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THE CARL AND WINIFRED LEE HONORS COLLEGE

CERTIFICATE OF ORAL EXAMINATION

Erin Kenzie, having been admitted to the Carl and Winifred Lee Honors College in Fall 2000 successfully presented the Lee Honors College Thesis on July 27, 2005.

The title of the paper is:

"Developmental Systems Theory: A Search for Human Nature"

A handwritten signature in cursive script, reading 'Arthur Falk', written over a horizontal line.

Dr. Arthur Falk, Philosophy

A handwritten signature in cursive script, reading 'Jon Adams', written over a horizontal line.

Dr. Jon Adams, English

A handwritten signature in cursive script, reading 'John Martell', written over a horizontal line.

Dr. John Martell, Lee Honors College

Developmental Systems Theory: A Search for Human Nature

Senior Thesis, Lee Honors College

Erin Kenzie

Spring 2005

Introduction

When trying to identify the driving forces behind the development of traits, 'nature' and 'nurture' are presented as the sole answers to a seemingly inevitable philosophical question. There must be reasons behind why an individual has a certain trait, so the rhetoric goes, and the line of reasoning has to go in one of two directions. Either factors in the individual's environment – such as parental care or life experience – are responsible, or the trait is an immutable characteristic of the individual's biological makeup. Although this dichotomy has permeated the public consciousness, it is dismissed by those who study development as a gross oversimplification of a complex, dynamic process. The more widely accepted view is that traits and characteristics are the result of an interaction between biological and environmental factors (more broadly, nature and nurture). This interactionist approach is more complex, but it relies conceptually on the very dichotomy it attempts to supersede. In recent years, developmental systems theory (DST) has emerged as an alternative way to conceptualize the dynamic process of development. DST claims that the division (or even the interactionist's continuum) between nature and nurture is nonsensical because it is impossible to isolate and classify reasons or provide explanatory stories in regards to development in the first place.

Taking a more holistic approach, DST outlines development as a process of change involving many factors, and emphasizes the qualities of shared agency, contingency, and constructive interaction in the system. Although DST appears to alleviate many conceptual quagmires, the importance of the theory is

a contested issue. In this paper, I will take a critical look at the origin, structure, utility, and philosophical significance of this theory. DST is meant to be a comprehensive meta-theory, applicable at all levels. For this reason, the discussion will span several fields of inquiry and many levels of analysis. Ultimately, I will argue that while DST has done much to clarify our discussion of development and rid it of misconceptions, it ultimately falls into its own trap. The very concepts DST is introduced to replace become necessary in arguments for its justification.

DST emerged because our conceptualization of development, while helped by advances in technology, has been hindered by a long-standing focus on the nature-nurture dichotomy. Early theories touted the relative importance of one or the other, often supported by whatever limited scientific knowledge was available. Preformationism, for example, was the belief that the sperm contained fully-formed miniature humans which were incubated in the mother's womb. In this model, dating back to Aristotle, all traits and characteristics are immutable, determined prior even to conception. The individual's environment is thought to be an empty vessel, rather than an active, participatory factor in development. Nature, in essence, determined development. As technology advanced, it became apparent that conception and gestation was a much more interactive and sophisticated process, and the preformationist model, as such, fell out of favor.

Although preformationism itself was replaced by other models of heredity, its assumptions and implications persisted in the popular conception of

development. Maturation was thought to be the unfolding of one's innate nature, and traits were determined by heredity. When preformationist attitudes were applied to the philosophical question of human nature, a strongly deterministic belief in fixed innate capacity resulted. With the 1690 publication of *An Essay Concerning Human Understanding*, John Locke countered this notion, postulating that all of human knowledge is the result of individual experience (Morris 15). For Locke it was this knowledge, not heredity, that determined who a person was.

