ or put in symbolic logic “ q ” is logically equivalent to “ \bar{q} ”, where symbols and postulates are interchangeable. I ask then, what does psychology depend on? Is there a premise that a psychological experiment and its outcome must abide by to be labeled sound, besides the power of a statistic? If there were an error in operation performed in mathematics the outcome would be wrong. If a human behavior did not fit a psychology paradigm that would have predicted differently, the said human behavior can be dismissed as an insignificant statistic or “outlier”, but

the prediction wouldn't be wrong. What would be considered by other sciences as anomalies that need attention psychology can dismiss as a misfit or error. If only 9 out of 10 objects on earth obeyed the pull of gravity, physics would be a shambles and would not rest until gravity was explained in a way that applies to all things. Why can we not expect the same from psychology, since it is a science? To do that, to hold psychology on a par with other sciences, it needs a unifying principle that psychology can use as a premise for all experimentation and explanations. The trick is where to start and here I turn to pragmatists Charles Peirce and William James.

One issue (perhaps the most important) that stands out when approaching this problem is that psychology is dealing with a very abstract mechanism, the brain. The brain, in my opinion, is the one of the most mysterious of materials on earth because it is not clear how or why it works. For instance, the normal human brain has areas where activity can be regularly seen for doing routine tasks and we have named them accordingly. For instance, the occipital lobe is where visual information is processed (Garret, 2003). However, there are cases of people with hydrocephalus, a condition where the ventricles of the brain expand due to the abnormal collection of neural fluid, who have hardly any brain matter at all yet these people function and behave just as well if not better than normal people. There are yet other cases where people born with little to no brain have developed brain mass as time progressed and lived a normal successful life (Dallas, 1991). A lobotomy will demonstrate that removing mass can affect the brain most negatively, which uncovers a paradox: some people can have little brain mass and be functional but others, who have seemingly excess brain mass, have a bit removed or damaged and may become handicapped forever. Also, the recent 2002 book *The Mind & the Brain: Neuroplasticity and the Power of Mental Force* by Schwartz and Begley discusses work that has shown with owl monkeys that the cortical activity can be rewired, or rezoned, through experience to process differently than how the cerebral cortex brain was originally designed to do. Through the implications that arise from these observations between brain neuroplasticity and non-debilitating hydrocephalus, it is my opinion that psychology and medicine, through no fault of their own, simply do not at this time have the tools or technology to examine the brain with the sophistication needed to understand why or how the brain physically works. While we can pick and marvel at pieces of the brain and how it physically reacts when it gets sensory input or causes or prevents particular actions we are far from being able to predict and explain exactly how the physical brain produces behavior and takes in information. I propose then we should, for the moment, be satisfied with knowing that the brain just works. I suggest merely accepting the brain as something that works because whatever we deduce now cannot account for all the observed anomalies that occur

between different brains nor do I think we have observed all the different anomalies that can exist between human brains. To borrow Peirce's words "the true conclusion will remain true if we had no impulse to accept it, and the false would remain false, though we could not resist the tendency to believe in it" (Peirce1, 1997, p. 10). To reiterate, the mechanics of why or how the brain physically works will exist regardless whether of we discover it or not. Any premature or false belief we have now about how the brain works, no matter how sound it appears or how willing we are to accept it will still be false. A clue to whether or not a theory of how the brain works is true is given by the introduced quote above: it will explain everything observed and omit nothing. To the best of my knowledge we do not have such a theory that is accepted by all psychologists yet. What then do we do with why and how a brain works physically? For the moment, as stated before, we leave it and I intend to comfort you in doing so by giving you Peirce's response to not knowing an abstract fact such as force:

The idea which the word force excites in our minds has no other function than to affect our actions, and these actions can have no reference to force otherwise than through its effects. Consequently, if we know what the effects of force are, we are acquainted with every fact which is implied in saying that a force exists, and there is nothing more to know (Peirce2, 1997, p. 41). Likewise, if we know what the effects of the brain are then we are acquainted with every fact which is implied in saying someone has a brain, and there is nothing more to know. For the moment this will have to do because we simply cannot yet fathom how the brain physically works. Now that we can leave the brain inside our heads for the moment we are now faced with the dilemma of coming up with what is the effect of the brain? This is the job of psychology though, in my opinion, psychology does not seem to be getting the job done.

