Balanced biosocial theory for the social sciences

Michael A Restivo
University of Nevada, Las Vegas

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BALANCED BIOSOCIAL THEORY
FOR THE SOCIAL SCIENCES

by

Michael A. Restivo

Bachelor of Arts
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Michael A. Restivo

Entitled

Balanced Biosocial Theory For The Social Sciences

is approved in partial fulfillment of the requirements for the degree of

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Dean of the Graduate College
ABSTRACT

Balanced Biosocial Theory for the Social Sciences

by

Michael A. Restivo

Dr. David Dickens, Examination Committee Chair
Professor of Sociology
University of Nevada, Las Vegas

Evolutionary theory is the unquestioned paradigm for all biological sciences and is gaining acceptance in many of the social sciences, predominantly psychology and anthropology. Sociology, as a discipline, has failed to embrace evolutionary theory and remains uninformed about the most powerful scientific theory of living things: the theory of evolution by Darwinian selection. Traditional sociological theory is based largely on empirically questionable ideas about human development, behavior, and psychology, and often contradicts fundamental knowledge about evolution. As such, it often fails to contribute to a coherent and progressive corpus of sociological knowledge. Biosocial theories present a compelling alternative to the standard social science model. They provide an empirical account for human behavior by drawing on research from the biological sciences. I propose the following research as a conceptual framework for biosocial theories in the social sciences, explaining how they might be successfully incorporated into sociological thought.
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CHAPTER 1

SCIENCE AND SOCIOLOGY

If, as professional sociologists, we agree that the goal of our discipline is to understand social behavior through the systematic study of humans in their collective aspect, then I believe sociology has been slow to realize this goal. Its slow progress is, in part, due to sociology's incoherency. As a discipline, it operates with multiple, and oftentimes contradictory, conceptual frameworks. As such it is unable to integrate all its research projects into a unified corpus of knowledge.

Sociology's three grand approaches to studying society and social behavior—scientific, interpretive, and historical—have yielded insightful yet only partial answers to questions that lie at the heart of the discipline. Each provides a different perspective, which consist of assumptions about ways of thinking about the world, a preferred means of conceptualizing the objects of inquiry, and seeking answers to those questions that can be adequately addressed by that perspective. These perspectives are practiced as though they are mutually exclusive, but in actuality their content domains overlap. The theoretical challenge for sociology lies in creating an integrative approach, one that incorporates the strengths of these different approaches by taking into account the historical, causal, and meaningful dimensions of a social phenomenon.

I believe it is interactionist sociology, and particularly symbolic interactionism, dramaturgy, ethnomethodology, and postmodern interactionism, as research programmes, that have been most resistant to an integrative approach. The trend in interactionism in
the last thirty years has been toward increasing separation vis-a-vis other approaches in sociology, a contradistinction to the intention of the early interpretive sociologists. One need only look at how contemporary interactionism differs from the aim of Weberian sociology to see this difference. Though the foundations for interactionism were laid over a century ago by pragmatist philosophy, in the years since Peirce, Mead, and Dewey, interactionist sociologists have made few theoretical contributions that are significant outside of their perspective and to the discipline of sociology as a whole. Contemporary interactionism has progressed, if at all, in merely the collecting of limited, fragmented, and partial descriptions of phenomena.

Interactionism, as a perspective, relies on several assumptions about the social world: “that humans have always existed within society, that society is the source of our qualities as a species (for example, conscience, language, mind, self), and that it is the source of our qualities as individuals (interests, values, talents, ideas, and so on)” (Charon 2001:17). In recent years, these assumptions have been challenged by scientists working in the discipline of sociobiology. They have question the notion that it is society alone that shapes our self, our brain, our mind, our capacity for language and communication, our values, talents, and ideas. Rather, sociobiology posits that it is our biological nature as a species that provides a framework by which individuals organize their surroundings.

With the arrival of sociobiology, the stakes for an integrative approach become greater. Sociology must now consider insights from the biological sciences as well as the approaches of its own discipline. Interactionist sociology can occupy a crucial domain in terms of level of analysis. The contents of its study, in effect, lie at the boundaries of all other levels of analysis for social behavior, connecting individuals to social structures on the grander scale and to biology on the smaller. Interactionism is the glue that can hold a
comprehensive social science explanation together. It can, and must, carry out this
important function if we are to better explain and understand human behavior. But
interactionist research has become more curiosity than systematic study. Precisely at the
time when a perspective that can integrate approaches is needed, interactionism has
retreated from the promise of providing causal and meaningful adequacy. It has limited
itself with several theoretical weaknesses. Interactionism now posits the inherent
inapplicability of one context to another and unquestionably assumes the importance of
every interaction. By its own admission, interactionism tries to foster understanding of a
phenomenon but can really offer no guidance as to its meaning outside the unique
context. How can we as sociologists reconcile the two? One answer being popularized is
that we cannot. The advent of postmodern influences on interactionism forsakes any
concern of how to better understand the social world. It has failed to contribute
improvements of any consequence, and rather has mystified and obfuscated the entire
ordeal.

Recalling Peirce, I implore that we need to rescue the good ship sociology for the
service of science from the lawless rovers of the sea of interactionism. There is no better
indication of success than progress, and those scientific disciplines that have shown a
clear progression of knowledge are benefiting at sociology’s expense. No longer can
sociology claim that a particular phenomenon falls on ‘our turf’ and hence our
explanations are good enough. Biology has suggested ways to find better answers, and the
time has come for sociology to revise its theories so as to consider what biology can teach
us. An integrative approach that reaches across disciplinary borders and adopts new
thories, concepts, and practices, will once again unite sociology with the corpus of
scientific knowledge.
But these are merely position statements, not arguments. In this research, I will review the case for practicing sociology as a science, outline the major theoretical and methodological underpinnings of evolutionary theory and its approaches to studying social behavior, assess the limited attempts of traditional sociology to incorporate the relevant theories and findings from the biological sciences, and finally, suggest a way for interactionist sociology to cooperate with the dominant biological-science paradigm of evolutionary theory.

Social Science

Although it has recently become the 'postmodern' fashion to declare science either dead on arrival or irrelevant to an understanding of our own species, twenty years ago the vast majority of social and behavioral scientists took it for granted that the development of a true science of human behavior, society, and culture was the Holy Grail toward which they were striving. (Cronk 1999:42)

Science has been one of the most successful ways of acquiring knowledge. It is the activity that the scientific community takes part in because it is perceived as having a successful method for seeking and arriving at useful knowledge about the physical world. "What makes a field a science is not found in the way it collects its basic data but rather in the way in which it phrases questions, tests them, and makes claims about new knowledge" (Cronk 1999:51). Science relies on empirical observations, logical induction, the hypothetico-deductive method, and in using these it aims to develop theories that are able to explain and predict occurrences in the physical world.

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1 I can already anticipate a Neo-Marxist-inspired criticism of my use of the word “dominant,” attacking evolutionary theory as “bourgeois hegemony” oppressing “emancipatory” science; or a feminist-inspired criticism that condemns “dominant” as a metaphor for masculine-bias and subjugation of a “woman’s way of knowing”; or a postmodern-inspired criticism of my use of the word “dominant” as a demonstration that evolutionary theory is accepted over other theories (which can be more-or-less “true”) only by social and political negotiation. (Notice the scare quotes.)
In sociology’s short history as an academic discipline, sociologists have variously embraced two contradictory models for how sociology should be conducted, either as a science or as an anti-scientific discipline. The early influential sociologists all promoted sociology as a science of the social world. More recently, some sociologists, most often associated with interpretive sociology, argue that the scientific model is inappropriate and wrong for sociology. They promote an alternative purpose for sociology, one that aims not for discovering deterministic or probabilistic laws, but for understanding motivation and meaning from the perspective of the individual.

Dualistic thinking characterizes much sociology, and these alternative conceptions of sociology are often thought to be opposed to one another. There is room in sociology for both, and indeed the content of sociological research will be richer by incorporating the two. In this research, I am mainly emphasizing new ways for sociology to be practiced in the scientific model, but I will modestly propose some ways for the two approaches to be reconciled. A biosocial approach to sociology, the topic of this research, is one that goes beyond the traditional sociological focus of looking only to social phenomena in order to explain social behavior. It accepts that the knowledge produced by other scientific disciplines can be relevant to understanding our social behavior, and as such, it incorporates those theories and concepts that are relevant into its explanations. Biosocial approaches are still the domain of the social sciences; the biological discipline of sociobiology, in contrast, “has a more ambitious agenda, [as] it concerns itself with the behavior of all animals, has a grand theory (evolutionary theory), and it seeks ultimate causes” (Walsh 1995:1). It is a scientific discipline within the field of evolutionary biology that seeks to uncover the biological basis for social behavior. For our purposes in
the social sciences, sociobiology is a discipline that we can learn from, not one that we
must stand in contrast to.

The Importance of Theory

It is almost obligatory for any research about science to talk about Kuhn’s The
Structure of Scientific Revolutions (1970). One difficulty of this work lies in the
numerous and imprecise uses of the term paradigm. At the narrowest sense, a paradigm is
a piece of technical equipment or a set of exemplars in scientific achievement. In its
widest sense, a paradigm is the entire theoretical, methodological, ethical,
epistemological, and ontological worldview of science. A third sense of the paradigm is
the sociological community of science, including research and educational institutions.
When we speak of a paradigm in science or a paradigm for sociology, we must first
define what this means.

Ritzer uses a narrow definition of paradigm to mean the sociological organization that
“serves to differentiate one scientific community (or subcommunity) from another”
(1975:6). He goes on to explain that “paradigms can, in a sense, co-exist within a given
science . . . multiple paradigms co-exist within contemporary sociology, but they do not
co-exist peacefully” (p. 12). This definition is useful in the sense of demarcation, but tells
us little about content of a scientific paradigm.

It is more useful to use paradigm to mean the conceptual framework that a scientific
community assumes and works as a part of. That is to say, scientific research, theory, or
practices will make sense only in relation to the conceptual framework under which it
exists.² The conceptual framework of sociology is one that can best be called pre-

² Other terms that have been used to mean nearly the same thing are worldview (Weltanschauung),
categorical scheme, or framework.
scientific in that it is only successful at “amassing a wealth of data on a variety of topics because they do not have a clear idea of what is important” (Cronk 1999:46). How is this a hindrance to the social sciences? Imagine if chemistry today was practiced the same way as sociology. Anthropologist Henry Harpending speculates:

We would spend a lot of money measuring anything measurable about substances and materials around us. With modern computers, we would create a huge database; with modern software, we would make any patterns readily apparent. We would discover, for example, a correlation between “conducts electricity” and “shininess.” In the jargon we would say that “shininess” is a determinant of conducting electricity. Another group would find that “density” is also a determinant of conducting electricity. Papers would appear discussing whether density is a determinant of shininess or shininess of density. None of this would get us close to the periodic table or anywhere near modern chemistry. Meanwhile policy experts would advocate polishing household machinery to make it shinier and thus more efficient. Universities would be plagued with workshops on shining things up. (Harpending 1995:100)

A paradigm gives scientists a framework of fundamental theories and exemplary examples of applications of theory and research; it identifies accepted accomplishments and points to important questions that can be solved by further research; and it provides researchers with methods and standards for finding solutions. The paradigms in sociology do not serve this function for practicing sociologists. Some sociologists argue to the contrary, that adopting a scientific paradigm will prohibit sociology from conducting research that is relevant to sociology, and hence, this is not a model sociology should follow. Others recognize the value of a coherent conceptual framework, but argue that sociology’s paradigmatic state is fine, and sociological theory is adequate in its own right. It only appears limited because sociology is in its disciplinary infancy, and just needs to be progressively developed and internally connected.

There are sociologists, however, who do believe that sociology’s failure to become a progressive, high-consensus science stems from its pre-paradigmatic state. Price laments that “Sociology lacks a common set of concepts, has very few verified propositions, and
is totally devoid of systematically tested theory” (1969:iii). Sociology’s strength lies in its comprehensive collection of historically factual information and methodology of data collection; its weakness lies in its dearth of adequate concepts and theories.

Defending Science

What makes a field a science is not found in the way it collects its basic data but rather in the way in which it phrases questions, tests them, and makes claims about new knowledge. (Cronk 1999:51)

This, some critics assert, is the myth of science. They argue that science as a discipline relies on a flawed methodology for learning about the world, and that science maintains a limited perspective on the nature of reality. It challenges the assumption of of science that there is a natural world ‘out there’ that can be objectively explained.

Peirce said a century ago that “a man must be downright crazy to doubt that science has made many true discoveries” (1931b:106). Yet there are many—practitioners of the strong programme in the sociology of science—who have these doubts. They regard science as a myth-making enterprise, as a wholly social endeavor, one that has no recourse to the physical world because reality is itself a social construction—“the constructivist assertion that scientific facts themselves were socially constructed” (Segerstråle 2000:4).³ For example, Collins stated that the “natural world has a small or non-existent role in the construction of scientific knowledge” (1981:3). A more moderate version of the strong programme in the sociology of science has “come to view scientific knowledge as a social construction rather than a product of pure cognition or description. . . Scientific knowledge is a product of social work, a discursive accomplishment” (Restivo 1994:21, italics in original). What makes this moderate is that it maintains a

³ “Constructivism” and “social constructionism” are used synonymously.
position of ontological realism. Nonetheless, both versions of the strong programme
dispute the the epistemological claims of science.

Other sociologists of science analyze science as an institution that is guided by certain
social norms, and is influenced and influences other social institutions. This is the so-called Mertonian paradigm. It acknowledges that there are both social forces and
immanent forces in the development of science. Social forces are those factors that shape
science as an institution and describe how the institution works, while immanent forces
are the inner logic that explains how and why scientific ideas emerge (Restivo 1994;
Segerstråle 2000). For a Mertonian analysis of science, scientific knowledge is placed in a
black-box outside the scope of inquiry and outside the influence of social forces.