The Victorian age brought a renewed focus on heredity and innate character. Sir Francis Galton, a cousin of Charles Darwin, dismissed environmentalist explanations and used a deterministic explanation of human nature to promote "the science of the improvement of the human race by better breeding," later known as eugenics (18). Galton based his arguments on his study of three hundred families, outlined in his 1869 book *Hereditary Genius*. Having tracked the successes and failures of these individuals, Galton concluded, to quote Richard Morris, that "the offspring of eminent men... had a better-than-average chance of achieving eminence themselves" (18). Therefore, thought Galton, only the more eminent individuals in the species should be allowed to breed.

The views of Locke and Galton represent alternate sides of a continuum between nature and nurture and reflect an incomplete understanding of the mechanisms of inheritance and trait development. Through no fault of their own, the lack of knowledge of the developmental process at a cellular level in their

time limited their ability to explain development, and in effect, human nature. Today, science has given us a more nuanced understanding of development, and these two extreme perspectives exist only for the sake of argument.

When DNA was discovered, it was widely popularized as the long-awaited-for missing link between the evolutionary history of a species and the manifestation of an individual's traits. "Genes vs. environment" soon replaced "biology vs. culture" and a gene-centric vocabulary rich in metaphor took hold. Whether the term of choice is "blueprint," "code," "instructions," or "information," the message conveyed is that genes are responsible for development in a way unmatched by any other factor. Exerting what Susan Oyama terms an "outward flow of causality," genes determine an individual's traits, characteristics, and even behavior (*Eye* 23). As the primary movers of development, the rhetoric goes, they are the conduit along which what is inherited can be transmitted.

In this genetic determinism, experience and the environment are only discussed in regards to their capacity to prevent or trigger the unfolding of the instructions of the genome. As Richard Dawkins says in *The Selfish Gene*, "we, and all other animals, are machines created by our genes" (Dawkins 2). Dawkins continues that "the fundamental unit of selection, and therefore of self-interest, is not the species, nor the group, nor even, strictly, the individual. It is the gene, the unit of heredity" (11). Although Dawkins claims that his theory has no bearing on the nature-nurture debate, his privileging of the gene over other factors as a causal force in development undermines this assertion.

To say that genes are not the preeminent force in development is not to say that they are irrelevant or secondary to other factors. Indeed, they are essential to the composition of the developmental system; however, their significance, just like that of any other factor, can only be recognized in concert with the whole. By virtue of the binary nature of genes (i.e. an individual either has or lacks a particular one), it is easy to carry the computer analogy further and think of the genome as a program for behavior. This move, however, falsely assigns full agency to the gene. The presence of a gene in the genotype does not guarantee the expression of a certain trait.

This gene-centric model of development is pervasive. Charles Ofria, whose Digital Evolution Laboratory produced a computer program that models the processes of evolution, has a simple, if bleak, view of life: “You could consider a living organism as nothing more than an information channel, where it’s transmitting its genome to its offspring, and the information stored in the channel is how to build a new channel” (Zimmer 23). This idea of organisms as information conduits neglects to acknowledge the importance of environmental factors and contingencies, and essentially limits the human experience to the process of reproduction.

The idea that genes contain ‘information’ that determines the development of the organism is a common one, popularized by the code-like structure of DNA. Although somewhat appropriate when discussing alleles, the metaphor is inaccurate when generalized to larger levels of analysis. When the term ‘genetic information’ is used, it is usually in the context of trait inheritance. There is an

assumption that the DNA is like a computer program, in that it is copied and expressed identically over generations. The terminology also carries with it an assumption of isolation or encapsulation, suggesting that the 'information' is the primary factor in a trait's development. As Peter Godfrey-Smith said, "talk of codes and programs is just a picturesque way of talking about certain causal relations (or perhaps correlations) between genes and traits" (305). The complexity and contingent nature of these relationships are not reducible to graphic or algebraic representation.

In an attempt to incorporate both ends of the nature/nurture continuum, an interactionist perspective emerged. Most dialogue today is centered around this approach, which attempts to balance the two extremes by acknowledging the importance of both biological and environmental factors in development. This interactionism often appears in talk of "predispositions." In respect to a certain trait, an organism is said to inherit a certain range of possible phenotypes. Someone is thought to genetically inherit a tendency to exhibit a certain trait or behavior, which will be expressed if the environmental conditions encourage it. Environmental influences affect the phenotype, but only in the sense of changing the volume on a stereo. The range of motion is predetermined, and environmental factors can serve only to enable or prohibit the performance of a certain trait.