Psychology versus Chemistry

Plotnik (2002) defines psychology as the systematic, scientific study of behaviors and mental processes. Within psychology there are many approaches and Plotnik listed the approaches that were used mostly at the time he published his text: the biological approach, the cognitive approach, the psychoanalytical approach, the humanistic approach, and the cross-cultural approach. There are texts devoted to each approach concerning how one should go about observing data and how to interpret it and in this lies a terrible problem. Now, not any one approach can explain all reasons for behavior though they do a great job explaining the little parts that can influence it. To return to the definition of psychology, it is a systematic and scientific study. There appears to be nothing systematic about psychology. With the many routes of reasoning about human behavior through the different approaches it seems there is no one systematic principle

or method. If an individual's behavior would vary from the norm each psychological approach would have a different reason as to why it occurred. Each explanation may have a ring of truth to it but none of them alone is correct. There are no problems with having sub-divisions within a science, but there must be some common ground, some related premise and psychology is absent of one. It then follows that psychology struggles to be a science, as science is defined as "the organized, systematic, enterprise that gathers knowledge about the world and condenses the knowledge into testable laws and principles" (Wilson, 1998, p.53).

It is important for a moment to delve into what science means and what it needs to be in order to understand what psychology is lacking and what needs to be corrected. Edward Wilson, the author of *Consilience: The Unity of Knowledge* (1998) distinguishes science from pseudoscience through the qualities of repeatability, economy, mensuration, heuristics, and consilience. Repeatability is the ability to reproduce and test a result as to confirm or discard it by means of analysis and experimentation. Economy is the ability to abstract information into a form that is simple and aesthetic while also yielding the greatest amount of information with the least amount of effort. Mensuration is the property of being properly measured, using universally accepted scales and being able to generalize about information without making it ambiguous. Heuristics is the property of stimulating new discovery. Consilience is the survival of explanations of different phenomena based on connections and proven consistency between them (Wilson, 1998). In my opinion, psychology holds little to none of these properties. Psychology cannot yet rely on any method that can reproduce the same result from every individual. Psychology does not have a form of information that is simple and aesthetic that yields a lot of information with little effort. Psychology does have some uniform scales for measuring some personality traits, such as the "Big 5". Psychology is forever finding new avenues to explore, but not entirely due to any true understanding as throughout the field there exists bewilderment, in my opinion. Consilience is absent from psychological explanation and theory as there is always some individual that is an exception to the rule, for which the theory or explanation does not account.

Like psychology, there are many sub-divisions of chemistry: organic chemistry and inorganic chemistry to name two. Yet the discipline of chemistry, as well as physics and biology, has acquired those things necessary as prescribed by Wilson. Chemistry has two fundamental premises, two that all chemistry experimentation must follow and these are the laws of conservation of mass and energy. The law of conservation of energy is that energy cannot be either created or destroyed, and the law of conservation of mass indicates that mass cannot be either created or destroyed (*Chemical Principles*, 2005). All chemists can agree with this point and if something is observed where this law is not preserved

then there is a problem with the controlled environment or the instruments involved. Case in point: there is no unexplained variance in chemical reactions; there should not be any variance at all. If there were then great attention would be brought to it until it was reasoned out as to why it occurred. In that lies the difference between chemistry and psychology; chemists have a premise by which all experiments must abide, psychology as of now does not have any such thing.

Of course chemists have it far easier than psychologists: chemists have the luxury of knowing a reaction will occur 100% of the time no matter when it is done if all the conditions are the same; the era and culture of the human subject varies as studies go through the years. Also, chemists don't need to get the element's permission to do experiments on them; humans are a bit more sensitive when we want to pick at their brains.

Variance and Statistics

In psychological experiments there is always an observed variance that either does not follow the norm or conflicts with the experimental hypothesis. Each approach in psychology has a way of accounting for this array of behaviors that occur. The psychobiologists will look toward neural connections and brain activity, psychoanalysts will explore the unconscious and the behaviorists will look towards the environment for cues of causation. As to why these variances occur, that's where the subdivisions of psychology turn into independent factions and not a part of a whole. The behaviorists could explain a particular behavior that would also be explained in a completely different way by a biological or psychoanalytical approach. They all can't be solely correct but they can each have a degree of truth. Other than ideology, there are experimental steps to account for variability in subjects such as selecting subjects through random sampling or having a control group with which to compare the experimental group. The best tool, though, for coping with or dismissing variability is statistics. When testing their theory, any observed variance that results that does not fall into the scheme of things get tossed into the "dismissed" or "error" pile of statistics, which can be very damaging to a science when taken too far. Statistics can be very important when discovering variables or outputs that would not have been noticed before without the statistics to show either significance or descriptive direction. But when experimentation is guided only by statistics and ends with it the point of the science is gone. Instead of testing a theory, the attempt is instead trying to show anything that can occur in nature with very little value to its meaning. As Powers puts it: "Significance in [psychological] experimental results had come to mean something other than 'importance.' It now means a little triumph over nature's noise level" (Powers, p. 6). "Nature's noise level" is the vast variability between individuals; their personality, history, experiences, attitudes, physiology and chemistry (note

that there is an approach for most of the reasons for variability). As psychology is now, it is dealing with all these noises individually with no clear intention to bring it all into harmony.