A significant number of criticisms of science have emerged based on standpoint
epistemologies. These challenge that positivist, post-positivist, and other modern
conceptions of epistemology are male-biased or Eurocentric (see Alcoff and Potter 1993).
One solution, for example, is the development of a “feminist epistemology [that] consists
of theories of knowledge created by women, about women’s modes of knowing, for the
purpose of liberating women” (Koertge 1996:413, italics in original). Others contend that
all science is paradigm-bound and hence can only offer different, not better, explanations
for phenomena. These criticisms are themselves all subject to the creeping of
epistemological relativism. On grounds of this drawback and the deficiency of being able
to formulate cogent alternative epistemologies, Koertge concludes that critics “find their
(1996), Sommers (1994), and others offer sound critiques of this contemporary version of
the oft-raised philosophical issue of epistemological perspectivism.
A popular tactic is for critics to use these aforementioned criticisms as a summary critique of scientists as naively participating in an epistemologically, empirically, and methodologically flawed enterprise. Steven Weinberg, winner of a Nobel Prize for physics, rejects this idea, noting that

sociologists and historians sometimes write as if scientists had not learned anything about the scientific method since the days of Francis Bacon, while of course we know very well how complicated the relation is between theory and experiment, and how much the work of science depends on appropriate social and economic settings.

(2003:217)

When this summary criticism of science fails, critics may tout, seemingly as a last resort, the failures of the project of positivism as evidence that sociology should rely on alternative models for acquiring knowledge. But by doing this, many contemporary critics of science sound as if they just discovered the first half of the twentieth century, and hope nobody else noticed. The grand ambition of logical positivism was done in by Duhem, Quine, Wittgenstein and others before any social scientist began criticizing it as an invalid model for knowledge.

It is pertinent for us to be aware of the criticisms and limitations of science, and the consequent relevance to our practice of sociology. Indeed, these are all cromulent reflections on epistemological and ontological issues in science. Accordingly, a significant number of sociologists are wary in one of the manners outlined above of practicing sociology as a science. We should be familiar with these criticisms and how scientists and philosophers respond (see Gross and Levitt 1994; Gross, Levitt, and Lewis 1996; Parsons 2003; Segerstråle 2000). Although mine is not the place to present an in-depth defense of science from its critics, I believe that the project of sociology should continue to be the scientific study of the social world. Steven Cole provides us with a pragmatic reason to not abandon this project. In terms of scientific knowledge, that is, the
cognitive content that a scientific community accepts, critics “have failed to give a single example where the social processes influence the content of such a discovery” (1996:280, emphasis added). If this indeed is the case, as Cole’s review of the contemporary science criticism literature indicates, then truly “ours is an age in which partial truths are tirelessly transformed into total falsehoods and then acclaimed as revolutionary revelations” (Szasz 1973:23-24). Because this research is about the content of a scientific discipline as it can apply to sociology, and our scientific knowledge, while not immune to criticism nonetheless remains for now on secure ground, we can be safe in our decision to leave these debates behind and to move on.

Unification

What is wrong is that sociology is incoherent . . . While each article/book/course may be well crafted, they have little to do with each other. They may share methods and even data sets . . . but each is about a unique problem with a unique set of variables. (Davis 2001:99)

One of the assumptions of science is the unification of knowledge. The concept of unification commonly goes by the name reductionism, and science is often criticized for championing a reductionist role for science. But the term reduction in the philosophy of science is often used to mean different things. In its strongest meaning, also called micro-reduction, the specific goal is to be able to, in principle, use a unique lowest level of analysis (particle physics) in order to explain any higher-level phenomenon (like psychology), even though “it would nevertheless be hopelessly impractical to try to derive the behavior of a single human being directly from his constitution in terms of elementary particles” (Oppenheim and Putnam 1998:269). While some scientists and philosophers

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4 Cole goes on to say: “A frequently used constructivist rhetorical trick is to argue that it is impossible to separate the technical from the social; that all science is inherently social. This turns their entire argument into a tautology” (1996:280).
have advocated this, most philosophers of science advocate the more modest use of reduction, sometimes called hierarchical reductionism: to accept that different disciplines will concentrate on different levels of analysis of a phenomenon, but where the levels of analysis meet or overlap, the disciplines should use the same concepts.

This second, more modest type of reduction approaches the meaning of unification. Because of the many ways in which the term reduction is used, the use of the term unification is preferred for the sake of clarity and distinctiveness. Even then, unification often goes by different names. Cosmides, Tooby, and Barkow refer to unification as vertical integration, “the principle that the various disciplines within the behavioral and social sciences should make themselves mutually consistent, and consistent with what is known in the natural sciences as well” (1992:4). Wilson calls this consilience, “a belief in the unity of the sciences” (1998:4). Steven Pinker champions a type of reduction that leads to unification, and despite the terminological confusion, gives an example that succinctly demonstrates the virtues of unification: mountains are just sand and dirt, but a physics or chemistry alone cannot explain the geography of Europe (Rakoff 2002).

The appeal of unifying the natural and social sciences is that it would allow explanations of social behavior on many levels of analysis to be empirically consistent with one another. If a theory is supported by hypotheses on multiple levels of organization, it is a more successful contribution to scientific knowledge. Ultimately, this would be beneficial to both sociology and biology.

Consider the prospects for sociology. This science is now in the natural history stage of its development. There have been attempts at system building but, just as in psychology, they were premature and came to little. Much of what passes for theory in sociology today is really labeling of phenomena and concepts, in the expected manner of natural history. Process is difficult to analyze because the fundamental units are elusive, perhaps nonexistent. (Wilson 1975:574)
Sociology would gain access to a corpus of empirically-justified knowledge, methods of conducting research, and novel theories for studying behavior. The exchange of disciplinary knowledge is a two-way street, and sociology would have much to offer biology as well. "Just as modern biology must take chemistry into account if it is to have any claim to completeness, so the behavioral sciences must take evolution into account if they are to deserve being called sciences. Yet just as there is much in modern biology that is not explained by a knowledge of chemistry alone, there is much in the behavioral sciences that goes beyond the analytic and interpretive power of sociobiology" (Barash 1982:6). One contribution that sociology would have for biology is its perspective of interactionism, which is the best available perspective for studying and understanding that crucial contextual component of the environment variable.

In spite of the potential benefits to both disciplines, an uneasy boundary is maintained by many social scientists between their field and the biological sciences. Maintaining these disciplinary boundaries serves two functions. The first is that prevents taking on the inherent difficulties of combining disciplines, which would entail organizational and social challenges on the part of the institutions involved. This is an argument about the way science functions as a social institution, not about the content of the scientific discipline. But artificially maintaining boundaries because of social organization can detrimentally affect the development and progression of scientific knowledge. Wilson (1982) describes the creative tension between disciplines and antidisciplines that ultimately causes the advancement of both. One of the proponents for a biosocial

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5 The term antidiscipline is troublesome because its ostensible meaning is opposed to a scientific discipline. The true meaning of the term as Wilson uses it, however, is against a discipline. He explains that it refers to "studies of adjacent levels of organization" (1982:29) where the practices and theories of an established discipline at one level of analysis come up against a newly developing discipline (the antidiscipline) from a higher or lower level of analysis. Eventually, these two become complementary in their explanations of their adjacent levels of organization.
approach in the social sciences, the criminologist Anthony Walsh, is keenly aware of this, explaining that “complex social phenomena can be more fully understood if their explanations maintain consistency with what we know about the more elementary units” (1995:3, italics in original). Such consistency can only come at the expense of significant reorganization in the way the social sciences are practiced.

The second function of maintaining disciplinary boundaries is potentially more troubling. It allows for the development of theories that conflict with those from other disciplines. Research of this sort can occur unintentionally, because the methodology of one discipline is generally not suited to analyzing the concepts from another, leading to empirically inadequate theorizing. But maintaining that two disciplines are incompatible can also be used as an intentional way to promote theories that otherwise would be empirically indefensible. Such use of science would be nearly indistinguishable from ideology and thus is antithetical to the idea of the unification. Requiring interdisciplinary consistency and exposing research to such review will only improve theories, methods, and findings.

Biophobia

Nearly all of the classical social theorists considered the role of biology in their theories. Knowledge from the biological sciences has progressed significantly since the foundations of sociology were laid, but attempts to incorporate biology into contemporary sociology have met with increasing hostility. Two years after the release of Edward O. Wilson’s Sociobiology, in the midst of the sociobiology debate, sociologist Gerhard Lenski opined that sociology’s longstanding opposition to efforts to take biological factors into account in the study of human social systems has become an albatross. If we persist in ignoring, or worse yet,
denying the powerful influence of genetic and biochemical factors, we jeopardize sociology’s credibility in the scientific community. Environmentalist arguments that may have been persuasive in the 1920s and 1930s no longer wash, and the longer we persist in propounding them, the more we harm our discipline and reduce its potential. (1977:73)

In the nearly thirty years since, sociology’s animosity toward the biological sciences has grown greater as evolutionary biology has made inroads into research areas traditionally thought to be sociology’s domain. This short history of progress in evolutionary biology makes Lenski’s remark seem prophetic.

Social constructivism enshrines culture as the central concept to be used to explain human social behavior. “Culture is a thing sui generis which can be explained only in terms of itself” (Lowie 1917:25, italics in original). Durkheim, one of the founding fathers of sociology, also favored only social explanations for social behavior: “The determining cause of a social fact should be sought among the social facts preceding it and not among the states of individual consciousness” (1895a:110). Stretching the logic of this position, the anthropologist Clifford Geertz claims that “our ideas, our values, our acts, even our emotions, are, like our nervous system itself, cultural products—products manufactured, indeed, out of tendencies, capacities, and dispositions with which we were born, but manufactured nonetheless” (1973:50). Taken further to its logical extreme, it is the tenuous position of postmodern constructivism. As such, this implies several beliefs about the limitations of evolutionary biology’s contributions to studying culture. Our evolutionary past, it is argued, has no relevance for our current condition. Human behavior arises and is shaped largely by culture, and culture is not influenced by our evolutionary past but instead is best accounted for by cultural explanations (Cartwright

Evolutionary biologists explicitly reject these limitations, arguing instead that our evolutionary past does play a role in shaping our social behavior and hence our current cultural conditions. As such, there must be a significant biological component that influences the development of culture.

There seem to be some intellectual obstacles to incorporating biological concepts and theories into sociology. Ellis (1996) suggests one common-sense reason: social scientists generally lack training in and knowledge of biology. So many attempts to import biology into the social sciences have been riddled with inaccurate use of biological concepts that a basic understanding of biology should be a prerequisite. Acquiring this knowledge requires familiarizing oneself with material outside the domain of traditional sociology. Consequently, many social scientists are content to remain unacquainted with biology, or the more pernicious, to use biology with no proficiency.

Van den Berghe (1978) suggests a number of additional reasons why sociology remains hostile toward biology, which I will briefly outline here. First is the social sciences resistance to reductionism and unification within science. Confusion due to the many meanings of reduction in science (see above) does not help the matter, but sociology has an additional reason to reject reductionism. Sociology has a long-standing tradition of reifying the group. Societies are made of individual actors, but societies, cultures, social structures, groups, and networks of individuals are thought to be a separate reality and the preferred level of analysis for sociology. This thinking can be traced back, in part, to Durkheim, who famously argued for social-level explanations of social phenomena: “every time that a social phenomenon is directly explained by a psychological phenomenon, we may be sure that the explanation is false” (Durkheim 1895b:129). The reasoning Durkheim employs immediately prior to making this
pronouncement is not so famously remembered: “In a word, there is between psychology and sociology the same break in continuity as between biology and the physicochemical sciences” (p. 129). This conclusion—a necessary break in continuity between levels of analysis—has proved to be false not only for biology but for all the natural sciences.

Wilson (1982) points out that drawing a conclusion by this reasoning is as likely to be wrong for sociology as well. That social organization is an emergent characteristic of individuals interacting is not in question. But whether this constitutes a separate reality that operates independently of the forces of lower-level phenomena is unproven and doubtful. Biology focuses on the lowest possible level of organization for social behavior, whereas sociology focuses on the highest. As such, they represent opposite approaches to studying social phenomena, and ideally these two levels of analysis should be complementary rather than antagonistic.

Dualistic thinking also characterizes much research in the social sciences. Because sociologists tend to favor social constructivist models, they often view biology as genetically determinist. The reasoning becomes that sociology should not incorporate biology because it is anathema to sociological reasoning. Evolutionary theory, however, emphasizes the interaction between organisms and environments, favoring neither influence in its explanations. Whether it is called environment, nurture, social learning, or most-broadly culture, it is only half of the equation. Sociology should not reject the other half.

“Perhaps the most common ground for rejecting a biological approach to human behavior is the presumably unique self-consciousness of human beings . . . Because humans are self-conscious organisms, it is argued, their behavior is in principle not comparable to that of other animals” (van der Berghe 1978:37-8, italics in original). For
interpretive sociologists who believe behavior is conscious, meaningful, and motivated, the phenomenon of consciousness is a limitation that in principle is grounds for rejecting biology. However, because evolution shaped the development of human consciousness, and consciousness is structured, ordered, and influenced by biological forces, these considerations would seem to nullify the argument that phenomena resulting from conscious human behavior is outside the scope of biological study. “Our mind structures our experience, but the structures used have been laid down during the evolution of the species” (Cartwright 2000:18).

Other sociologists reject that consciousness plays a significant role in social phenomena, but nonetheless also reject biology for the reason of the uniqueness of human consciousness. It is paradoxical in this case because for these sociologists, the social world is a reality sui generis which similarly favors ignoring conscious motivation. Biological forces can, as surely as social forces, shape patterns in the social world independent of human consciousness.

One additional issue related to consciousness continues to be an impediment to biological thinking. It is the growing trend in interactionist sociology to focus attention on verbal instead of nonverbal behavior. It is true that we give accounts of our motives, intentions, and the meanings for our actions, but in spite of this, we still act in particular ways. Verbal behavior can lead us to misunderstand why people act the way they do. Pinker (2002) retells an example where a neurosurgeon had to sever a patient’s corpus callosum, a brain structure that connects the two hemispheres, to eliminate the patient’s severe seizures. After the successful surgery, the doctors had the patient undergo some experiments to determine the side-effects, if any. What they found was bizarre. Because
the two hemispheres of the brain were no longer able to communicate, so to speak, they found that

if an experimenter flashes the command “WALK” to the right hemisphere (by keeping it in the part of the visual field that only the right hemisphere can see), the person will comply with the request and begin to walk out of the room. But when the person . . . is asked why he just got up, he will say, in all sincerity, “To get a Coke”—rather than “I don’t really know” . . . Similarly, if the patient’s left hemisphere is shown a chicken and his right hemisphere is shown a snowfall, and both hemispheres have to select a picture that goes with what they see . . . the left hemisphere picks a claw (correctly) and the right picks a shovel (also correctly). But when the left hemisphere is asked why the person made those choices, it blithely says, “Oh, that’s simple. The chicken claw goes with the chicken, and you need a shovel to clean out the chicken shed.” (Pinker 2002:43)

Unlike in this example, healthy humans walk around with their corpus callosum intact. Nevertheless, this type of research is helping show that there are allegedly separate domains for action and explanation that function simultaneously in our brains. The parts that account for the conscious or verbal explanations many times may merely be providing us with interpretations of the actions prompted by another part of our brain.