Scientists studying certain behaviors often conduct correlational research in which they look for patterns in the genotypes of individuals possessing the behavior. For example, many studies refer to certain people having a genetic

predisposition toward aggression from birth. If raised in an aggressive environment, the logic goes, the child is more likely than his non-predisposed peers to display violent behavior. This language of predispositions is often used when talking about behavior patterns such as alcoholism. People are said to be predisposed to alcoholism if they have a certain gene “for” the disease. Having such a gene sets the “volume” at birth to a high level. Even though environmental influences have some control, the probability is high that a person born with a gene “for” alcoholism will develop the disease.

This language of genes “for” certain characteristics is a shortened way of saying that if the gene in question is present, the corresponding characteristic will reliably be present in the phenotype. The problem with this way of thinking about development is that it presupposes the other factors will remain predictably stable, which of course they cannot. Time is an inevitable factor. It is also just as logical to hold genetic factors constant and think in terms of environments “for” characteristics (Godfrey-Smith 309). The “genes for” terminology does not allow such explanatory symmetry.

Oyama claims that the solution offered by this form of interactionism is illusory because it depends on the same faulty assumptions regarding development and transmission as previous models. Genes are still seen as the “repository of true nature” in that even if the environment could select for a certain phenotype, it is doing so within boundaries preset by the genes (*Eye* 50). The interactionist claims that both biology and environment play a role in development, but insist that these roles can be measured against each other. In

most interactionist accounts, genes still exert an “outward flow of causality” in that they determine predispositions but are either encouraged or inhibited by environmental influences (*Eye* 47). Although interactionists claim to balance both sides, a disproportionate amount of agency is still attributed to the “genetic.”

Monozygotic (identical) twins who were separated at birth and raised in different households have become golden children, of sorts, for genetic research, and are often cited when a gene “for” a certain trait is claimed to be discovered. Because these pairs of individuals have identical genomes at birth, the presumption is that differences in traits between the two people must be attributable to conditions of rearing (*Ontogeny* 42). If a trait is shared despite dissimilar environmental contingencies, its presence is seen as testament to how ‘biological’ the trait is.

There are several problems with the ways in which these studies are often discussed. “When environmental variation leads to no phenotypic variation, the phenotype is typically concluded to be ‘under genetic control.’ In contrast, when genetic variation fails to lead to phenotypic variation, people don’t usually say that the species-typical phenotype is under *environmental* control” (*Ontogeny* 17). In twin studies, this conclusion of genetic control is often drawn, perhaps hastily, from findings of variation. Oyama continues, “Just as any biological regularity is a joint product of ‘control’ by genes and conditions, so is any particular variation” (48).

Once a characteristic is identified in a twin study as ‘under genetic control,’ these findings are taken as proof that the trait in question is ‘biological’ or ‘innate.’

The innumerable other factors that went into the development of the trait in the participants get written out of the equation, taking with them the dynamism and coherence of development. In cases where genes are claimed to be isolated as “for” a certain trait, when genetic variation can be reasonably correlated with trait expression, the other factors must be held constant. In reality, though, development cannot be suspended. Developmental factors are in a constant state of change, in an ever-changing system of contingencies. Just because a condition may not be variable in a certain instance does not mean that it is not important. Indeed, its very importance is taken for granted.

The language of predispositions is designed to integrate nature and nurture in traditional interactionism, but it actually perpetuates the same nature/nurture dichotomy. In *Evolution's Eye*, Susan Oyama claims that the metaphoric language used to explain genetics, popularized before the process was more thoroughly understood, has promoted an inaccurate conception of genetic transmission.