What psychology needs is an approach or theory that all experimentation in all approaches contributes to. The problem that exists today is that there are many concepts and models across the sub-disciplines that overlap. This is not a novel observation as a recent publication of Dr. Staats from the University of Hawaii explored the shocking similarities between works and conclusions of past psychological research. He writes in an article: “the great commonality was overlooked, and with it the possibility of establishing a consensual, parsimonious, more understandable, and heuristic body of unified knowledge” (Staats, 1999, p. 6). Also, there may be an over-dependence on the old theories. As a new approach is needed, how do we go about creating it?

Powers

Powers wrote *Behavior: The Control of Perception* and in it he addresses this issue that psychology is facing. In it he discusses three ways of producing a theory: Abstraction, Extrapolation and Modeling. Abstraction is when an observed phenomenon is generalized to explain a broader law of nature. He uses the example of observing a rabbit eating a carrot. The rabbit will be generalized as a rodent and the carrot will be generalized as nourishment. Now we have a theory or “law” that follows that all rodents accept nourishment. It starts as an observation but turns into a verbal abstraction that goes farther away from what was observed to claiming what occurs concerning all related things. Although this seems logical and even true there is a fatal flaw in going about making rules of nature this way. For instance, some generalizations that are clearly wrong are “all birds fly” or “all mammals grow hair.” Such a method would fall short of accounting for the billions of variances in any behavior observed in humans as mentioned above. Any attempt at it would be so vague that it would be meaningless, like “humans do something.” Extrapolation is the generalization of masses of data and is only valid for predicting behavior en masse. Our aptitude tests and standardized tests depend on the reliability of the past predicting the future. Although this is a start for a science it isn’t an end, as Powers demonstrates with his analogy of Mars. Mars can be observed to follow a curve over a period of weeks but it is wrong to assume it will forever follow that curve, even if it might for a while. Mars will stop and appear to move backwards. Those with high SAT scores are predicted to do well in college but they very well may drop out and those with low SAT scores are predicted to do poorly in college but they may very well succeed with honors. As mentioned, extrapolations are great for predicting behavior en masse but individually, they are poor predictors of an outcome. Statistics, again, is a key source here to dispel the individual difference. Another quote from Powers says it: “Statistics has

become a mainstay for psychology, to the point where it is a substitute for thought, creativity, and evaluation” (Powers, 1973, p. 12). If an experiment shows a correlation or a minute percent of error then it is a success, even if the experiment is mindless drivel. When psychology uses these extrapolations such as IQ and standardized test scores and applies them to predicting an individual’s performance it may be wrong.

Model building is the third approach to forming theory and the one I wish to insist on for the psychology discipline. Powers also attempted the same in his book but it has seen little success. To echo his voice again “A model in the sense I intend is a description of subsystems within the system being studied, each having its own properties and all – interacting together according to their individual properties- being responsible for observed appearances” (Powers, p. 14). It is this approach that must be adopted by all facets of psychology to put together a system that explains all behaviors as we observe it. Powers began to suggest such a system as being a hierarchical control loop (Figure 2). It is now we turn to Carver and Scheier and recent works on the subject.

Control Loop

A hierarchical control loop is the system suggested by Powers that accounts for all observed human behavior. His idea was adopted and refined by Carver and Scheier, who came up with the self-regulative model.

Self-regulation is a term used by Carver and Scheier (1986; Scheier & Carver, 1988) to describe a motivational system that keeps an individual progressing toward a goal. As noted by Carver and Scheier, the idea has been around for a long time before they proposed it. The motivational system involves monitoring the discrepancy between a current state and an ideal state, and altering behavior to move the self closer to the desired goal. The implicit components of self-regulation, as explained by Carver and Scheier (1986), can be seen in their relationship to one another in Figure 1. The self-regulation feedback loop consists of six parts: Disturbance, Impact on environment, Input, Comparator, Reference Value, and Output. The disturbance and impact on environment constitute the context that a person is in at any moment. The input function is the process where a person monitors or checks on their present activities, qualities, or states within that context. This perception is then compared against salient reference values or standards in the comparator process. If there are any discrepancies between the individual’s perception and their reference value when they are compared then action will be made to correct this, which would result in an output function exhibited as a change in behavior. This change in behavior may, in turn, change the impact on environment. This feedback system is a continuous process that repeatedly monitors how closely the

perceived outcomes of behavior match the reference value. The model's function is to minimize any discrepancies within the comparator (Carver & Scheier, 1986).