If a neurological undermining of intentionality is not all-together convincing, keep in mind that “perhaps the most damaging criticism [of intentionality] . . . is the fact that each person is not necessarily the best or sole judge of his own intentions” (Fay 1975:74). Sociological research, because of the potential value of knowing conscious intentions, must operate with a greater naïveté, and consequently, is more susceptible to being mislead by verbal behavior.
CHAPTER 2

EVOLUTIONARY THEORY

Evolutionary biology operates within the paradigm of evolutionary theory, evolution by natural selection. It provides the unifying interpretive framework for research and theories. It also constitutes a valuable paradigm for the life sciences that stem from biology, such as behavioral biology, population biology, and ethology.

Sociobiology is the discipline from which biosocial approaches can draw the relevant concepts and theories. Because sociobiology is a specific application of evolutionary biology, a basic understanding of the concepts of evolution is necessary.

Natural Selection

In the *On the Origin of Species* (1859), Darwin’s greatest contribution was not the introduction of the idea of evolution, which had been a theory going back all the way to the ancient Greeks (Gillispie 1960), but rather the mechanism by which evolution operates. Darwin described this mechanism as natural selection. I will briefly outline the components of natural selection according to Darwin.

All living things have a tendency to produce more offspring than necessary for the population to remain at the same size. If this process goes unchecked, the increase in population expands exponentially. However, over long periods of time, each species’ population tends to remain stable despite this tendency to overproduce. Among sexually reproducing species, differences exist among individuals (except for identical twins).
Some of the differing characteristics of individuals are passed on to their offspring. If the population of a species remains stable over time, some individuals must be more successful than others in producing offspring or some offspring are more successful at maturing and producing their own offspring. Individuals possessing characteristics that make them more capable of maturing to adulthood and reproducing will tend to do so and be better represented in the next generation. Natural selection is the differential reproduction of individuals and genes from one generation to the next. The accumulation of gradual changes in the genetic makeup of a species occurs through the forces of natural selection constantly operating on succeeding generations. These changes are evolution (Barash 1982; Endler 1992; Hodge 1992).

Phenotype and Genotype

To understand natural selection, it is important to understand the distinction between an organism’s phenotype and genotype. Phenotype refers to any actual, observable characteristics—such as size, shape, structure, behavior. By contrast, an organism’s genotype constitutes its genetic makeup. The genotype is usually only discernible through its influence on the organism’s phenotype, but these concepts are distinct from each other.

It is important to recognize that the interaction of both genetic and environmental characteristics determine an organism’s phenotype. Neither genes alone nor environmental factors alone can solely determine the phenotype. It is only through

7 Lewontin (1992) offers a more precise definition: “The ‘phenotype’ of an organism is the class of which it is a member based upon the observable physical qualities of the organism, including its morphology, physiology, and behavior at all levels of description” (p. 137).

8 Lewontin again: “The ‘genotype’ of an organism is the class of which it is a member based upon the postulated state of its internal hereditary factors, the genes” (1992:137).
epigenesis that a phenotype emerges. Epigenesis is “the process of interaction between
genes and the environment that ultimately result in the distinctive anatomical,
physiological, cognitive, and behavioral traits of the organism” (Lumsden and Wilson

Conceptually separating genetic and environmental influence during epigenesis is
important to understanding how natural selection works. Imagine, for instance, identical
twins of any species. Identical twins share the same genotype. However, imagine that in
this case, one is chronically malnourished from birth but the other receives adequate
nourishment. The difference in their observable characteristics—bone density, muscle
mass, height, weight, et cetera, i.e. their phenotypes—will in this case be the result of
environmental and not genetic factors.

If individuals possess characteristics (a phenotype) that enable them to produce more
successful offspring, they are said to be reproductively favored. Individuals may benefit
from having phenotypes that develop as a result of fortunate environmental factors (as the
example above illustrates). Or, individuals may develop phenotypes with favorable
characteristics as a result of genetic differences. Only the characteristics of the genotype
is passed on to offspring through reproduction. Natural selection can only ‘select’ a
genotype. Recalling that evolution is the gradual accumulation of genetic changes within
a species, we see then that natural selection can only produce evolutionary change in a
population in which the individuals who are reproductively favored have favorable
phenotypes that are the result of genetic and not environmental factors (Barash 1982;
Chromosomes, Genes, and Alleles

Providing definitions for some terms from genetics is in order. All of our genes exist in structures called chromosomes. Chromosomes are compact intertwined molecules of DNA found in the nucleus of cells. Chromosomes contain the cell's genetic information or genes. Humans normally have 23 pairs of chromosomes (46 total chromosomes), one chromosome of each pair inherited from each parent. The definition of a gene is less clear; branches of biology define genes differently so as to be a usable concept in the discipline. One definition is that each gene codes for an individual protein. An alternative definition is that a gene can be identified by analyzing the base-pair sequence on the chromosome on which it resides. Others use it broadly to mean an inheritable section of DNA. These various definitions do not imply that a gene is an arbitrary conception, but rather it is defined differently by biologists who are studying different aspects of genetics. The most basic definition of a gene, which subsumes all of the ways in which other biologists define it more precisely it in more specialized contexts, is that a gene is “a genetic unit which is small enough to last for a large number of generations and to be distributed around in the form of many copies . . . a little bit of chromosome which potentially lasts for many generations” (Dawkins 1976:34-5).

Because only one gene can be contained at any one position on a chromosome, any genes that can potentially reside in the same spot are called alleles. They can be thought to be rivals for a specific position on a chromosome (Dawkins 1976). An allele is one of several alternative forms of the same gene. In a population, there can be any number of alleles, but only one can be present on in any individual chromosome. The gene pool, then, can be thought of as all the alleles present in a population.
The Synthetic Theory of Evolution

While Darwin and his contemporaries described the mechanism of evolution, they did so without our modern understanding of genetics. The modern synthetic theory of evolution combines the mechanism of natural selection with insights from the discipline of population genetics. Evolution involves a change in gene frequencies in a population. If the frequencies of genes in a population remain in a statistical distribution (because there are no factors which modify their frequencies), that population’s gene pool is said to be in Hardy-Weinberg equilibrium. In a population in such equilibrium, evolution is not taking place. The study of evolution, then, is the study of the factors that disrupt Hardy-Weinberg equilibrium (Barash 1982). There can be an influx or outflow of genes between populations (immigration and emigration), resulting in new genes entering or existing genes being removed from a population. Random mutation can also introduce new genes and eliminate old ones. The equilibrium of a genetic population can also be affected by genetic drift; when breeding occurs in a small population, some of the genetic diversity is ‘lost’ or underrepresented in offspring by statistical chance. Frequencies of genes in such a population are said to drift randomly (that is, nonadaptively) from one generation to the next.

The most significant factor that disrupts genetic equilibrium is natural selection. Individuals differ in their reproductive success because of differing phenotypes. Genes are one component that shape an individual’s phenotype. Genes, then, also differ in their reproductive success because they are transmitted by individuals during reproduction. The fitness of genes is a measure of their reproductive success. Fitness is not a fixed,

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9 A cornerstone of population genetics is the Hardy-Weinberg law. It explains the relationship between frequencies of genes in a population and the various combinations of genes in individuals.
inherent measure, but rather is relative to all other traits which affect reproductive success, and also relative to the environment. "A trait may confer high fitness in one environment but low fitness in another" (Barash 1982:23).

Adaptations

There are two ways in which the term adaptation is used in evolutionary biology. The term adaptation, in the first sense, is used to mean the evolutionary process of "transgenerational alterations of the features and capacities of organisms in a lineage that enable them to solve ... problems posed by the environment, problems of internal integration, and the problem of reproducing" (Burian 1992:7). Natural selection causes the differential reproduction of individuals with phenotypic advantages, producing these changes.

A second way in which adaptation is used is to mean features of organisms. A characteristic of an organism that increases its fitness (that is, its reproductive success) is called an adaptation. "Adaptations are phenotypic features (morphological structures, physiological mechanisms, and behaviors) that are present in individual organisms because they were favored by natural selection in the past" (Thornhill and Palmer 2000:5). An adaptation is the difference in one trait from another that results in increased fitness for the individual (Clutton-Brock and Harvey 1979).

It is important to make the distinction between traits that have a high adaptive value and adaptations. "To be considered an adaptation a trait must be shown to be a consequence of selection for that trait" (West-Eberhard 1992:13). A trait may have a high adaptive value (that is, it contributes to the adaptedness of a organism) but this these traits may not have necessarily been selected for (Burian 1992). They may be the result of an
incidental “good fit between the organism and the environment” or “ability to perform a task effectively” (West-Eberhard 1992:13). Because of a phenomenon called pleiotropy — “the tendency for genes to have multiple effects” (Barkow1989:29)—it is often difficult to know the difference between an adaptation and an incidentally-useful trait.

Proximate and Ultimate Causes

Evolutionary scientists employ two levels of analysis in determining the cause of behavior. They speak of proximate causation and ultimate causation. First, it should be clear that, in this context, cause is used to mean “that without which an effect or phenomenon would not exist” (Thornhill and Palmer 2000:4). This is the scientific conception of cause. In seeking to determine what causes a particular behavior in an individual, one is actually seeking the answers to a number of separate but related questions: What stimuli or factors elicit such behavior? What genetic, physiological, or psychological mechanisms influence such behavior? What factors present in the environment elicit such behavior? To answer these questions is to seek a proximate cause of behavior (Barash 1982). The proximate causes of behavior are “those that operate over the short term—the immediate causes of behavior” (Thornhill and Palmer 2000:4). These include bodily traits, like genes, hormones, and brain mechanisms, and environmental stimuli, both psychological and social.

Evolutionary scientists also are interested in the ultimate causes of behavior. They would ask additional questions about what causes a particular behavior: What is the

10 Because this paper is primarily concerned with human social behavior, I will focus on outlining the relevant concepts from evolutionary theory as they pertain to behavior. Behavior is merely one phenotypic trait, and these concepts apply equally to all characteristics of an organism.

11 Baldwin and Baldwin (1981) prefer to use the “distal” as synonym for “ultimate” because of the misleading connotation of ultimate causation. I share their concern, but because “distal” has not gained wide acceptance, I will use the standard terminology.
adaptive significance of this behavior? Was this behavior selected as a way of increasing reproductive fitness? Why is this behavior similar to (or different from) behaviors of other species faced with the similar evolutionary challenges? To answer these questions are to seek the ultimate causes of behavior (Barash 1982). Ultimate causes are the explanation for why a proximate cause can occur in the first place.

For evolutionary scientists, it is not sufficient to understand only the proximate causes or ultimate causes of behavior. The best explanation for the cause of any behavior takes into account both proximate and ultimate levels of causation. Ultimate cause explains why a proximate cause exists, and proximate causes explain immediately why a behavior occurs.

How Genes Influence Behavior

Genetics and developmental biology are new sciences, and much needed research is still being conducted. “Given our general ignorance of the pathways between genes and behavior . . . it would probably be wisest not to speak of a gene for a trait but rather of a gene influencing the probability of occurrence of a behavioral or morphological character” (Barkow 1989:26, italics in original). Why does biology use this speculative or probabilistic language? The first is to ward off any notion that biology only offers genetically deterministic explanations (see “Common Misconceptions of Evolutionary Biology,” page 30). This language is also used because of the ideas of single-gene effects and polygenes. A single-gene effect is an instance where one gene is responsible for a single attribute, usually with relative autonomy from environmental influence. Research on single-gene effects has tended to focus on instances where a disability, such as a disorder like hemophilia, is linked to a single gene (Barkow 1989). Nearly all complex
attributes of an organism’s phenotype, including behavior, are the product of multiple, co-
ordinated genes or ‘polygenes.’

Even in the case of polygenes, the general model for all living things holds true, that an organism’s phenotype is the product of genes interacting with environmental factors. Biology is, in actuality, the study of these interactions (Thornhill and Palmer 2000). Because behavior is one characteristic of a phenotype, when studying any behavior it makes sense to study both the genetic and environmental contributions to that behavior. “The relative contributions of genotype and environment may vary considerably, but neither is ever equal to zero” (Barash 1982:29).

A common misunderstanding is to think that behavior is somehow contained within a gene, or a particular gene programs a certain behavior. Genotypes are merely blueprints that, through their interaction with environmental factors, code for a range of potential phenotypes. Environment, in this case, is defined broadly. Anderson, an evolutionary biologist, writes that “environment is used, as I believe it is generally used in biology, to mean all contingencies other than genes” (1979:99). Recall that epigenesis is the process of interaction between the genes and the environment that results in an organism’s phenotype. Epigenesis encompasses all of the biological processes of an organism, “from the moment that RNA is transcribed from DNA, then forward through all phases of development to the final assembly of tissues and cognition itself; the interacting environment first is composed entirely of the cell medium but then expands until—in the case of human beings especially—it includes all aspects of culture” (Lumsden and Wilson 1981:370).

In some cases, the environmental influences on how a gene codes for a particular phenotypic trait is very low, leaving little room for learning or experience. In other cases,
the genetic contribution can be so general as to leave almost all of the phenotypic development the result of environmental factors. “Among human beings, for example, the blink reflex is highly specified by our genetic makeup whereas personality is largely determined by experience” (Barash 1982:30). Just like any other characteristic of a phenotype, behavior can evolve by natural selection.