Terms like “blueprint,” “code,” and “program” denote a method of transcription that is infallible and rigid. Information in this sense is replicated in large, unchanging chunks and if successful, the new product is identical to the original. In contrast, Oyama presents her own view:

What is transmitted between generations is not traits, or blueprints or symbolic representations of traits, but developmental *means* (or *resources*, or *interactants*). These means may include genes, the cellular machinery necessary for their functioning, and the larger developmental context... [and are] transmitted in the sense of being made available during reproduction and ontogeny (*Eye* 29).

This move away from transmission-based terminology and toward the idea of development as a constructive process helps to clarify the discussion and to discourage harmful assumptions rooted in the old terminology. These assumptions promote a gene-centric view of development, and therefore also perpetuate the nature/nurture dichotomy.

A gene-centric focus in scientific research is fueled by the widespread use of the nature/nurture dichotomy in the popular understanding of development. Discoveries such as the Human Genome Project or the cloning of Dolly the sheep, are sensationalized in the media because they appeal to our curiosity about human nature. Often, however, these discoveries get simplified or distorted due to journalists' attempts to make the story accessible to the layperson. Metaphors referring to "blueprints" and "codes" are taken literally, and the public inadvertently makes preformationist assumptions about development. The "gene for" terminology is prevalent, especially in politically-charged discussions of traits such as homosexuality, aggression, and intelligence. What may be a highly nuanced scientific finding is easily simplified in the public discourse as evidence supporting a "born that way" mentality.

Discussing development in such terms often sways public opinion about the group of individuals in question. "A boy described as genetically predisposed to criminality," Oyama said, "may be treated quite differently from one who is thought merely (!) to have fallen in with the wrong crowd." She continues, "The developmental story is also a pronouncement on what is fundamental in the

present – some inner “propensity” that must be suppressed or channeled” (*Eye* 167).

Few areas of scientific research are as politically and socially charged as the issue of homosexuality in genetics. Correlational studies have been done to explore the relationship between homosexuality and certain genetic and environmental factors. Talk of a possible “gay gene” raised fears of eugenics. Although homosexuality was removed from the Diagnostic and Statistical Manual of Mental Disorders decades ago, it still has a stigma of pathology. On the other hand, so-called “reform” programs for gays and lesbians use the idea that homosexuality is a choice to justify their practices. Of course, scientific knowledge cannot be condemned just because of the way someone uses that knowledge. In this case, however, the harm originates from the way in which the studies are interpreted, namely through the nature/nurture dichotomy. If the discourse was not so polarized, a more sophisticated understanding of human behavior could emerge.

In recent years, there has been much talk about ‘developmental systems’ or ‘systems theory’ as an alternative approach to development. In *Evolution’s Eye*, Susan Oyama outlines developmental systems theory (DST) as a reconceptualization of development based on several themes: contingency, constructive interactionism, and shared agency. The central argument in DST, which is more a new paradigm than a hypothesis, is that developmental factors cannot be dichotomized. Biological cannot be pitted against cultural, genes cannot be put opposite environment, the theory says, because the idea of such a

separation is nonsensical in the first place. For each trait or behavior, the developmental systems theorist says, countless factors and conditions come into play. As part of a contingent system, each of these factors are integral to the outcome. Causal significance cannot be retroactively assigned to genes or any particular factor.

DST: Main Thematic Elements

In DST, no single factor exerts directed control over the development of traits or of the system as a whole. Each aspect of development, working in concert with the others, is vital to growth. This quality of contingency is essential to the nature of developmental systems. A trait or characteristic is a product of the system as a cohesive whole.

For example, when examining the properties of a person's leg bone, it is tempting to say that its development is due primarily to the section of the genetic script dealing with bone structure. On further inspection, the present condition of that bone is also contingent on factors such as quality of diet, possible injuries in adolescence, presence of genetic diseases, prenatal care, physical activity, and so on. What was once thought of as the unfolding of a genetic blueprint now becomes a dynamic system of factors. Even if a good argument could be made that in this particular case, genetic factors play a comparatively large role, would that mean the factors are *more contingent* for the development of the trait? Essentially, the idea of something being more or less contingent is nonsensical.

In a truly interdependent system, each factor is essential to the whole.

Contingency implies necessity, something that cannot be measured in degrees.