Carver and Scheier do not expect this model to replace current thought, but rather to work with many other ideas. (Carver and Scheier, 1998). There is an emphasis, though, on the necessity of goals in that "goal engagement is a necessity of life" (Carver & Scheier, 1998, p. 346). These goals are explained as being essential to the feedback loop process. What I find problematic with their discussion of the importance of goals is that these goals could just be viewed as specific reference values. Outside our basic needs such as thirst, hunger and sleep there are no specific goals that are necessary to live. That is to say, one does not need direction (such as a dream or career, aspiration, etc.) in their life to go on living. If one does exist though, it serves simply as another discrepancy in the forever reducing feedback loop. So what is necessary then, for life, or behavior in general, is a discrepancy to exist within the system of a thinking being.

I would suggest that there is no observable behavior that cannot be explained by this model. I challenge anyone to come up with an observed behavior that cannot be explained through self-regulation. To quote William James from his work *The Principle of Psychology* "A less obvious way of unifying the chaos [observable human behavior and suspected mental functions] is to seek common elements in the divers mental facts rather than a common agent behind them, and to explain them constructively by the various forms of arrangement of these elements as one explains houses by stones and bricks" (James, 1890, p. 1). I am proposing that parts of self-regulation, as shown in Figure 2, are the common elements in all observable and reportable behaviors and thoughts. Powers intended the hierarchical model to go as far as explaining how the brain controls the very hands used to type this paper. As it is not one nerve ending that controls the fluid motion of one hand it is many that influence the tendons and muscles that allow a person to manipulate their body to produce the desired effect. But, at the same time as a person uses the feedback loop to continuously stress and relax the tendons and the muscles of their hand to type they must also have a feedback loop monitoring their breathing, heart beat, and eye movements. Whatever the task is or need be a discrepancy feedback loop is a reasonable process that would describe its occurrence. As soon as the paper is done I need not type any more, thus the discrepancy would be extinguished; ergo to fix it my hands would stop pushing keys. As this model does not need to be complicated to describe a single observable behavior it does need more complexity when cognitive functions and multiple actions are introduced to the equation. For instance, I'm a responsible adult, I was given a grant to write this paper, ergo I must write this paper so I must be sitting down at a computer to type the paper and be typing it to

complete the paper. It turns into a map of reasoning that guides behavior based on what we have for reference values.

What makes up reference values or determines what belongs where is a puzzle that needs to be and can be solved. The Powers model is a hierarchical model but it lacks the complexity that is needed in order to show basic human functions and to account for the multiple complex faculties that occur simultaneously. To allude to Maslow's hierarchy of needs, which consists of (from bottom up) physiological needs, safety needs, belongingness and love needs, esteem needs and self-actualization needs, it is recognized that this order is not fixed, as some starve themselves for some higher purpose like going on a hunger strike for some humane cause (Myers, (2004). Priorities can change between contexts. There are many contexts where priorities can change, such as that obedience is important around your parents but when your friends arrive the priorities shift to a desire for more rebellious action. And as priorities change there are multiple avenues where action can take place at the same time. A person can be writing a poem for an English class and as there are negative feedback loops that allow his body to control his hand movements something about the context of the poem can trigger a memory that evokes an emotion that the body then controls, changing the boy's facial expression to express the emotion while he continues to write it. There are reference values that are culturally induced, such as the dead should be mourned. There are outputs that require hormones and other chemical discharges, like adrenaline for the flight or fight response. There are also personality types that are more sensitive to particular stimuli, making an OCD patient more aware of the tidiness of their room. I propose then that a model be produced, loosely based on the self-regulation feedback control loop, that encompasses all behavior. This is not meant to be strictly for a particular approach within psychology; it is for all approaches in psychology as the model requires the input of all methods to make it work. It must also be considered that these reference values are able to change in position when viewed hierarchically, in that they depend on the condition or context a person is in, or the nature of the environment. For example, an adolescent may act in two very different ways depending on whether or not he is with his friends or with his folks. These changes in consistency were observed by James as he mentions in his work "the faculty [memory] does not exist absolutely, but works under conditions: and the quest of the conditions becomes the psychologist's most interesting task" (James, 1890, p. 3). I propose that the effect of how the environment influences the sequence and strengths of the comparators is the subject of said interesting task.

To help visualize this model we need to look at another science, biology. Biology itself is a science of many topics but these topics come together. As the chemists have their law of conservation

of energy, biologists have their first law of thermodynamics. The first law of thermodynamics states that energy can be transferred or transformed, but it cannot be created or destroyed (Campbell & Reece, 2002). With this law in mind the production of energy must be traceable since energy must come from somewhere since it cannot be created (Figure 3) and it must go somewhere since it cannot be destroyed. With the combined effort of many great minds and study a metabolic pathway chart was created that shows how metabolism occurs in the cell, let it be through photosynthesis or the Krebs cycle (Campbell & Reece, 2002). The point is that such a chart would not be able to be if it were not for a collection of efforts from biologists who study plant cells as well as those who study animals and other organisms. Together the approaches of psychology might produce such a chart, not for metabolism, but for human behavior, including human cognition.