If understanding the mechanisms by which genes influence behavior is difficult12, thinking about it from a developmental standpoint may offer a more clear perspective:

The DNA of which genes are composed specifies the production of proteins, leading to the various structures constituting an organism. These structures include bone, muscle, gland, and nerve cells. Behavior unquestionably arises as a consequence of the activity of nerve cells, which presumably are susceptible to specification by DNA, just as any other cells. Accordingly, insofar as genes specify the organization of nerve cells, just as they specify the organization of bone cells, there is every reason to accept a role for genes in producing behavior, just as we accept the role of genes in producing structure. As phenotypes go, behavior may be somewhat more flexible or susceptible to environmental influences than are most other phenotypes. But the relevance of genetics to behavior is undeniable, and since evolution is the primary force responsible for the genetic makeup of living things, evolution must also be relevant to behavior. (Barash 1982:34)

Evolutionary biology makes clear that genes do influence behavior. But genes only work at a molecular level, and behavior results from action by our muscles and nervous system and so on. Determining how genes influence behavior is an extraordinarily difficult task for geneticists and developmental biologists who are only at the beginning of this quest even for simple organisms. Knowledge that genes influence behavior is “not the same as knowing how that gene will function in any of a potentially vast array of environments” (Alcock 2001:46). Evolutionary biologists need not have all the

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12 It is difficult, even for biologists, to understand the mechanism of how genotypes affect behavioral phenotypes; yet the field of evolutionary biology that specializes in this area, behavior genetics, has accumulated overwhelming empirical evidence demonstrating the correlation between genes and behavior for a wide variety of animal species, including humans.

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developmental details—how genomes and environments become phenotypes—before proposing and testing hypotheses about genetic influences on behavior.

The distinction between knowing that genes influence behavior and knowing precisely how or precisely which genes affect particular behaviors leads into the next section where I will address some criticisms of evolutionary biology.

Common Misconceptions of Evolutionary Biology

A Gene For...

One impediment to understanding evolutionary biology is the notion that there are genes for particular behaviors. From the preceding section, it is clear to see why this idea is in error. Any behavior is actually a complex phenomenon that requires analysis on many influencing factors, not just attribution to one simplistic cause. Nevertheless, this has become a popular idea. A recent Popular Science article claims that embryonic stem cell research could “tell us what each and every gene actually does” (Weed 2003). The New York Times Magazine ran a story about a possible gene that prevents heart disease, stroke, and diabetes (Dominus 2004). There is an ongoing discussion about the genes for alcoholism, violence, musical ability, et cetera. The list is nearly endless, but research supporting such ideas is often tentative and couched in language like “supports the idea that genes regulate” or “suggests a genetic basis for”—far from the deterministic language “a gene for” a behavior.

The converse of this argument, that no gene has been found to cause a particular social behavior, is often used by critics of evolutionary biology. “No one has ever been able to relate any aspect of human social behavior to any particular gene or set of genes” (Lewontin, Rose, and Kamin 1984:251). The mistake here is to conclude “that an
absence of evidence on the genetic foundation of human social behavior constitutes
evidence for the noninvolvement of genes in the development of our sociality." (Alcock
2001:52, italics in original). Alcock goes on to explain that “the shortage of detailed
information on gene-behavior relationships arises from the complexity of these
relationships and the resulting difficulty in establishing which genes are doing what, and
not because genes are irrelevant when it comes to the development of behavior” (p. 53).

If the point has not been made already, then try to follow the logic of the ‘no gene for
a particular social behavior’ argument as it might apply to a non-behavioral phenotypic
trait. Biologists have not identified which genes cause the development of our heart and
lungs (cause, of course, meaning to provide the information that is responsible for the
development of our heart and lungs). Are we then to suggest that in the absence of these
genesis our cardiopulmonary system would be the same?

The Naturalistic Fallacy

‘Things that are natural in origin should not be changed, because natural things are
good.’ This is the naturalistic fallacy. It should be noted that this type of reasoning is not
confined to those studying evolutionary biology, but rather, it is a widely-held assumption
by those who fancy nature but misunderstand biology. Popular examples abound, and the
naturalistic fallacy often can be found lurking in the promotion of many environmental
and political movements, such as Greenpeace, The Sierra Club, or the Libertarian Party.¹³
For example, Greenpeace’s “goal is to ensure the ability of the Earth to nurture life in all
its diversity.” The Sierra Club bills itself as “inspired by nature.” The Libertarian Party
promotes a governing system that stems from "the laws of nature and of nature's God."
The naturalistic fallacy can also be found in issues related to nutrition and health. Arluke

¹³ This is not meant to be an indictment or promotion of any organization.
and Sanders (1996) provide an unexpected example; in the 1930s and 1940s, the Nazi party in Germany promoted vegetarianism as a natural way of living.

The refutation of this fallacy is plain enough. In nature, “there are diseases, plagues, parasites, infant mortality, and a host of other natural events which we try to eliminate or reduce” (Buss 1994:16). Rarely will you find someone arguing that these things, because they are in nature, ought to exist. “The search for morality in nature has led to sentimentalizing and romanticizing nonhuman animals and preliterate peoples . . . Some anthropologists imply that anything that occurs in preliterate society—infanticide, geronticide, warfare, mutilation—is ‘good’ because it ‘functions’ to promote stability in a culture, society, or ecosystem” (Symons 1979:61).

Evolutionary biologists do not argue that we ought to accept nature, but critics often misinterpret the descriptions of what nature is like as an endorsement of what ought to be. “Because there is an evolutionary origin . . . does not mean that we must condone or perpetuate it” (Buss 1994:17). Dawkins explains, “I am not advocating a morality based on evolution. I am saying how things have evolved” (1976:3). There is a distinction between what we believe is the way things are and what we believe ought to be the way things are. Biologists rarely commit the naturalistic fallacy, but are often accused of it.

Genetic Determinism

Closely related to the naturalistic fallacy is the notion of genetic determinism: ‘Our genes cause us to behave in some fixed, programmed way, and thus our behavior is natural and immutable.’ It is a fallacy “to suppose that genetically inherited traits are by definition fixed and unmodifiable” (Dawkins 1976:3). Evolutionary biologists stress the inseparable and equally important contributions of genes and environmental factors in the

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14 For a philosophical treatise on this distinction, see Moore (1903).
development of all traits, including culturally learned behaviors. “Our genes may instruct us [to behave certain ways] . . . but we are not necessarily compelled to obey them all our lives” (Dawkins 1976:3). Genes on their own do nothing at all because “the information they contain cannot be expressed in the absence of many other chemicals, all of which are environmentally supplied” (Alcock 2001:43). Genes influence, not determine, behavior; sociobiology is built on this premise (Alcock 2001; Wittenbenberger 1981).

That this misconception of evolutionary biology is so widespread is particularly interesting because nearly all researchers believe—and in their works go into great detail to explain why—this idea is inaccurate. John Maynard Smith, one of the most respected and accomplished evolutionary theorists of our time, conclusively states that genetic determinism is “an incorrect idea that is largely irrelevant, because it is not held by anyone, or at least not by any competent evolutionary biologist” (Maynard-Smith 1997:524).

*Misunderstanding Proximate and Ultimate Levels of Causation*

Although nearly every major work in evolutionary biology duly refutes genetic determinism and the closely-related naturalistic fallacy, these misconceptions are still held by some social scientists. One explanation is that “ultimate and proximate causation frequently are confounded: ‘produced by natural selection’ is equated with ‘innate,’ and an evolutionary view of humans is thought, erroneously, to imply that attempts at social reform are doomed” (Symons 1979:59). A clarification, then, would seem to be in order.

Understanding proximate and ultimate levels of causation can be troublesome for a number of reasons. “Our cognitive and perceptual mechanisms have been designed by natural selection to perceive and think about events that occur in a relatively limited time-span” (Buss 1994:16). It is easy to conceptualize the proximate causes of behavior;
evolution, however, takes place gradually over many generations. Because we do not experience them happening, ultimate causes of behavior are more difficult to grasp, and as such they are sometimes dismissed.

Other times, ultimate causes are mistaken for proximate causes. “This is why the explanation that a behavior exists because it was favored by selection (an ultimate hypothesis) is often mistakenly seen as an alternative to the explanation that learning is involved in the occurrence of the behavior (a proximate hypothesis)” (Thornhill and Palmer 2000:111). Proximate and ultimate levels of explanation are dependent upon one another; when a proximate-level explanation for a behavior assumes an implausible ultimate-level explanation, evolutionary biologists can be assured that this incompatibility requires further investigation. But those who misunderstand these two levels of causation may inadvertently reject the need to satisfy both proximate and ultimate levels of causation, leading them to accept dubious causes for behavior. One such example is the Oedipus complex proposed by Freud. “Because of the reduced viability of offspring produced by mating of close relatives, close inbreeding is selected against. Thus, Freud postulated as fundamental to human nature a trait that simply cannot exist” (Thornhill and Palmer 2000:112).

Ideology

Upon this first, and in one sense this sole, rule of reason, that in order to learn you must desire to learn, and in so desiring not be satisfied with what you already incline to think, there follows one corollary which itself deserves to be inscribed upon every wall of the city of philosophy: Do not block the way of inquiry. (Peirce 1931a:56)

In spite of overwhelming and convincing arguments by evolutionary biologists against the aforementioned misconceptions (including both technical and lay explanations), these misconceptions are still held by some critics. One possible reason for
this is because evolutionary biology may conflict with some ideological beliefs. Critics may hold these or other mistaken ideas about evolution not because they misunderstand the concepts, but instead use these ideas when critiquing evolutionary research as a means of undermining it for ideological reasons.

Historians of science would point out that ideological-based critiques have always accompanied work in evolutionary theory, even as early as the publication of Darwin’s *Origin of the Species*. Venable (1966) summarizes Engels’s critique of natural selection: “In short, far from supporting Marxism, this theory merely serves, if transferred back from natural history into the society from which it was originally borrowed, to eternalize and justify as though grounded in nature itself, the barbarous economic relations of the particular historical epoch of bourgeois capitalism” (p. 64).

While politics and science often seem to be inseparable, it is for the betterment of both to be able to discuss each as conceptually distinct. Science has been used to justify political ideologies, and political ideologies have at times determined the content of *scientistic* research (viz. Social Darwinism and Lysenkoism). Nonetheless, more often the culprit is science’s association with the political ideology, not the content of the science. “Should we abandon the germ theory of disease because the Nazis used it to justify their anti-Semitism?” (Johnson 2002:14).

When we find a scientific position manifestly misrepresented in order to criticize it, ideology may be lurking nearby. This type of straw-man argument is evidenced here in an article in the journal *Social Text*. It is a variation on the ‘gene for’ argument, couched in obscurantist language:

15 Ruse (2000) provides a useful overview of the historical misuses of evolutionary theory.
The interaction of an organism with its own genetic structure is only one of the crucial determinants of its course of development and transformation. Its two environments—its own species and the ecosystem of which it is a part—are intrinsic to both its survival, growth, and transformation. Thus, contrary to classical genetics, both the spatiality and temporality of life forms is essentially indeterminate from the perspective of the genetic code. (Aronowitz 1996:181, emphasis added)

But classical genetics (indeed, all of biology) is well-aware that genes and environments are the two sides to the same developmental coin; in fact, the importance of the “two environments” is a scientific discovery, not a contribution by a social constructivist’s commentary on biology. Why the blatant misuse? Two possibilities exist: It was either unintentional because of a lack of actual knowledge of biology. Or, it was intentional in order to undermine biology for ideological reasons. The latter is more likely; the article was featured in the ‘Science Wars’ issue of Social Text in which social constructivists responded to the criticism of Gross and Levitt’s Higher Superstition (see “Defending Science” p. 8), a book that charged “cultural studies critiques of science [of being] riddled with incompetence” (Boghossian 1998:23).16

But criticism of evolutionary biology on ideological grounds can even come from within the scientific discipline. “As working scientists in the field of evolutionary genetics and ecology, we have been attempting with some success to guide our own research by a conscious application of Marxist philosophy” (Lewontin and Levins 1976:34) How to adjudicate between research and ideological belief, when they come into conflict, seems to be clear: “There is nothing in Marx, Lenin or Mao that is or that can be in contradiction with the particular physical facts and processes of a particular set of phenomena in the objective world” (p. 59). That this thinking comes from Richard Lewontin, one of the foremost authorities on evolutionary biology, at Harvard University,

16 It is a telling irony that Sokal’s parody (1996) was included in this issue as well.
reminds us that ideology and science may sometimes coexist, but only uncomfortably. Separating the two may leave them both for the better.

Feminism is another example where tension can exist between ideology and science. I will use the example of the feminist biologist Tang-Martinez as illustrative of this conflict. Tang-Martinez rejects sociobiology, asserting that it is “neither relevant nor necessary to understanding or ending the oppression of women. The objections raised by traditional feminists . . . are both methodological and ideological” (1997:117). She accuses sociobiology of being “biologically deterministic and serves only to justify and promote the oppression of women” (p. 117). What is accomplished by invoking this misconception?17 It is clear that Tang-Martinez, a practicing biologist, understands the fallaciousness of the argument. She rejects sociobiology as biologically deterministic because it is unfavorable to feminist ideology, but she does not reject sociobiology when its use is ideologically favorable. In fact, she goes on to write that some feminist biologists “use sociobiological methodology and analysis in an attempt to understand the origins of male domination and female oppression . . . [so that] by understanding the evolutionary origins of male dominance, we will be able to formulate more effective responses to counteract female oppression” (p. 118, italics in original). It now becomes clear what can be accomplished by marrying science and ideology: one can accept what is ideologically beneficial and undermine the rest that conflicts. If feminism is a political ideology of what ought to be—that is, “the eradication of male dominance and female oppression” (p. 119)—and evolutionary biology a science of what is, then again I argue that separating the two may leave them both for the better.

17 The use of “biological determinism” and “genetic determinism” here are synonymous.
CHAPTER 3

SOCIOBIOLOGY

The biological theories of human social behavior fall under the rubric of sociobiology. The publication of Edward O. Wilson's Sociobiology: The New Synthesis (1975) is regarded as a watershed event, because it was Wilson's book that first synthesized the existing theoretical work by biologists and animal-studies by ethologists into a new discipline for the study of animal social behavior (Maxwell 1991). Wilson's book is a “massive summary review of the research of other scientists who have employed Darwinian evolutionary theory to make sense of social behavior” (Alcock 2001:16). In Sociobiology, Wilson accomplished a monumental scientific task: he was able to digest the existing evolutionary literature on social behavior, organize it clearly, and explain how the existing research on social behavior made sense in light of evolutionary theory (Alcock 2001). He also gave a label to this new field of evolutionary biology: sociobiology. Sociobiology is, by Wilson's own definition, “the systematic study of the biological basis of all social behavior” (Wilson 1975:4).