A systems view of causality emerges within this framework. In *The Ontogeny of Information*, Oyama argues for “a view of causality that gives formative weight to all operative influences, since no single factor is alone sufficient for the phenomenon or any of its properties, and since variation in any of them may or may not bring about variation in the result, depending on the configuration of the whole” (18). This view of causality can best be termed *shared agency*.

A useful illustration is the nail-for-battles idea. As an old rhyme goes, “For want of a nail the shoe was lost, for want of a shoe the horse was lost, for want of a horse, the rider was lost...” The pattern continues until it seems that the loss of one nail caused the entire battle to be lost. Obviously, the outcome of battles depends on many more things than nails. “Even if it could be shown that the loss of a battle were traceable to a lost nail, this would not make the nail an adequate causal explanation for the entire complex of events that constituted the battle. Indeed, it is the entire complex that defines the nail’s role” (*Eye* 74). In order to isolate the nail, to make it a nail *for* battles, the rest of the system would have to remain remarkably predictable. It would have to be able to be re-created. In this way, a gene is only a gene *for* a certain trait if all other developmental factors remain constant, an idea which is conceptually flawed. No trait can be isolated and identified as an independent causal force. Agency is shared by the system as a cohesive and dynamic whole.

Traditional interactionism, in which the effect of factors can be quantified, is, to the systems theorist, not truly interactionist due to its reliance on a flawed conception of genetic transmission. This reliance biases the interactionist in the direction of either nature or nurture. Outside of this framework, Oyama advocates an interactionism based on a constructive view of development. Interactive construction is “a developmental phenomenon that is not explicable by only one set of its constituents or by only one of its levels” (Eye 30). Instead of being conceived as a replicable unit transferred unaltered between generations, a trait is newly constructed in each individual. Patterns of traits are due to the similarity of developmental systems across generations. This constructive interactionism relies on contingency and shared agency rather than one-for-one transmission.

In Oyama’s view, the development of the organism is a *process* involving many interdependent factors in a constant state of change. While this alone may not seem like a revolutionary statement, DST stands out in its loyalty to this concept. DST emphasizes that development is dynamic and constantly changing. It is not, as more traditional theories profess, a fixed journey from point A to point B. At any moment in an organism’s development there are innumerable possible future scenarios. Some are more likely than others due to the components of the developmental system, but no particular path is pre-determined.

DST as Meta-Theory

Throughout her books, Oyama uses examples of human behavior traits alongside physical characteristics and other individual differences in her discussion of development. A psychologist herself, Oyama addresses the problems she perceives in psychology and makes comparisons. For example, she asks “Why should there be such striking parallels between the problem of the subject in developmental psychology and the problem of conceptualizing biological, especially genetic, processes?” (*Eye* 172). Her answer is that the common source of both of these problems is the perpetuation of the nature/nurture dichotomy in the form of gene-centric language and terminology. Indeed, it is this misconception, claims Oyama, that is the source of nearly all problems in the study of development. She presents DST as a solution that addresses this core issue, and therefore has universal implications. Therefore, DST can rightfully be called a *meta-theory*, a theory that attempts to explain, in a larger scope, the way an analytical system works and why. Considered thusly, the philosophical implications of DST can be discussed.

Just as the theories of Locke and Galton addressed the philosophical issue of human nature, DST also has philosophical implications. The three thematic elements – shared agency, contingency, and constructive interactionism – show DST to be a holistic approach to development, fundamentally different from previous dichotomous views. Instead of categorizing human behavior as either nature or nurture, DST recognizes that each characteristic emerges from a unique, dynamic system.