How Extension of the Model Needs to Start

If a model is to unify a science then the parts of the model must be accepted by the whole discipline of psychology. Going back to the self-regulation feedback loop, let's start examining the parts that cannot be denied: output, input, and environment. As all energy or mass must come from somewhere since it cannot be created, so must the mind depend on something to cause it to act and this is where environment starts to be defined. One can reason and accept that we all live in some context, though they may be different. These differences may be cultural and biological. Despite the similarities that may exist, there is a dichotomy between the environments of two people. For instance: if two men share the same room the two men do not have the same environment. Person A is in a room with Person B and Person B is in a room with Person A. Person A cannot see himself outside of his body so his experience of himself is not the same as Person B's experience of Person A. Also, Person B would not feel or be aware of the effects Person A's body is having on Person A. As Person A may be able to explain how tired he is to Person B, Person B cannot fully know how much stamina Person A has. This demonstrates that the environment does not only exist outside of our bodies but inside as well. Our hormones, chemical balances, stamina and so forth are part of our environment. This is not to separate or bind mind and body but it should be understood that people are aware of what is going on with their body and act accordingly. When our heart is beating too fast and we have shortness of breath we generally slow down and rest a bit. I am also going to propose that other things people can report, such as emotions and memories or creative ideas, are part of our environment. As emotions, memory, and creative images or ideas are popularly noted as cognitive functions it isn't far of a stretch to say that they can influence behavior. An emotion is felt, it can be described and understood by others, which can affect others and our own behavior therefore it is part of our environment. A memory can

be drawn out or played through, it can be used like a map to guide us back home or to a lost object, it can paint a picture of yesteryear to recall people and events and as these memories affect behavior can it not be reasonable to call it then part of our environment? A creative image or idea, like a memory, can spark ambition or entertain but influence behavior nevertheless, therefore is it not part of our environment if we define the environment as all that can influence behavior? A problem with psychology is that there are no entirely accepted premises but hopefully we can start now by agreeing what the environment is. The environment, for our model's purposes, is the context an individual is in. It encompasses all that can be felt and described: physical and metaphysical, internal and external. It also encompasses all that cannot be felt and described. As long as it can affect a person's behavior it is part of an individual's environment. This is the first thing that must be agreed upon by everyone in order to make the rest of the model make sense. This definition can apply to all methods of psychology, the psychoanalytical and biological, behavioral and cognitive. There is no reason to deny this definition of an environment as described. If the environment is not everything that can have an effect on behavior then what is it? Keep in mind the purpose of the model is to unify psychology and connect all approaches so that they can contribute towards and work with each other. Behaviorists use the environmental cues that guide behavior, psychoanalysts use the unconscious mind's desires and fears that guide behavior, biologists use the hormones and available anatomic bodily sensors that help guide behavior and cognitivists use the thoughts that help guide behavior. No aspect of psychology is omitted, an important and vital point.

From the environment (all that is physical, metaphysical, internal and external that can influence behavior) an individual takes in sensory input. This input in our model is what is perceived and sensed through our body and mind. Input is the sensory feed that reports what is going on with our outside world and internal body. It is a report of what is going on, from respiratory function to road conditions on the highway. A blind man will obviously not have any visual input as a deaf man would have no audio input, as there is none from their environment to collect from, but everything else that can be sensed or reported is. I cannot foresee any dispute over this claim, that this encompasses all that an individual perceives both consciously and unconsciously. Too often semantics get in the way of progress in that many terms in psychology have more than one meaning (Chalmers, 1996). When scientists argue over the meaning of "sensed" or "felt" a greater purpose is lost. The greater purpose is not the meaning of the words but scientific study and the effect of the brain. Chemists all agree an element is a unique structure of protons and neutrons; hopefully psychologists can agree that input is all things that can be perceived and reported, both consciously and unconsciously, and the environment is what all input comes from.

Output is any observable behavior. Anything an individual or the individual's body is observed or reported to do is an output and this output has a direct effect and thus changes the environment, creating new input. This output can be a thought, memory, creative idea, movement, and speech or lack thereof as witnessed by another individual or self-reported. Output, plainly, is all observed and reported behavior and cognition. Everything we do or that our body does is done for a reason. So under the assumption that all of our behavior and cognition is a discrepancy reducing result of some comparator, the question arises, "what is the nature of these comparators?" The nature of the comparator is the big project.

The Big Project

Only a complete model that is supposed to apply all of the time and in all circumstances can really be tested by experiment. If one limits the scope of a model, failures of prediction or explanation can always be attributed to effects of what has been omitted. (Powers, 1973, p 78).