With the publication of Sociobiology: The New Synthesis, thus began the great sociobiology debate that raged through much of the 1970s and 1980s. Sociobiology was criticized on political grounds as reifying conservative values and legitimizing racism and sexism (Lewontin, Rose, Kamin 1984). But Sociobiology was also criticized on scientific grounds as reductionist and deterministic. "Social scientists bitterly disputed Wilson's claims, found faults with his methods, and dismissed his explanations as speculative.
stories” (Laland and Brown 2002:4). Balanced analysis of the work on its scientific merits was scarce. John Maynard Smith, one of leading evolutionary biologists at the time, commented in his review of Sociobiology that Wilson made “a major contribution” to an understanding of animal behavior and carefully reviewed its many positive features (Maynard Smith 1975:496). But Maynard Smith also pointed out that given the misapplication of biological theories in the past (like scientific racism and Nazism), one must be very conscious of creating a work that could foster the inappropriate uses of biology. His initial attitude toward Wilson’s book was “one of considerable annoyance and distress” (Segerstråle 2000:241).

It is far outside the intent of this paper to delve into the details of the sociobiology debate. Complete and impartial treatments of the participants, concepts, issues, and history—including both the scientific and political aspects of the debate—have been written (see Alcock 2001; Ruse 2000; Segerstråle 2000). For our purposes, it is enough to know that in the scientific community, sociobiology has become a well-established and widely-accepted discipline for studying animal social behavior. Sociobiology has done much to outlast its critics and is now an established branch of evolutionary biology. In fact, in 1989 the international Animal Behavior Society took an informal poll of its officers and fellows. They rated Wilson’s Sociobiology as the most important book on animal behavior of all time (Segerstråle 2000). In the fifteen years since, sociobiologists have continued to accumulate successful research that has secured their position as practitioners of a legitimate and mature scientific discipline.

We should be clear about what sociobiologists actually study and the type of research they are engaged in. Sociobiology is the study of the evolutionary origins of social behavior. It is just one branch of evolutionary biology, a broader field concerned with the
evolutionary causes of all components of life—like physiology, psychology, anatomy, genetics. Evolutionary biology, in turn, is just one branch of the overarching science of biology—the study of all living things and life processes.

When analyzing any behavior, there are really four types of questions we can ask about that behavior. We may ask: What are its immediate (or proximate) causes? In what ways does this behavior develop over the individual’s life-span? What is the function of this behavior that caused it to be favored by natural selection? Finally, what is the evolutionary history of this behavior, that is, what are its ultimate causes?

Asking the first question about the proximate causes of a behavior is really asking about how the internal mechanisms of an organism work. Answering this question is the domain of cellular biology and neurophysiology. The second question, about the development of a behavior in the individual’s life-span, is one that developmental biology most suitably answers. It is the third and fourth questions, about the function and evolutionary history of a behavior, that most concerns sociobiologists. “Sociobiology is primarily concerned with the adaptive significance of behavior; that is, its ultimate causation, as opposed to proximate factors” (Barash 1982:45). Despite each discipline's ability to explain in detail one aspect of a behavior, no explanation of any behavior can be complete without integrating the answers to all four types of questions. The value of sociobiology is that, of all the biological disciplines, it can provide answers to the questions we deem most relevant concerning our social behavior. That is, why do humans act the way they do? In order to find out the evolutionary history and causes of our behavior, we need to understand the sociobiological way of answering this question.

One conceptual tool for understanding the evolutionary history of traits, including behaviors, is taking the gene’s eye view for hypothesis generation and testing. Dawkins
introduced this way of reasoning in *The Selfish Gene* (1976), and it has since become an important tool in evolutionary biology. The idea is that we should imagine the perspective of the gene, whose only desire is to propel itself (through replication) into the next generation of hosts. Genes that tend to influence their hosts into doing things that aid in their reproduction are more successful genes. A gene is selected on one criteria: “its average effectiveness in producing individuals able to maximize the gene’s representation in future generations” (Williams 1966:251). This is what Dawkins means when he describes genes as being selfish. If we think about the phenotype of an organism (which is caused by its genes interacting with the environment), by taking the gene’s eye view we can see that many phenotypic characteristics of the organism function to benefit the replication of genes. Thus we can form hypotheses about why different species evolved the way they did by thinking about how the evolutionary history of the species was beneficial to its current genetic makeup.

At this point, we should take a step back and recognize that Dawkins is using gene’s eye view reasoning as a metaphorical way of thinking about evolution, not literally. Genes may appear selfish, but they do not *act selfishly*; while only one allele may secure a place on a chromosome, this does not mean that genes are *competitive*; and although multiplying prodigiously is one characteristic of a successful unit of replication, Dawkins is not implying that genes have an actual *desire* to see themselves reproduce. These are merely terms that humans use to help explain the course of gene evolution. Genes do nothing except code for proteins that, in turn, shape the phenotype of an organism. Variations in phenotypes allow for differential reproductive success, and hence, the evolutionary process. “The environment is the ultimate natural selector” (Barash 1982:16). What Dawkins is saying is that if we use gene’s eye view reasoning,
evolutionary biology has a powerful tool for understanding how adaptations emerge and proliferate in the evolutionary history of a species.

One central issue of sociobiology is explaining altruism. Altruism, in biology, has a specific meaning: an individual’s behavior is said to be altruistic if it increases another’s chances of survival and reproduction while decreasing its own chances (Alcock 2001; Dawkins 1976; Laland and Brown 2002). Because behaviors that decrease the chance of survival should be selected against, the question emerges: how can such behavior have evolved? The answer is kinship, and it can best be understood by taking the gene’s eye view. Because an offspring receives half of its genes from each parent, the genetic relatedness of parent to offspring is 0.5—that is, each parent and the offspring will share 50 per cent of their genes. Two siblings also have a genetic relatedness of 0.5 because half of each siblings genes come from each their mother and father. The relatedness of other relatives can be calculated as well: offspring and grandparent, 0.25; two cousins, 0.125; and so on. This measure of genetic relatedness is the probability that any two relatives will possess the same gene.

The reproductive fitness of an organism is its ability to survive and reproduce successfully. But if relatives share many of the same genes, from the selfish gene’s perspective, reproductive fitness should include not only the organism in which it is being carried but also all its relatives that may also be carrying a copy of the gene. The term inclusive fitness is the idea that both the individual’s reproductive success and the reproductive success of relatives is important from the perspective of the gene.

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18 Siblings have a genetic relatedness of 0.5, but they only statistically share 50 per cent of their genes. Due to the random assignment of genes during meiosis, siblings have an equal likelihood of acquiring any particular gene from either parent. But their genetic relatedness may actually be greater or less due to this random acquisition.
If altruistic behavior reduces an individual’s reproductive fitness at the expense of raising another’s reproductive fitness, then in the interest of the survival of the gene, there are instances where altruism is evolutionarily beneficial. If the genetic relatedness of two organisms is 0.5, and one individual does an altruistic behavior for this relative, then the altruist has a 50 per cent chance that it will be benefiting its own genes in the relative. That is, the probability of an altruistic behavior benefiting shared genes is the same as the measure of genetic relatedness. Selection for an altruistic behavior will occur if the cost of acting altruistically is less than this probability of benefit to the relative. Or put another way, selection for altruistic behavior will occur when the probability of benefiting shared genes outweighs the cost of the behavior.

The idea of altruism benefiting the genes held in common between relatives is known as kin selection. Kin selection describes “selection that takes account of other relatives as well as immediate descendants . . . and can be generally applied to any situation in which an individual behaves in apparently altruistic ways towards closely related kin to enhance their reproductive fitness” (Laland and Brown 2002:78). The occurrence of altruistic behavior is contingent upon the genetic relatedness of the two individuals involved, and in addition to altruistic behavior, many of the other key concepts in sociobiology deal with the weighing of the costs and benefits.

Evolutionary game theory is another way of thinking about behavioral patterns. A behavioral policy that is governed by genetic factors, and hence is innate or pre-programmed, is said to be a behavioral strategy. In a population individuals act according to various strategies. For example, one strategy may be ‘always steal food’, another might be ‘always share food’, and a third might be conditional, ‘share food with those who are willing to share in return, but attack those who try to steal food’. There are many different
possible strategies, but over the evolutionary course of a population, one set of strategies may be the most beneficial and impenetrable by individuals employing other strategies. Take, for example, the three strategies just mentioned. In a population of only food thieves, starvation would be rampant and the survival rate of such a population would quickly reach zero. In a population of food sharers, everyone would benefit equally until one food thief migrated into the population; at this point, the thief would benefit at the expense of all the sharers. The thief has a greater reproductive fitness and in turn, over passing generations, more and more members of the population are thieves until finally it is a population of all thieves and can no longer be sustained. But take the third strategy: sharing food would benefit the population until a thief arrives, but as soon as the thief is discovered, it would be attacked and driven away. This strategy tends to encourage sharing and discourage theft and remains stable over many generations. Such a strategy is known as an evolutionarily stable strategy (ESS), and the study of ESS is one of the cornerstones of sociobiological research (Dawkins 1976; Maynard Smith 1982).

One ESS seems to be special. It is what Robert Trivers, in a 1971 paper, named reciprocal altruism:

He suggested that, if unrelated individuals interacted over an extended period of time, an altruistic behaviour which was initially costly to the actor but beneficial to the recipient could be selected if this were a high probability that the altruistic act would be reciprocated between the two individuals on a future occasion. Over time, both individuals would gain more than if they had not cooperated at all. (Laland and Brown 2002:83)

Because of the possibility of cheats, there is a difficulty to overcome before reciprocal altruism can evolve as an ESS. It would likely occur only when the each individual can maintain a memory of the interaction, so that those who cheat and do not reciprocate
would be remembered and not receive altruism in the future. The idea of reciprocal altruism can help explain the selection for altruistic behavior outside of the kin relation.

With these conceptual tools—gene’s eye view, inclusive fitness, kin selection, evolutionary stable strategies, reciprocal altruism—sociobiology has many ways of explaining social behavior. The central principle of sociobiology is that individuals will tend to behave in ways that will be most successful in passing on copies of their genes into the next generation. But underlying this is the premise that, insofar as behaviors can be shaped by evolution, it is in the environment in which those behaviors evolved that the behaviors should allow for maximum reproductive success. (Barash 1982; Wilson 1975). Sociobiology, then, still must take into account the environmental context in which genes and individuals operate.

**Human Sociobiology**

With the introduction of Wilson's *Sociobiology*, researchers in evolutionary biology had a new methodology and body of literature to draw upon. If sociobiology was the systematic study of the biological basis of all social behavior, why should these new methods not be applied to human social behavior? Forerunners of this new human sociobiology were scientists like George C. Williams, Robert Trivers, John Maynard Smith, and William Hamilton (Laland and Brown 2002).

In conjunction with *Sociobiology*, it was the work of Richard Dawkins, an Oxford zoologist, that lead to the explosion of research in human sociobiology. In human sociobiology, the most relevant question is, “Why are people?” As incongruous as this question sounds, it is really a way of asking how we have come to be what we are now and why we behave the way we do. Dawkins begins *The Selfish Gene* (1976) by
pondering the answer to this question. Human sociobiology seeks to uncover the ways humans were developed by evolution and how evolved behavioral strategies influence our behavior.

Wilson argues “that the human species is prescribed to some extent but also displays some genetic differences among individuals. As a consequence, human populations retain the capacity to evolve still further in their biological capacity for social behavior” (1978:3-4). Wilson outlines the four characteristics of human sociobiology:

1. **Specificity of human social behavior.** Human behavior exhibits great cultural diversity. However, this variation comprises only a small subset of all of the social behavior variation exhibited by all species on earth.

2. **Phylogenetic relationships.** Our social arrangements most closely resemble animals with which we share a common ancestry and close genotypic relation. Since we share a common ancestry, for our social arrangements to resemble those of monkeys and apes is to be expected, only “if human social behavior is still constrained to some extent by genetic predispositions in behavioral development” (1978:4).

3. **Conformity to sociobiological theory.** If there are genetic constraints on human behavior, the sciences that form the foundation of sociobiology—that is, population genetics and ecology—can be applied to the explanation of human social organization.

4. **Genetic variation within the species.** Biochemical and genetic analysis has revealed that point mutations on the human chromosome and chromosomal aberrations affect behavior, affect mental capacity, and alter motor ability. Wilson calls attention to Lesch-Nyhan syndrome and Turner’s syndrome. “More complex forms of human

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19 The evidence supporting such a claim, Wilson argues, can be found in Chagnon and Irons (1979), Freedman (1979), and others; a detailed analysis of the assertion, however, lies outside the scope of this paper.
behavior are almost certainly under the control of polygenes (genes scattered on many chromosome loci), which in turn create their effects through alternating a wide array of mediating devices, from elementary neuronal wiring to muscular coordination and ‘mental set’ induced by hormone levels” (1978:5).

“My overall conclusion from the existing information,” Wilson summarizes, “is that *Homo sapiens* is a typical animal species with reference to the quality and magnitude of the genetic diversity affecting its behavior. I also believe that it will soon be within our ability to locate and characterize specific genes that alter the more complex forms of social behavior” (1978:6-7).

Human sociobiology added one additional principle to these four that would aid the research on specific mechanisms of human behavior. It is the validity of comparing humans to other animal species. The logic of such a comparison is summarized in the following argument:

If two species are very closely related, they have a very recent common ancestor, that is, one that lived a few million years previously, from which they will have inherited a large number of genes. Some of the ancestral genes that both lineages have received are likely to remain unchanged over a relatively short time, geologically speaking, and therefore could be responsible for some of the shared attributes between the species. Detailed similarities between two very closely related species could therefore be the product of shared ancestry and need not have evolved independently from different genetic backgrounds. If so, we can use the similarities between these carefully selected species to infer what traits were present in their shared ancestor, one step back in these species’ history. (Alcock 2001:75-6)

Using the tools of sociobiology to study human behavior has been used in the past to much success. Trivers described the conflicts between parents and offspring as a result of their differences in genetic relatedness (1972; 1974). By using the concepts of kin selection and gene’s eye view, a novel approach to understanding such conflicts emerges. (Although Trivers introduced his ideas of parent-offspring conflict before Dawkins
popularized the gene's eye view for hypothesis generation, in their reasoning there is much similarity between the two.) Parents would want to dole out resources and support to their offspring in equal amounts, and save some resources for further reproductive capability, but offspring would want to get as much resources and support from parents as possible before having to become self-reliant. This is because, although their genetic relatedness is the same (0.5), the offspring, by their nature of being the forward generation, are more concerned with their survival and reproduction. Natural selection would favor traits in offspring that prompt them to get as much as possible from parents, while selection would favor traits in parents that cause them to withhold resources in an attempt to strike a balance between current and future offspring.