DST is also presented as a teleological approach. Arthur Collins says of teleology, "Whether or not actions are caused, reason-giving explanations do not appeal to the causes of the actions they explain" (Collins 120). In philosophy, teleological explanations are those that give reasons rather than causes. In its arguments against causal explanations of development as well as its necessitated inclusion of conscious goal-setting, DST aims to set itself apart as a new, teleological approach to development. This is contrasted with other, causal models, such as psychoanalysis or genetic determinism, that inevitably depend on the transmission misconception discussed earlier. In the following passage, Oyama defends her teleological stance:

Insofar as it is committed to being scientific, which today often means being biological (and, increasingly, cognitivist, in the sense of thinking in terms of information-processing mechanisms modeled on computer technology), psychology affords less and less room for human subjects. Indeed, part of the mission of modern science is the replacement of mentalistic explanation with mechanistic accounts, of intentions with causes. This has left the science of mind in a confusing position. Biological explanation sometimes seems to threaten the realms of personal experience and responsible action that are implicitly associated with the psychological level, and various attempts may be made to salvage the subject, often by invoking social factors. Sometimes, though, psychology seems to do away with persons altogether, as when it conceptualizes humans simply as the products of genetic and environmental (including social) causes (*Eye* 167)

She goes on to argue that DST is a reason-giving, teleological alternative to older causal models because it does not explain traits and behavior in terms of causal agency. Just as the battle was not lost solely because of a nail in our earlier example, behavior cannot be explained by tracking the causal process back to either nature or nurture.

DST as Solution

By identifying the common misconception regarding genetic transmission, Oyama argues a convincing case for DST in the context of trait inheritance. To be successful as a meta-theory, it also needs to stand up to scrutiny in other areas, such as the study of human behavior.

Initially, the application of DST to psychology appears to solve the parallel conceptual problems mentioned by Oyama. In psychology today, most clinicians take an eclectic approach to treatment, meaning that they use treatments that have emerged from many different traditions in psychology. Because these schools of psychology have their own explanations of human behavior, eclectic psychologists are put in the awkward position of having treatments that work, but no coherent theory to explain why. Applying DST to psychology allows the clinician to embrace eclectic treatment while at the same time being supported by a unified theory about human behavior. The eclectic clinician's concern over theoretical inconsistency is rendered obsolete by the inclusive nature of DST. Removing the singular focus of individual theories, and discarding the idea that causal elements related to a specific event have to be universalized, it becomes possible to see human behavior as a complex system of contingencies with no single driving factor.

While DST as a psychological theory may be revolutionary at the conceptual level, it would be rendered useless if it were to provide no guidance for treatment. Psychological traits such as aggression or alcoholism have

typically been explained using an uncertain formula of genetic predispositions and environmental influences. People can be alcoholic for a number of reasons: perhaps they had alcoholic parents and modeled their behavior, maybe they possessed a certain mutation of an allele that is correlated with alcoholism, they could have a stressful job or home situation, or they might have chosen to adopt a type of *carpe diem* philosophy that provides rationalizations for substance abuse. These are obviously not the only possible factors that go into alcoholism, and they should not be considered as yes-or-no options, as entirely present or entirely absent variables that lend themselves easily to algebraic expression.

A closer look at these factors reveals their contingent properties. Suppose this hypothetical alcoholic had a mother who was also alcoholic, and a father who was not. The boy begins to model after his mother in his late teen years, as drinking helps him cope with the stressful relationship he has with his father, who is rarely home and demands too much out of him. He starts to hang out with peers who drink and perform various small-scale acts of vandalism. The father becomes mad with his son about the moral character of his friends, which motivates him more strongly to visit these friends, as he wants to rebel from his father's wishes. As a result of a heart-to-heart discussion with the boy's girlfriend (who he met through these deviant friends), his mother realizes that her son adopted her coping strategy, and that he must have similar issues with her husband. The mother describes to the girl how the physically abusive relationship her husband had with his own father affects his own disciplinarian parenting style. The girl wants to help her boyfriend, but knows that a direct

confrontation would be counterproductive. In a philosophy class the couple attend at school, the issue of free will comes up, and the boy is visibly interested in the topic. The girl notices his attraction towards the idea of free will, and starts a discussion that leads ultimately to rekindling the boy's sense of responsibility about his actions. He makes amends with his mother, and the two start to attending Alcoholics Anonymous meetings. The boy confronts the father about his impossibly high expectations, but the father remains firm in his position and scoffs at the idea that alcoholism is a disease. The boy loses some respect for his father because of his narrow-mindedness, and in turn, he works even harder to stay clean.