When something is omitted from a model or theory then it is bound to fall short of predicting all things. Even worse, the omitted aspects of the model may become viewed as unimportant or overlooked completely, which restricts what to do next (Powers, 1973). No one sub-discipline studies all aspects of the environment or every input a person has, nor should that be done differently. An experiment that takes every variable into consideration sounds terribly daunting. So how can this model possibly be made or used in a fashion that is useful? Going back to the metabolic pathway chart (Figure 3) it is going to be the progressive construction of many parts into a whole, looking at the many aspects and then relating them to this whole. When describing a single basic behavior the basic self-regulative model (Figure 1) could stand alone but when multiple behaviors occur at once and you look behind them as to why a particular comparator was used it falls short of explanation. To demonstrate how this may work, let's look at a topic that has had a lot of attention in research and theory: stress appraisal and coping.

Stress Coping and Appraisal

Cognitive appraisal is an evaluative process that determines why and to what extent a particular transaction or series of transactions between the person and the environment is stressful. Coping is the process through which the individual manages the demands of the person-environment relationship they have appraised as stressful and the emotions they generate (Lazarus & Folkman, 1984, p. 19).

In so many words, appraisal is the comparator that determines the discrepancy between the person and environment and coping is the output that is meant to deal with this discrepancy. The idea

that appraisal can be synonymous with a comparator goes back to the very problem with psychology mentioned before. As I describe the Lazarus and Folkman's appraisal theory I will use terms from the suggested model, to demonstrate how they can be seen as the same thing.

Lazarus and Folkman describe two types of appraisal, primary and secondary. There are three types of primary appraisal. Primary appraisal can be categorized as irrelevant, benign-positive, or stressful. Environmental input would be categorized as irrelevant if there were nothing to be lost or gained by it. Habituation to a reoccurring stimulus is such a case where the stimulus is categorized as irrelevant. This could be also that there is little to no discrepancy produced by the input. Benign-positive appraisals occur if an encounter is construed as something that will either preserve or enhance well being. This appraisal is characterized by pleasurable emotions. Guilt or anxiety can also characterize benign-positive appraisals as an individual may feel that good states must be paid for or will be followed by some misfortune. This characterization varies with personal factors and situational context (environment).

In the instance where people vary Lazarus suggests that there exist commitments and beliefs. These commitments are things that affect a person in a way that guides their behavior and how they perceive things. These commitments seem to take on a huge role and it is mentioned that these commitments can have varying depth to them. This seems like a good attempt to explain the variance in people who may appraise or cope with the same situation differently.

"By themselves, commitments and beliefs are not sufficient to explain appraisal. They work interdependently with situation factors to determine the extent to which harm/loss, threat, or challenge will be experienced." (Lazarus & Folkman, 1984, p. 81). This is a good attempt to recognize that the scope of predicting individual behavior considers many dimensions; however, exactly how to incorporate these dimensions is not described. Where this theory seems to echo off, the model I propose encompasses such dimensions. Also, to further demonstrate the problems in the science of psychology, the terms "commitments" and "beliefs" create further vocabulary and easy confusion talking about multiple things. In the interest of parsimony, Lazarus and Folkman might have used terms that link their ideas to other well-known and studied concepts or else it seems we are creating multiple words for the same thing. Such problems result in people confusing terms that are described in the same literature: "The distinction between coping and automatized response is not always clear" (Lazarus & Folkman, 1984, p. 131). I expect any two terms used in a discipline to be distinguishable.

Though the practice of using the cybernetic model of self-regulation to explain behavior has also been discussed in Matthews et al.'s *Emotional Intelligence: Science & Myth* (2002) as an explanation for occurring emotions, these authors suggest that emotions serve as reports on the functioning of the feedback system. If it is functioning well then there are positive emotions, if not, then negative emotions. As this is an attempt to link self-regulation to emotions, it raises a question: what system then is monitoring self-regulation and how does that work? Their approach raises more questions and it is my quest to reduce those questions. Instead of describing emotions as a monitor for the feedback loop, emotions themselves are a result of the feedback loop, as an output, since output is all observable behavior and it must serve to reduce some discrepancy. Then, terms such as primary appraisal are descriptive words whose purpose is to generalize the nature of the feedback loop and its outcome. An output can be a positive experience, benign-positive, or have a lack of emotion, irrelevant. Further on in the book it claims that "self control is said to be central to EI [Emotional Intelligence]... the term may refer to the overall operation of self-regulation" (Matthews et al., 2002, p. 361). To sum up appraisal and coping in terms of the discrepancy feedback loop I offer Figure 4. The appraisal is in place of the comparator, as it is doing essentially the same process, and coping is the output. While the similarities between appraisal and self-regulation are almost obvious, there are many mental processes that are not so obvious.