Although the way parent-offspring conflict arise and functions has proved difficult to investigate, "Trivers's ideas provided huge impetus for further work by biologists and led to a fresh interpretation of parent-offspring interactions in humans" (Laland and Brown 2002:81). Evolutionary game theory and study of ESS in humans also remain two important ways of studying human behavior with the intent of determining how humans attempt to maximize reproductive fitness given the environmental context. In this way, human sociobiologists attempt to learn what the purpose of behaviors.

For a discipline to be considered scientific, one criteria it must meet is that its theories must be falsifiable—that is, shown the conditions under which the theory is considered false (Popper 1965; Lakatos 1970). One criticism of human sociobiology is that its hypotheses are unfalsifiable and are no more than story-telling for the origin of behavioral traits. But sociobiologists have responded to such a charge and point out that any "hypothesis generates various predictions ... [and] one could in principle test [a] hypothesis much more extensively" by submitting these predictions to further testing
Human sociobiological research takes efforts to prevent just-so storytelling. The first is to perform the vital task of testing these additional predictions or the consequences of a hypothesis, for if these turn out to be inconsistent with the hypothesis, it is evidence that the theory may be flawed. Human sociobiologists also rely on comparative methods to provide support their theories. With a careful application of comparative methods, the findings of one approach of biology can be applied to the hypothesis-testing of another. Reconciling hypotheses with evidence from the fossil record, behavior genetics, population genetics, and animal ethology increases the likelihood that human sociobiological explanations are true and not merely plausible.

Human Behavioral Ecology

The evolutionary science of behavioral ecology is chiefly concerned with identifying the links between ecological factors and adaptive behaviors. Behavioral ecology assumes the following key features: "ecological selectionist logic, a ‘piecemeal’ analytical approach, a reliance on modeling, a focus on ‘decision rules’ or ‘conditional’ strategies, and the so-called phenotypic gambit" (Smith 2000:29). Ecological selectionist logic means to seek out which environmental features, like resource density or competitor frequency, select for a particular behavior, making predictions about such selection based on theoretical expectations of natural selection. It is piecemeal in the sense that “complex socioecological phenomenon are fruitfully studied piece by piece—in a reductionist rather than holistic fashion” (p. 29). Decision rules or conditional strategies are ways of explaining how behavioral variation will correlate with environmental variation. Finally, the phenotypic gambit posits that constraints on adaptation, “be they genetic, psychological, or social, are so minimal as to justify their being ignored in the
construction of models and the testing of hypotheses” (Laland and Brown 2002:136).

Behavioral ecologists are not concerned whether the specific adaptations are the result of genes or psychological mechanisms; what matters is that if behavior is adaptive then it can be modeled and predicted (Laland and Brown 2002; Smith 2000).

Human behavioral ecologists apply the logic and assumptions of behavioral ecology to studying human social behavior. In doing so, human behavioral ecologists draw several conclusions about human social behavior:

1. Behavioral diversity is largely a result of diversity in the contemporary socioecological environment (rather than in contemporary variation in genes or cultural inheritance, or in past environments).

2. Adaptive relationships between behavior and environment may arise from many different mechanisms; hence HBE [human behavioral ecology] is generally agnostic about mechanisms (including the question of cognitive modularity).

3. Since humans are capable of rapid adaptive shifts in phenotype, they are likely to be well-adapted to most features of contemporary environments, and to exhibit relatively little adaptive lag. (Smith 2000:29)

Human behavioral ecology emphasizes the flexibility of human behavior, and tends to be particularly concerned with resource issues, game theory, and theories of optimality (Cartwright 2000). Human beings are assumed to be able to flexibly alter their behavior in response to environmental conditions. Humans posses the characteristic of high adaptability, which is the ability to “survive and successfully reproduce in a wide range of environments” (Laland and Brown 2002:114). Human behavioral ecologists use mathematical models of evolutionary theory to generate and test hypotheses about human behavioral patterns. If behavior is an adaptation selected to increase reproductive fitness, then given the environmental circumstances, models can be produced that predict what would be optimal behavioral patterns. These models can then be compared with data from anthropological research. If the data fit the predicted behavior from the model, the
hypothesis provides a relatively good explanation of the behavioral patterns, decision-making strategies, and important environmental cues that influence behavior. If the data do not fit the model, it can be concluded that behavioral patterns in the studied population are not optimal to the situation.

Human behavioral ecology does not formulate theories of adaptations but "merely establish[es] which behaviour patterns appeared adaptive by correlating human behavioural traits with reproductive success" (Laland and Brown 2002:132). As such, it does not clearly distinguish between adaptations and adaptiveness. An adaptation is a phenotypic characteristic that is selectively favored by natural selection that, because it is effective in solving particular environmental challenges that the organism faces, increase reproductive success. A similarly named concept, but one that is conceptually very different, is adaptiveness. Adaptiveness is the measure of a behavior's effect on reproductive success. Behaviors that increase reproductive success are said to be adaptive.

We can ask two questions about any behavior: Is the behavior an adaptation? Is the behavior adaptive? There are four possible explanations for any behavior—the cross of this two-by-two matrix of adaptations and adaptiveness. A trivial example may help explain this point: the human blink reflex.20 Let us assume that the blink reflex is an adaptation. If we live in an environment where no foreign objects ever threaten to enter the eye (an unlikely, but hypothetical, scenario), then we might conclude that this adaptation no longer has a high degree of adaptiveness—that is, it is no longer adaptive. That is to say that in this special environment, the blink reflex is an adaptation but is not

20 I wish to stress that example is using the blink reflex is purely hypothetical. In no way is this meant to be a scientific analysis of the blink reflex, its evolutionary origins, or current adaptiveness. It is merely a convenient hypothetical example to use because it is familiar and helps explain the distinction between adaptations and adaptiveness.
currently adaptive. We do not live in such a sanitized environment, and we can assume that the environment in which the blink reflex was favored by natural selection as an adaptation is in many ways similar to the environment we live in today. Thus, the blink reflex is an adaptation and also is currently highly adaptive.

Now, let us change our minds and assume that the blink reflex is not really an adaptation. Instead it can be considered a by-product of another adaptation, perhaps a by-product of the mechanism for moistening the eye. In the same scenario as mentioned above, if we live in an environment where nothing ever threatens to enter the eye, then in this case the blink reflex has a low degree of adaptiveness—that is, it is not adaptive. The blink reflex, then, is not an adaptation and also is not adaptive. In the terminology of evolutionary biology, the blink reflex in this case is a dysfunctional by-product. But we have already agreed that our environment is not such a sterile place. Whatever the reason is why we blink, it is currently something that has a high degree of adaptiveness. Although not an adaptation, the blink reflex is adaptive. In the terminology of evolutionary biology, the blink reflex in this case can be thought to be an exaptation—the utilization of a structure or feature for a function other than that for which it was developed through natural selection.

This example, I hope, has made clear the distinction between adaptations and adaptiveness. Human behavioral ecology has been criticized for assuming that all adaptive behaviors (that is, behaviors that increase reproductive success) are adaptations (characteristics favored by natural selection). Human behavioral ecologists respond by contending that they are well aware of the distinction, but such a distinction does not factor into modeling behavior. It is precisely on this point that a group of evolutionary scientists split with the human behavioral ecology tradition and began a new
Donald Symons (1990) summarizes the rationale for rejecting human behavioral ecology:

Darwinism is a historical example of the origin and maintenance of adaptations, and almost none of the phenomena of interest to social scientists—polyandry, bridewealth, the avunculate, and so forth—are themselves adaptations. Whether or not they are adaptive, they cannot be adaptations because they are not descriptions of phenotypic design. Darwinism can be ‘applied’ to traditional social science phenomena only insofar as it illuminates the psychological adaptations that underpin those phenomena. (P. 435)

Because of these criticisms and the subsequent development of the rival theory, evolutionary psychology, human behavioral ecology remains a small branch of anthropology. “Thus, while the methods of human behavioural ecology have the advantage that they are quantitative, rigorous, theory-driven, and insightful,” its ideas and empirical findings are underrepresented in sociobiological research (Laland and Brown 2002:150).

Evolutionary Psychology

Evolutionary psychology has proved to be the most fruitful of all sociobiology theories. “In terms of the number of researchers, human behavioral ecology is dwarfed by its cousin evolutionary psychology” (Laland and Brown 2002:151). Practitioners of evolutionary psychology argue that since that all aspects of humans evolved by natural selection, our brains “consist of a set of adaptations, designed to solve the long-standing adaptive problems humans encountered as hunter-gatherers” (Cosmides and Tooby 1997:241). Adaptations are characteristics of organisms which are the result of selection in a particular functional context (West-Eberhard 1992). Whereas human sociobiologists and human behavioral ecologists focus their explanations on behavioral traits, evolutionary psychologists focus on the adapted psychological mechanisms to explain
proximate and ultimate causes of behavior. Two pioneers of evolutionary psychology, Cosmides and Tooby (1987), explain:

[In the rush to apply evolutionary insights to a science of human behavior, many researchers have made a conceptual ‘wrong turn,’ leaving a gap in the evolutionary approach that has limited effectiveness. This wrong turn has consisted of attempting to apply evolutionary theory directly to the level of manifest behavior, rather than using it as a heuristic guide for the discovery of innate psychological mechanisms. (Pp. 278-9)]

The adaptations that are key for an evolutionary psychological perspective are those that arose throughout the evolutionary history of hominids, and especially homo sapiens. Humans had lived in small hunter-gatherer groups for around 99 per cent of their existence since the emergence of Homo sapiens\(^{21}\) (Badcock 2000; Cartwright 2000; Tooby and Cosmides 1997). Natural selection acts within the environmental conditions faced by a species throughout its evolutionary history (Symons 1979). For humans, the environment of the Pleistocene era, a period of time from 1.7 million to around 10,000 years ago, is the environment of evolutionary adaptedness, or EEA (Badcock 2000; Bowlby 1969; Laland and Brown 2002; Tooby and Cosmides 1997). The properties of this ancestral world endured long enough to allow the alleles well-adapted to the environment to occur and flourish at high frequencies in the population’s gene pool.

Accrual of these successful adaptations takes a considerable amount of time. Evolution by natural selection is very slow, taking place gradually and incrementally over many hundreds of generations, in comparison to the changes that can occur in history and culture. In the time since the development of agriculture around 10,000 years ago, human culture has changed dramatically. These rapid changes leave our evolved psychological mechanisms lagging behind the environment faced by humans in the modern era (Laland and Brown 2002). Adaptations in humans were shaped by the features of our ancestral

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\(^{21}\) The first species of the genus *Homo* evolved nearly two and a half million years ago, with the emergence of *Homo sapiens* about 200,000 years ago.
environment, and so "human psychological mechanisms should be adapted to those
environments, not necessarily to the twentieth-century industrialized world" (Cosmides
and Tooby 1987:201). When an adaptation that conferred reproductive fitness in one
environment decreases fitness in another, evolutionary psychology identifies these traits
as maladaptive:

The difference between current and evolutionary historical environments is especially
important to keep in mind when one is considering human behavioral adaptations.
Today most humans live in environments that have evolutionarily novel
components... Therefore, human behavior is sometimes poorly adapted (in the
evolutionary sense of the word) to current conditions. (Thornhill and Palmer 2000:7)

Evolutionary psychology operates on the assumption that "natural selection cannot
select for behavior per se; it can only select for mechanisms that produce behavior”
(Cosmides and Tooby 1987:281). Psychological mechanisms include the information
processing circuits in our brain that shape behavior, context-specific emotions,
preferences, and proclivities (Laland and Brown 2002). Pinker (2002) draws together
evidence from cognitive science, neuroscience, and genetics to support the principle held
by evolutionary psychology that the human mind has domain-specific processing abilities
adept at solving particular problems. Evolutionary psychologists also cite the
anthropological work (Brown 1991) on human universals—a set of characteristics and
aptitudes that all cultures have in common—as evidence that "natural selection has
endowed humans with a universal complex mind” (Pinker 2002:55).

Evolutionary psychologists argue that evolved cognitive mechanisms, at least in part,
shape the way humans learn, reason, develop, and acquire culture (Cosmides and Tooby
1997). These evolved cognitive mechanisms are domain-specific and are designed to
process information from each content domain with the “recurrent structure of its
characteristic problem type, as encountered under Pleistocene conditions” (Cosmides and
Tooby 1997:243). What this means is that our brains have been shaped by natural selection “with a set of ‘mental modules’ that give us innate skills and predispositions . . . [like] modules for language acquisition, for face recognition, for building basic taxonomies of life forms and much else” (Johnson 2002:12). Our minds have a large number of these mental modules that are “dedicated to finding quick and efficient solutions to particular problems that were of significance to our ancestors” (Laland and Brown 2002:162).

With an understanding of the characteristics of the environment of evolutionary adaptedness and its inherent adaptive problems, evolutionary psychologists can attempt to determine what cognitive mechanisms evolved. This is because, in the environment of evolutionary adaptedness, human hunters and gatherers had to solve specific problems. Thus this way of life was “the only stable, persistent adaptation humans have ever achieved . . . insufficient time has elapsed since the invention of agriculture 10,000 years ago for significant change to have occurred in human gene pools” (Symons 1979:35).