This scenario seems quite complicated on paper, however is not entirely improbable. To properly describe behavior, one must take into account every variable, as above. No individual factor is isolated or identified as the primary force in the boy's alcoholism. The strained father-son relationship affected the boy's alcoholism, but not in one causal way. At first it worsened the behavior, then it served as inspiration for the boy to stay sober. The boy's mother provided a model for alcoholic behavior, but later provided support in resolving it. In addition, it is impossible to discuss the mother's changing influence without addressing her own alcoholism or her willingness to open up to a teenager. The girl's compassion and the context of philosophical discussion that enabled her to approach the boy also certainly come into play. This example helps illuminate the degree of contingency in the system, that factors exist in a state of

interdependent change. One variable cannot be addressed without considering its own origins, properties, and interactions.

The previous scenario describes the boy's behavior in a narrative sense, but caution must be taken to avoid thinking linearly about the situation. The various factors are not arranged in a clean, chronological series of certain cause and effect relationships. Alcoholism is a pattern of behavior, which by definition must be behavior that is repeated. Repeated performance of alcoholic behavior rests on contingencies unique to each repeated episode, making it impossible to assign blame to one factor alone. What about factors such as the availability of alcohol for minors in his geographical area, or the taboos and customs of his culture? The boy's willingness to change and introspective skill certainly helped him as well. These factors are not merely numerous and interrelated, they can influence each other in seemingly unpredictable ways. As the scenario is described, the notions of 'biological' and 'cultural' causes as such seem more like useless terminology. Dichotomies serve limited utility, and the phenomenon of behavior emerges as what can only be described as a complex, contingent system.

In this example, a DST outlook helps illuminate the complexity of the situation when looking at it retrospectively, however it is unclear how it could provide any substantive guidance in treatment. Certainly, the ideas of shared agency, contingency, and construction are good to keep in mind when inquiring as to the origin of the boy's alcoholism. They can prevent the clinician and client alike from drawing hasty conclusions. Guidance as to what *not* to do, however,

is decidedly less useful than advice on what *should* be done. The most concrete maxim DST can provide would be something along the lines of ‘pay attention to every variable’ or ‘use the treatment that works.’ While for those accustomed to an eclectic approach this broad advice may suffice, it offers no practical guidelines for treatment.

For DST to work as a comprehensive psychological model, it would need to incorporate individual conscious decision-making as a guiding force. Using this framework, the clinician could use various treatments within the context of tailoring the approach to the individual.

Problems with DST

Although DST has done much to clarify the discussion of development, expose false dichotomies, and emphasize certain thematic elements, it ultimately falls into its own trap. What began as a fundamentally philosophical question about human nature cannot be answered by scientific specificities. While DST may be helpful or illustrative at some levels of analysis, it clearly fails in others. As a meta-theory, DST is weakened by this inconsistency.

An important element of Oyama’s argument is the teleological nature of DST. This quality sets her approach apart from the others. A closer examination makes apparent that she is arguing for a teleological methodology from within a causal framework. All of her arguments can be traced back to the claim that a faulty understanding of genetic transmission permeates and distorts the discourse on development. This claim in and of itself appears to be valid, but

Oyama uses it in a way that she herself criticizes. By doing this, she undermines her entire argument.

The success of DST as a theoretical model is due to the universality of its thematic components. Contingency, shared agency, and construction can be used as thematic goals outside the rhetoric of DST to help clarify the discussion of development.

There are no easy answers in the debate about human nature. The success of DST's theoretical components in exposing the nature/nurture debate as an oversimplification and a false dichotomy should be recognized. This, however, does not save DST. Oyama's mistake was not in trying to investigate nature/nurture, but rather in looking to evolutionary biology for a definitive answer. Discussions pertaining to nature/nurture can be found in many fields, but the issue that Oyama is attempting to address is essentially a philosophical one – human nature. While DST may have come as close as anything to providing a new paradigm, its failings demonstrate the complex and elusive nature of this issue.

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