Describing the effect of the brain as a self-discrepancy reducer may lead to dead ends where it doesn't seem to make sense. For instance, how does imagination reduce a discrepancy? To explain the phenomenon of imagination as a discrepancy-reducing behavior let's start with the universal premises proposed thus far. The environment is the source of all things that influence behavior. If this is so then whatever we imagine is a product of things we already have in our environment. This can include experiences, images, knowledge of the world, etc. A blind man, then, cannot imagine a color if that blind man has never seen a color, much like a deaf man cannot imagine what a sound is if that deaf man has never heard a sound. If someone asked me what something was that I knew nothing of then I couldn't respond for the same reason a blind man could not imagine a color. I

would have never seen it, I would have no idea how to relate it to something else, and there would be no context in which to put it. When a person imagines, then, they use everything that exists in their environment, including memories and knowledge. Problem solving involves such creativity where one needs to use what they know to create a solution. Imagination is a similar function where one creatively molds together what is in one's environment to produce something. In a sense, problem solving and imagining is the same thing. Take a child who is bored in their backyard. To solve their problem of being bored, either intellectually or physically, the child will play pretend. But this pretending will be built upon faculties and knowledge already accumulated through life. A child may imagine a monster, and granted a monster with tentacles and wings could not have been seen before but if the child had never seen tentacles or wings then this monster the child imagined could have neither. The monster is a concoction of ideas and experiences. Children can make up words, but only with the syntax and sounds they were brought up with. In a sense then, the imagination is not limitless. It is constricted to what has been experienced in an individual's environment and it is sparked when there is a discrepancy that the act of imagining can fix.

If the idea of creating an overly complex model that fits everything seems too much wishful thinking then I'd say that is fair. I insist, however, that you take with you the idea that everything in psychology is connected and that humans are, or any animal with a brain is, a self-discrepancy-reducing animal. Through this approach all behavior and cognition is included. There will always be variances in observable behavior but all behavior will have the same goal, come forth to fulfill the same purpose: to fix a discrepancy. If you can accept that, look at behavior through that light, you would be intrigued to go back to all research that has been done in psychology and see if it cannot be viewed as describing in one way or another ourselves as discrepancy-reducing beings. Pavlov's salivating dogs illustrates a form of learned response, or in other words, a learned output. Is learning then in fact the creation of new discrepancies and intelligence the efficiency of reducing the discrepancy? As it is always easier to speculate than to prove, hopefully my reasoning as presented will convince you to humor the idea if not take it entirely to heart.

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Figure 1. Discrepancy reducing feedback loop (Carver and Scheier, 1986).

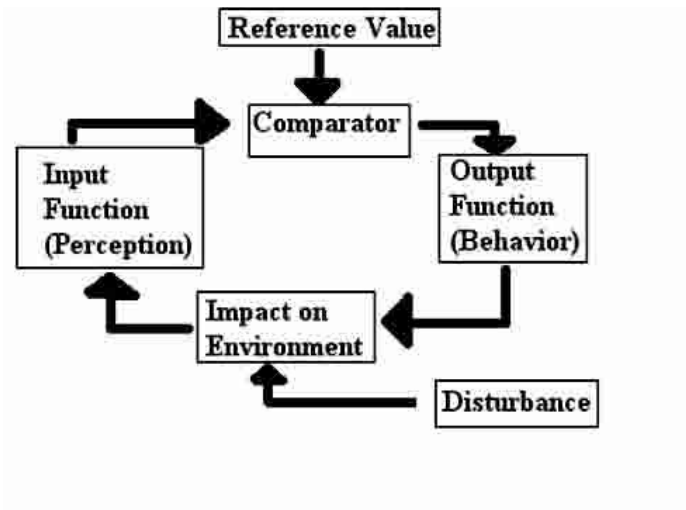


Figure 2. Hierarchical model of the discrepancy reducing feedback loop (Carver and Scheier, 1986).

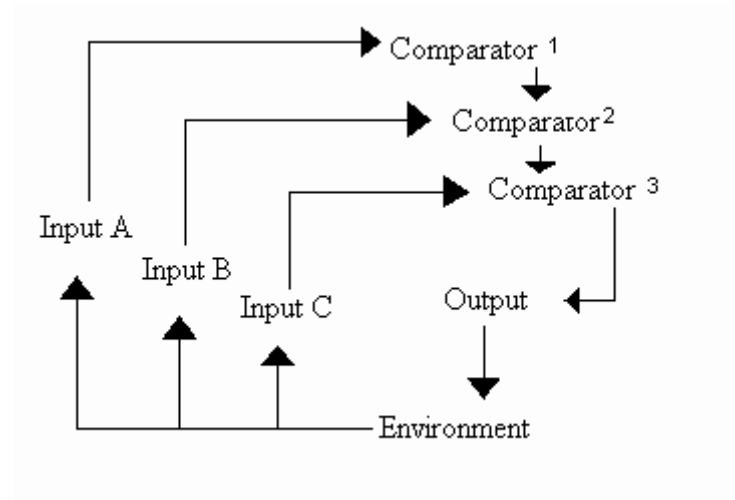


Figure 3. The metabolic pathway chart helps visualize how complex a model can be when connecting all the related parts and also that it embodies the theory of the first law of thermodynamics (Biology 6th ed., 2002).