For our purposes in understanding evolutionary psychology, Tooby and Cosmides provide two of its fundamental tenets: “the human mind consists of a set of evolved information-processing mechanisms instantiated in the human nervous system” and “these mechanisms, and the developmental programs that produce them, are adaptations, produced by natural selection over evolutionary time in ancestral environments” (1992:24). Evolutionary psychology seeks to uncover these mechanisms, postulate how they developed, and how they function in our modern environment. Because it is easy to engage in armchair evolutionary hypothesizing, evolutionary psychologists engage in a number of methodological practices that aim to increase the validity of their research:
1. Use evolutionary theory as a starting-point to develop models of adaptive problems
the human psyche had to solve.

2. Attempt to determine how these adaptive problems manifested themselves in
Pleistocene conditions, and endeavour to establish the selection pressures.

3. Catalogue the specific information processing problems that must be solved if the
adaptive function is to be accomplished. Develop a computational theory.

4. Use the computational theory to determine the design features that any cognitive
program capable of solving the problem must have, and develop models of the
cognitive programme structure.

5. Eliminate alternate candidate models with experiments and field observation.

6. Compare the model against the patterns of manifest behavior that are produced by
modern conditions. (Laland and Brown 2002:164)

Indeed, Tooby and Cosmides (1989) advise us that “the desire to leapfrog directly
from step one to step six must be resisted if evolutionary biology is to have any enduring
impact on the social sciences” (p. 41). That some research in this field does not heed this
warning by its main proponents is not reason to condemn the field in its entirety. The best
research in evolutionary psychology is rigorous, empirically-justified, consistent with the
knowledge and theories of related fields in evolutionary biology, and provide novel ways
of thinking about human social behavior. Laland and Brown summarize that “the
evolutionary psychology literature has made important contributions to the understanding
of culture, decision making, emotion, language, pregnancy, psychological illness, sexual
behaviour and sex differences, stigmatization, visual perception, and many other topics”

Memetics

The history of the sociobiological literature has demonstrated that the last chapter of a
book can cause the most controversy, as was the case with Wilson’s chapter on humans in
Sociobiology (1975, chap. 27). Richard Dawkins participated in this trend, too, when he
introduced the concept of memes as a new type of replicators in the last chapter of his
*The Selfish Gene* (1976, chap. 11). Whereas the gene is the unit of *biological* natural
selection, the meme is the unit of *cultural* natural selection. Dawkins identifies the
properties that any successful unit of natural selection must have: longevity, fecundity,
and copying-fidelity. Genes constitute a section of a chromosome which potentially last
for many generations (longevity), copy and spread rapidly (fecundity), and reproduce the
DNA information faithfully (copying-fidelity).

Using the gene as an analogy, memes, according to Dawkins, “propagate themselves
in the meme pool by leaping from brain to brain via a process which, in the broad sense,
can be called imitation” (1976:206). Memes are a unit of imitation. “When you imitate
someone else, something is passed on. This ‘something’ can then be passed on again, and
again, and so take on a life of its own” (Blackmore 1999:4). This ‘something’ is a meme.
If you retell a story that a friend told you, but don’t imitate every gesture or use the exact
words, this still counts as imitation as long as the gist of the story is copied. Retelling the
story is imitation; the gist of the story is the meme. It is the smallest sufficiently
distinctive and memorable idea that can be passed on through imitation. Memes possess
the same properties of a unit of natural selection that genes do. Memes frequently stay in
our heads for long periods of time, they can be copied and spread rapidly, and the
information is reproduced faithfully\(^\text{22}\) during replication.

Memeticists often point out that not everything is a meme. Imitation, in memetics, is
defined in the broadest sense, “to include passing on information by using language,
reading, and instruction, as well as other complex skills and behaviors” (Blackmore

\(^{22}\) More correctly, “at least some core components of some memes are reasonably faithfully
reproduced” (Laland and Brown 2002:199). Defining what constitutes an individual meme is one
of the unsettled analytic issues in memetics. See Blackmore (1999), Dawkins (1976), Dennett
What does not count as a meme are behaviors learned through conditioning, classical or operant; those behaviors that are contagious, like yawning when others do, because we already know how to yawn and thus no information about yawning is passed on in the imitation; and specific types of social learning, specifically, ‘stimulus enhancement’ or ‘local enhancement,’ in which attention is drawn to the object or locale by the presence of another person, but the behavior that is thought to be imitated is actually independently discovered (Blackmore 1999).

Memes are an example of universal Darwinism. Darwinian evolution requires three processes for replicators to undergo: variation, selection, and retention (Blackmore 1999). Memes conform to the mechanism of biological evolution, but operate in a different medium. There is variation (not all memes are alike), selection (some memes do better in the environment than do others), and retention (the ‘something’ that constitutes a meme is inherited through imitation).

Thinking about memes is similar to thinking about genes. Blackmore (1999, chap. 4) suggests we take a meme’s eye view, much as Dawkins suggested using a gene’s eye view, in order to think about the differential replication of memes. Remember that rival alleles compete, so to speak, for a place in an organism’s genome. Genomes are replicated, and the allele that secured a place on the chromosome get passed on to the next generation. Memes, too, can be rivals, but the structure that memes reside in and can ultimately contribute to a meme’s replication is the human mind. “Imagine a world full of brains, and far more memes than can possibly find homes. Which memes are more likely to find a safe home and get passed on again?” (Blackmore 1999:41). This is the central question of memetics. Successful memes are the ones that the mind selects and is passed on to another mind through imitation.
At this point, you might be asking one of the more central questions of memetics: What is it good for? Memes are a new concept, and it is still unclear whether memetics will establish itself as a scientific discipline. Memetics is not yet widely accepted in academia (Blackmore 1999; Dennett 1995). One of the champions of memetics, Daniel Dennett, concedes that “the prospects for elaborating a rigorous science of memetics are doubtful” (1995:369). Why then should memetics be considered a sociobiological approach?

One possible answer, which may not be so pleasing to memeticists, is that memes really only serve as a useful way of thinking about evolutionary psychology. Let us think about what makes a meme successful. If our minds are the ultimate natural selector of memes, then what makes a successful meme gives us insight in thinking about how our minds work. “From the perspective of memetics, evolutionary psychology provides a crucial underpinning. In order to understand why certain memes are positively selected and others rejected we need to understand the way natural selection has molded our brains for the benefit of the genes . . . To fully understand human behavior we must consider both genetic and memetic selection” (Blackmore 1999:36, italics in original).

Memeticists also make a grander claim that because culture is socially transmitted information, memetics can serve as the most appropriate tool for studying culture. Clearly memes can provide us with a different way of thinking about culture and cultural transmission, but whether memetics actually provides a superior way of analyzing culture remains to be seen. No complete memetic theory of culture has been proffered by any proponents of memetics. Given that memetics is in its infancy and has little empirical work to support it, at this time it would be wise to adopt only a tentative consideration for memetics in biosocial theories.
"There is only one evolutionary approach to the study of human behavior that takes up the challenge of understanding genetic and cultural evolution simultaneously by focusing directly on their interaction" (Laland and Brown 2002:242). This approach is variously known as gene-culture coevolutionary theory, gene-culture theory, or dual-inheritance theory. These theories seek to uncover how our genes restrict the development of culture, and ask how culture evolved and how it affects evolution (Laland and Brown 2002). Gene-culture theory draws heavily from population genetics and relies on complex mathematical modeling, two hindrances that prohibit it from being widely used as a sociobiological approach. Nonetheless, an analysis of the components of the theory and its possible uses is necessary to complete the conceptual framework of current approaches to human behavior in the sociobiology discipline.

The approach of gene-culture theory has two main proponents and schools of thought. The first was put forth by Lumsden and Wilson (1981) in *Genes, Mind, and Culture*. The second approach was advocated by Cavalli-Sforza and Feldman (1981) in *Cultural Transmission and Evolution*. These approaches share many similarities. Each use concepts that are similar to those used in evolutionary psychology and memetics, and rely heavily on mathematical models for hypothesis testing. But it is the work of Cavalli-Sforza and Feldman that has been more widely adopted as the theoretical foundations for this new field, with Lumsden and Wilson’s work having been severely criticized and their findings often refuted by the Cavalli-Sforza theories. In outlining an analytic framework of gene-culture theory, however, it remains useful to draw from both approaches.

23 I prefer to use “gene-culture theory” for the sake of concision.
24 The criticism came during the height of the sociobiology debate from a small group of often partisan reviewers. Additionally, the highly technical nature of Lumsden and Wilson’s work hampered attempts at popularizing the theory.
Gene-culture theory’s concept of culture walks the line between behavior genetics and cultural constructionism. Much of what we consider culture changes too rapidly to be the direct result genes, but conversely, human cultural universals and different cultural traditions found in similar environments belie the strict constructionist argument. Gene-culture theory rejects this dualistic stance and accepts that both “genes and environment undoubtedly account for some variation in human behaviour but the socially transmitted component of culture is hard to ignore” (Laland and Brown 2002:245).

Critical to gene-culture theory are the concepts of epigenesis and the epigenetic rule. Recall that epigenesis is the process of gene-environment interactions that result in the development of an organism’s phenotype. Lumsden and Wilson (1981) define an epigenetic rule as follows:

Any regularity during epigenesis that channels the development of an anatomical, physiological, cognitive, or behavioral trait in a particular direction . . . Some epigenetic rules are inflexible, with the final phenotype being buffered from all but the most drastic environmental changes. Others permit a flexible response to the environment . . . In cognitive development, the epigenetic rules are expressed in any one of the many processes of perception and cognition to influence the form of learning and the transmission of culturgens. (P. 370)

An epigenetic rule explains the phenotypic result of a particular gene-environment interaction. How do epigenetic rules relate to the thesis that genes and culture coevolve? Lumsden and Wilson first offer a working definition of culture: “the sum total of mental constructs and behaviors, including the construction and employment of artifacts, transmitted from one generation to the next by social learning” (1981:3). They go on to define a culturgen as any transmissible behavior, artifact, or mental construct. A culturgen is conceptually similar to a meme, in that they are attempts to divide culture into discrete units. Gene-culture coevolution is the change in epigenetic rules due to shifts in gene frequency, culturgen frequency, or both jointly. Put more simply, the makeup of the
human phenotype in a population—remembering that phenotype is all the physical qualities of an organism, including physiology and behavior at all levels (Lewontin 1992)—is the result of the combination of both genes and cultural elements.

Cultural selection is the process whereby culturgens increase or decrease in frequency within a population by being adopted by individuals at differing rates (Cavalli-Sforza and Feldman 1981; Laland and Brown 2002). Cultural selection can guide natural selection; individuals express differing cultural preferences, and sometimes as a result these cultural preferences cause individuals to survive and flourish at different amounts. In this way, the effects of cultural preference have a genetic component. The example of contraception is often used to explain this point. Fertility control is disadvantageous for genes in terms of natural selection in that practitioners typically have fewer offspring. But contraception is often a popular choice, and hence contraception as a culturgen is spread by its advantage in cultural selection. The advantage of gene-culture coevolution is that it can explain how cultural traditions that are non-adaptive in the biological sense can evolve. “When it has a sufficiently high cultural fitness, cultural information could increase in frequency despite the decreasing genetic fitness” (Laland and Brown 2002:251).

Gene-culture theorists give three reasons why human evolution may be different than other species’ evolutions because of our culture. First, as seen in the example of contraception, culture is an effective means of modifying the course of natural selection. Second, culture may generate ways to circumvent the regular natural selection process, like in the case where a particular cultural group (as opposed to individuals) are reproductively favored. Third, because culture can affect natural selection, the rates of evolutionary change can be speeded-up or slowed-down by culture (Laland and Brown 2002).
Ultimately, gene-culture theory tends to favor examining how culture affects the issues of population genetics and evolution. Cavalli-Sforza and Feldman (1981), pioneers in this approach, use the example of the development of agriculture to explain:

The dramatic increase in numbers of man with the adoption of agriculture is the most conspicuous testimonial of how a cultural adaptation, and hence culture itself, can promote Darwinian fitness of a species. There is no doubt that cultural mechanisms can be powerful adaptive mechanisms that favor survival and ultimate reproduction. Cultural adaptation, very much like physiological adaptation, is the transformation of the behavior of an individual to meet some potential demands or challenges. In the case of culture, this occurs through learning by imitation, education, or related mechanisms that involve use of the prior experience of other individuals. (Pp. 362-3)

Our genetic makeup, then, is not only the result of natural selection. It also bears the signature of culture’s influence on our genetic evolution and the current genetic variation among populations.
CHAPTER 4

BIOSOCIAL THEORY

Biology is the key to human nature, and social scientists cannot afford to ignore its rapidly tightening principles. But the social sciences are potentially far richer in content. Eventually they will absorb the relevant ideas of biology and go on to beggar them by comparison. (Wilson 1990:260)

The intent of this research is to outline the various evolutionary approaches to human behavior and show how they are relevant to the social sciences. It can be argued, on the one hand, that sociology already adequately incorporates concepts from biology into its analyses. It does so largely by picking and choosing from biology only what is immediately useful, and even then used only when necessary. Sociologist John Kunkel argues just this position, that "sociologists have recognized and accepted the role of biological factors for decades, albeit implicitly . . . we are [not] ignorant of these biological parameters, but only that they are simply part of the given framework of human social life" (Kunkel 1982:283-84).

On the other hand, the failure by sociology in recognizing the relevance of evolutionary biology to its own discipline is evidence that there is still much from biology that sociology is ignorant of. There are at least two important contributions from the biological sciences that sociology has been slow or unwilling to accept. The first is a refutation of the belief that human beings are a blank slate. Many sociologists hold on to the tabula rasa view of human nature, a view that has been shown to be demonstrably false and harmful. Nonetheless, the belief that humans are born with no innate cognitive
mechanisms is a widespread belief. A modern version of the *tabula rasa* view, one that at least in language attempts to distance itself from the blank slate doctrine, is that the human mind is rather is like a general-purpose computer. It comes equipped with the ability to process information and perform functions, but is “desperately dependent upon such extragenetic, outside-the-skin control mechanisms” to shape behavior (Geertz 1973:44). The conclusion from these two lines of reasoning is that “human nature is an empty vessel, waiting to be filled by social processes” (Tooby and Cosmides 1992:29).