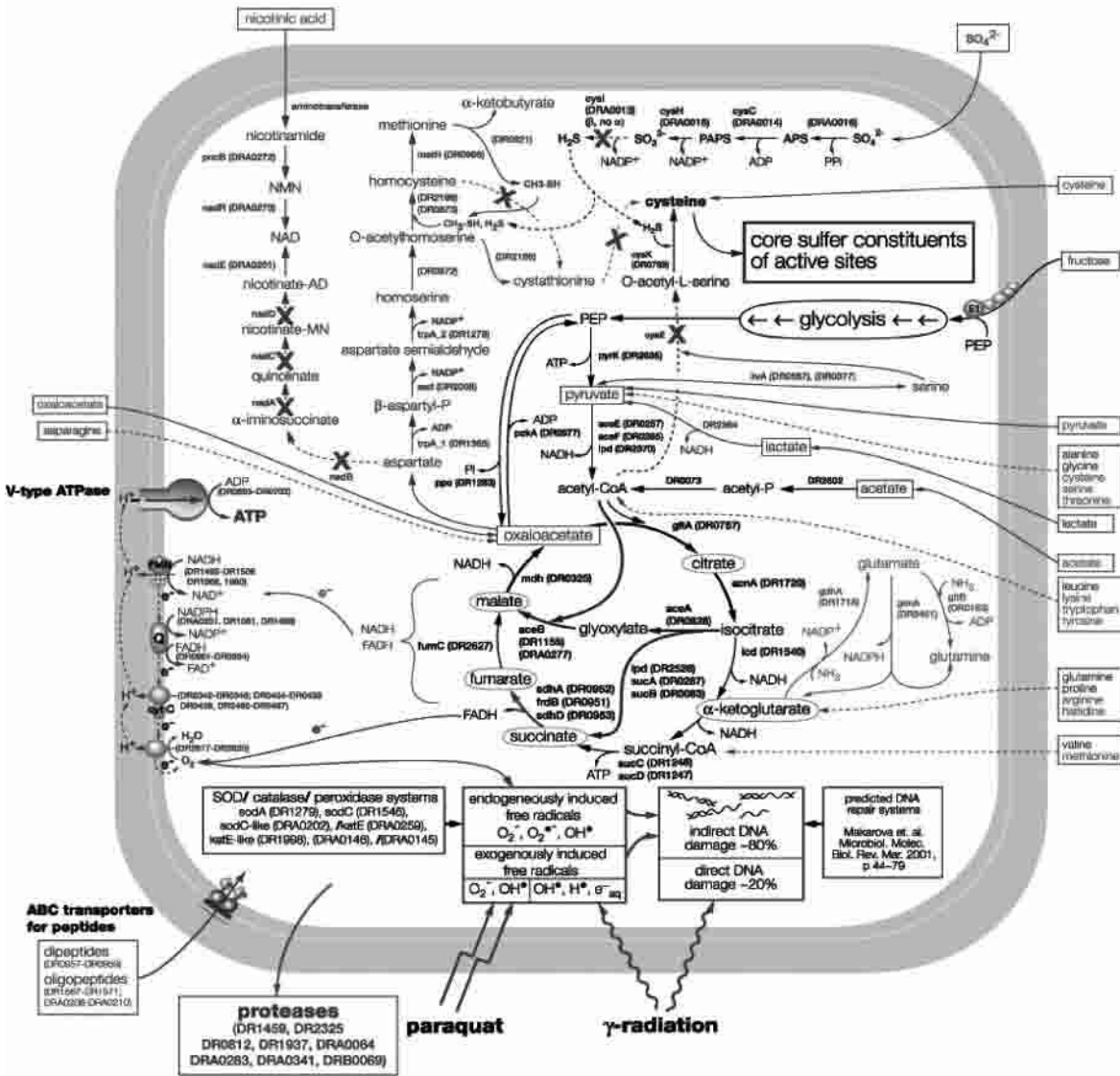


Figure 4. The function of appraisal and coping, as defined by Lazarus, can be illustrated as a form of discrepancy reduction as is shown by plugging into the discrepancy reducing feedback loop model.