Biology does not accept this model of the human mind. Research in cognitive science, neuroscience, genetics, and evolutionary psychology, to name a few, all posit the existence of an innate human nature. In fact, to refute the premises of strict social constructivism, Tooby and Cosmides (1992) refer to the research from cognitive psychology, evolutionary biology, artificial intelligence, developmental psychology, linguistics, and philosophy [that] converge on the same conclusion: A psychological architecture that consisted of nothing but equipotential, general-purpose, content-independent, or content-free mechanisms *could not successfully perform* the tasks the human mind is known to perform or solve the adaptive problems humans evolved to solve. (P. 34, emphasis added)

Theories of an innate, universal human nature are not mere rivals to the blank slate. They fundamentally contradict the blank slate doctrine, provide ample evidence why it is wrong, and offer superior evidence that the mind actually contains a large number of innate, specialized mechanisms for cognitive functioning.

Even so, the social constructivist model is often favored because if one assumes a set of false beliefs about biology, then strict cultural explanations are the only alternative. The dearth of knowledge of biology once again provides the starting point for a untenable

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25 Tooby and Cosmides (1992) call this the Standard Social Science Model (SSSM) and offer a refutation of its premises in detail.
position, as evidenced by this excerpt from a classic treatise on social constructivism, Berger and Luckmann’s *The Social Construction of Reality*:

> The human organism lacks the necessary biological means to provide stability for human conduct. Human existence, if it were thrown back on its organismic resources by themselves, would be existence in some sort of chaos. Such chaos is, however, empirically unavailable, even though one may theoretically conceive of it. (1966:52)

Here in one passage we find nearly all the social constructivist errors about biology. Human conduct is something wholly distinct from biology. In a state of nature, human existence is chaotic. Without the stability provided by culture, humans are incapable of human social conduct. Evidence for this position is unavailable but is at least theoretically conceivable.

Each of these beliefs has been widely refuted by the scientific evidence. Human conduct and biology are related, and the development of culture is a human biological universal. Social organization is the natural state of human existence. Human conduct is mediated by human nature and culture.26 One can theoretically conceive of evidence to support Berger and Luckmann’s grand claims only by being completely ignorant of the contradictory scientific rationale and empirical evidence that biology provides.

Even so, assuming that there is no human nature is often favored because it is thought to be politically liberating. If there is no human nature, individuals can be infinitely molded as society sees fit. All problematic aspects of humanity can be solved through sufficient socialization. The absurdity of this position becomes evident when Thornhill and Palmer (2000) point out that such a belief, for example,

> implies that women find rape a negative experience only when they are influenced by their culture to feel this way. If this were true, then stopping rape would not be necessary in order to solve rape as a social problem. Instead, according to assumptions

26 In addition to the conceptual framework of sociobiology provided in this paper, see Brown (1991) for an account of human universals and Pinker (2002) for a massive summary of the literature on human nature.
of the social science explanation of rape, the problem of rape could be solved simply by teaching women that rape is a wonderful experience. (P. 152, italics in original)

Proponents of the blank slate often hold on to its indefensible empirical position because of its perceived political benefits. Its implications may not always be politically liberating, however. Symons notes that “a tabula rasa view of the human mind is the totalitarian’s dream” (1979:65), and Mao Zedong wrote that “it is on a blank page that the most beautiful poems are written” (Pinker 2002:11). The policy implications of an innate human nature or of the blank slate doctrine are not as clear-cut as their proponents would like us to believe.

Sociology has also been slow to accept a second important contribution from the biological sciences: evolutionary theory. Much of sociological theorizing denies that biological factors influence behavior and are unaware of how evolution shaped these factors. Because of this, sociology is handicapped in its efforts to explain human behavior. The research of this paper suggests some of the ways that biological disciplines have made inroads into domains traditionally associated with sociological analysis.

In 1977, the sociologist Gerhard Lenski presciently asked, “Why cannot cultural and biological explanations of human social behavior be combined?” (p. 74). A biosocial approach aims at just such a goal. It involves incorporating the relevant data and concepts from the biological sciences into the sociological way of understanding human social behavior (Walsh 2003). I want to reiterate the distinction between biological perspectives, like the sociobiological approaches outlined in the previous chapter, and biosocial perspectives. The intent of the research is different between the two disciplines.

“Sociobiology is concerned largely with interpreting behavior in ultimate terms” (Barash 1982:29). Biosocial theories recognize that because behavior is “the continuous, mutual,
and inseparable interaction between biology and the social environment” (Lancaster et al. 1987:2), the most empirically adequate theories must integrate the relevant insights from natural and social science disciplines.

What are the characteristics of a biosocial theory? Baldwin and Baldwin (1981) give four criteria that must be met. The first is that a biosocial theory must “contain an empirically defensible mixture and interaction of genetic and environmental factors” (p. 17)—that is, not favor nature or nurture exclusively. As I will explain, sociobiological approaches are unwittingly biased toward nature because of misconceptions about what constitutes the social environment. Second, “biosocial theory will necessarily involve multicausal models of behavior, with room for interaction effects among the numerous causes” (p. 17). Third, the influence of genetic and environmental factors must be weighted according to the species under consideration. For humans, much of our social behavior is the result of learning; consequently, the influence of the environment (including the complex social environment) must be weighted heavily in biosocial research. Finally, we must recognize that the influence of proximate and ultimate causes of behavior vary over the course of the life-span (spanning from prenatal development until death) and thus our explanations must vary accordingly.

None of this is meant to imply that culture is merely biology writ large (Barkow 1989). Biology underlies psychology, and psychology underlies sociology. Nonetheless cultural experience accounts for a large portion of the variance in behavioral differences within and between cultures (Walsh 1995). A biosocial approach is amenable to the broad diversity of factors that influence social behavior. A biosocial theory, then, “should provide an empirically defensible interweaving of multiple causal factors—
both nature and nurture” (Baldwin and Baldwin 1981:16). The discipline of sociology rightly is broader than the narrow way in which it is currently practiced. “To understand any particular thing in human behavior, social organization, or culture, we need to bring to bear the insights provided by a variety of other disciplines” (Cronk 1999:45).

Why Context Matters

“From one perspective,” Buss tells us, “context is everything” (1994:15). The context of our evolutionary ancestors shaped our phenotypic adaptations, but it is in our current context that we live today. Understanding our current context is critical in understanding how our evolved phenotypes currently function. “It is realized that even a complete description and understanding of the genetic, hormonal, and neurological bases of complex behavior would not constitute a complete understanding of that behavior absent knowledge of cultural setting and of motives, purposes, and phenomenology of the individual actor” (Walsh 1995:8).

One weakness in sociobiological approaches is how they conceptualize contextual factors. While they are ready to concede that humans are sensitive to context and acutely aware of changes in contextual factors (Buss 1994; Pinker 1997; Symons 1979), because their data collection methods are not always suited to capturing contextual detail, often sociobiology research paints contextual factors with a broad stroke. Indeed, of all the ways of studying context by sociobiologists, ethnographic data are perhaps the best, and

27 Baldwin and Baldwin call this a balanced biosocial theory. Their work does not focus solely on human social behavior, but rather is broader in scope and can be “adjusted to fit the species and behavior under analysis” (1981:16). In their opinion, evolutionary biologists had been favoring genetic factors in their explanations. Adding the descriptor ‘balanced’ to the label ‘biosocial’ is a call for researchers to consider a fairer mixture of both genetic and environmental factors. In the case of the social sciences, the label seems to be redundant. No discipline advocates abandoning research on environmental factors. Any serious biosocial approach to human behavior should seek to incorporate relevant concepts from both natural and social science disciplines. In this case, ‘balance’ will be a characteristic of these approaches, and consequently the label can be omitted.

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even then ethnographers often fail to apprehend the relevant contextual factors because of the difficulty of their work. Mathematical modeling of behavior, as an alternative approach, reduces contextual factors to attribute variables; the development of interactionist sociology was, in many respects, a response to the inability for statistical analysis or mathematical modeling to capture important characteristics of context. It would be unwise if our attempt to forge a better way of understanding our behavior required us to take two steps back. Another approach is to use experimental control on contextual factors. While this may yield information about evolved responses to factors in a controlled context, we must then rely on comparative methods to attempt to determine if these responses actually occur during interactions in the day-to-day lived world.

What we need is a way of integrating approaches so that explanations take into account the contextual factors of behavior in situ. Such a limitation of contemporary sociobiological approaches is recognized by many researchers, who, for example, hold out that future studies will show “that we have evolved psychological mechanisms sensitive to contexts as yet not envisioned” (Buss 1997:193). This context may be out of the methodological grasp of sociobiological researchers, but the tool of interactionist sociology can open sociobiology up to a world not yet envisioned.

The Sociological Connection

The logic of incorporating biology to the study of human social organization is clear. Rather than relying solely on social science explanations, a biosocial approach can “account for many of the known facts in a more convincing manner than do previous attempts but should also identify the need for new kinds of information not conceptualized by the unaided social sciences” (Wilson 1978:4) This also holds true in
the reverse direction; incorporating social sciences to the study of biology has its
advantages as well. Interactionist sociology can provide a new kind of information about
context, motivation, and meaning that is not conceptualized by the unaided biological
sciences. Indeed, the benefits of a biosocial approach have long been recognized by some
in sociology:

What is needed is not a life-death struggle between sociology and sociobiology, but two
disciplines that can begin to communicate and cooperate with one another and develop
more sophisticated models of human societies and individual behavior than either alone
could create. (Lenski 1977:75)

Sociologists have more recently begun to promote the advantages to sociology of such
a synthesis (Freese, Allen Li, and Wade 2003; Udry 1995). I wish to reiterate some of
these advantages and suggest a few additional ways that a biosocial approach can be
beneficial. The first, and most obvious, is that biosocial models can be more successful
than models that rely on only biological or social factors. Evidence of this can be found in
Udry (1988), who predicts adolescent sexuality using a biosocial model that turns out to
be a significant improvement on its component biological and sociological models.

A second use of a biosocial approach is to revitalize rational-choice theories
(Kanazawa 2001; Nesse 2001). By providing a definition of rationality that is satisfactory
to the findings from biological research, rational-choice theories can escape the problem
of stretching the notion of rationality too far and begin to provide a useful method for
explaining social behavior. Especially relevant to this project are evolutionary psychology
and memetics; the more we understand about how individuals make choices, assess
contextual factors, and assign value to actions, the better a rational-choice theory will be
able to explain and predict behavior.
An evolutionarily-informed rational-choice theory would present a novel approach to studying institutions and affecting their organization through policy recommendations. This is a way for rational-choice theory to applies to the real world (Gigerenzer 2000). Mindful use of game theory in our policies can be a way to effect institutional change by creating institutional rules where it is more beneficial to play by the rules than to violate them. The Superfund can be thought of as an example of this; it is an attempt to inflict greater costs to those responsible for contamination and pollution than the benefits (in terms of cost-cutting) that polluting would normally have. The U.S. Constitution is another example; the separation of powers provides each branch of the government with ways to fight off encroachment by the other two branches to prevent concentration of power. Separation of powers, by its design, protects freedom and political process at the cost of efficiency.

Institutions operate on both micro and macro levels of analyses, internally and externally, in terms of the functioning of an institution vis-a-vis its constituent members, individuals it serves, its overall internal structure, and its relationship and interaction with other institutions. In any of these four areas, the way the institution functions can be modified by an application of the insights of rational-choice theory and game theory. On the micro-level of analysis—the relationship between institutions and individuals—rational-choice theory can be thought of as an analysis of institutions and bureaucracy, in the tradition of Weber and Blau. On the macro-level of analysis—an institution’s structure and relationship to other institutions within society—game theory can offer unexpected insights into how institutions function and interrelate.

Perhaps the most significant avenue for a biosocial approach is its potential contributions to the interactionist school of sociology. Interactionist sociology is a tool
par excellence for studying particular types of social phenomena: the meaning that
individuals attribute to interactions and social behavior; the way in which individuals
learn and use symbolic media; the motivations and intentions of individuals; the ways in
which individuals provide interpretations of social interactions; and the ways in which the
interpretive process is culture-bound, or more specifically, context-bound. By drawing
from biology—including sources like evolutionary psychology, behavioral ecology, and
neurophysiology—interactionist theory can improve by acquiring a crucial component
that had been missing. That component is the scientific knowledge of human nature. With
this knowledge, it can begin to advance explanations for why behavior varies by context,
for why individuals assign particular meanings to behaviors, for why individuals have the
motivations and intentions that they do. By accepting that biology plays a part in shaping
social interaction and in how individuals assign meaning to those interactions, we can
begin to suggest the contextual features that are important to look for and the reasons why
contextual variation matters so greatly. Evolutionary psychology suggests the criteria for
determining what contextual factors are important to human behavior. We can reposition
interactionist sociology to explain interpretation and meaning by understanding the
underlying factors that humans have evolved to be sensitive to. This is not to say
interactionist sociology should abandon its research programme; no, it should expand by
incorporating the relevant insights from biology, and connect with the attempts by
biology to understand context and meaning.

Furthermore, a biologically-informed interactionist sociology would be a useful
starting point for theories of the middle ground, or connecting together the various
sociological levels of analysis. Just as interactionism can bring the insights of biology to
aid its inquiry, sociological analysis that focuses on higher-level organization and the
structure of society can incorporate the insights of interactionist sociology. Because a biosocial interactionist approach can propose and test hypotheses about how context affects subjective interpretations, it would free interactionist sociology from offering descriptive analysis that is necessarily context-bound.

There is one more advantage of a biosocial approach to studying human behavior. It would provide the most empirically adequate explanation for social phenomena. If we desire to not only know the world, but to change it, then being aware of its true and multiple causes is the first step toward implementing policies meant to implement change to existing social relations. Research in the area of biosocial theories has only recently begun, and down that path lies the promise of a new way to better understanding human behavior.
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VITA

Graduate College
University of Nevada, Las Vegas

Michael A. Restivo

Local Address:
3940 Algonquin Drive #144
Las Vegas NV 89119

Home Address:
599 NW 10th CT
Boca Raton FL 33486

Degrees:
Bachelor of Arts, Sociology and Arts & Humanities, 2001, *Magna Cum Laude*
Florida Atlantic University

Special Honors and Awards:
University Honors Scholar, 1999
Florida Atlantic University

Thesis Title: Balanced Biosocial Theory for the Social Sciences

Thesis Examination Committee:
Chairperson, David Dickens, Ph. D.
Committee Member, Frederick Preston, Ph. D.
Committee Member, Donald Carns, Ph. D.
Graduate Faculty Representative, William Jankowiak, Ph. D.