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Evolutionary Success

Standards of Value

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1. Introduction

“Success” is a value term. Values imply a standard. So in assessing the degree to which humans have been successful, what standard of value shall we choose? What standard of success shall we apply?

For much of the 20th century, the most common answer would have been that all values are cultural, so the only standard of success available is a cultural one (Herskovits 1972; Mead 1928). The trouble with that answer here is that different cultures will have different standards of success. For any specific standard of success that might be proposed—for instance, population size, ecological dominance, tool use or technology—it is easy to imagine a plausible culture that values the opposite. We might value human ecological dominance and call that success, but some other culture might value ecological unobtrusiveness and call dominance failure. For a scientific investigation of success, that sort of cultural relativity is unsatisfying.

Happily, there are other value standards. In fact, as I shall argue later, there are five, in addition to the cultural standard: God, nature, reason, the autonomous individual, and human nature. These standards can be thought of as “value bases.” Each is a possible answer to the question of what we mean by success, of where to turn to evaluate success or failure. If we adopt God as our value basis, then we turn to God to discover the degree to which an entity or system is successful. God’s preferences are what count. “X is successful” simply means “God prefers X.” The next section discusses this six-option value-basis scheme and argues that only one, the human nature basis, may be suitable for present purposes, although applying it raises some difficult issues. Another value basis, the nature basis, could be modified to make it

useful, although, as will be seen, even suitably modified it too raises serious problems.

It might seem that for evolutionary success, no explicit value basis is needed because the standard of success is implicit in the evolutionary process. The thought is that natural selection is largely about competition, competition produces winners, and the winners survive and reproduce, generating offspring that are present in subsequent generations. Success is about winning. In other words, a standard of success is implicit in the process, just as it is implicit in competitive sports. For example, one could argue that in tennis, success is winning games and tournaments. Winning is implicit in the game in that it is built into the rules, the psychology, and the organization of the sport. The word “success” appears from time to time in the evolutionary literature, usually in passing, and when it does, success is usually meant to be understood in this sense, with no discussion of values seeming to be necessary. Success is just what the process favors.

There are several problems with this line of thought. First, if our intent is to talk in a value-neutral way about evolution, why use such a value-laden word like “success,” a word with such positive connotations? We could instead use an unambiguously value-neutral word like “trend.” That would be fine, but I sense that the choice of “success” in this context is not casual, that the intent of those discussing it is to put a positive spin on certain kinds of trend. (The same is true of the word “progress” in discussions of evolutionary progress.) As I shall discuss, one way to accommodate this problem is to acknowledge a value component in “success” but treat it as metaphorical. Success is what the evolutionary process “values.”

Second, however we maneuver to avoid the notion of value in a discussion of evolutionary success, values are always present. Imagine a species that survives, reproduces, and even expands on account of its profligate use of resources and its ability to destroy its competition, thereby depleting its environment and reducing diversity. Even if it finds a way to survive and to continue to expand, would we be happy to call it successful nonetheless? We probably would not, or at least many would feel uneasy doing so. The reason has to do with our values, values that are independent of the process that favored this species. No matter how the issue is framed, even if we claim to have no standard beyond what the evolutionary process favors, the word “success” drags true values into the discussion willy-nilly. The use of “value” in a metaphorical sense has the virtue that it reveals the conflict to be between standards that are, as I will argue, on the same footing, that are alternatives.

Which in turn allows us to say, for example, that a given species is successful by one standard and not by another.

Third, since I have raised the notion of selection favoring success, it needs to be pointed out that both in sports and in evolution, success is not always and only about winning. It is true that tennis star Roger Federer was considered successful because he won frequently. But that is not all there is to success in tennis. Federer is also polite and sportsmanlike. In calling him successful, we could mean that he excels in those areas. Another possible standard is the impact that a player has on the game, irrespective of how often they win. Venus Williams had a significant impact on the game, inspiring people of color to follow in her footsteps. And she continues to inspire, despite not winning quite as often in recent years. Thus, she could be said to be successful by a standard that has no necessary relationship to winning. Likewise, evolution is not about natural selection only. The process favors traits other than fitness. For example, in the absence of selection, individuals in populations tend to accumulate accidents and therefore to become different from each other. Diversity increases. Likewise, in the absence of selection, parts within individuals differentiate spontaneously. Complexity increases. This is the zero-force evolutionary law (ZFEL; McShea and Brandon 2010), which says that the evolutionary process has embedded within it, independent of selection, a tendency for diversity and complexity to increase. Thus the evolutionary process favors diversity and complexity, as well as fitness, and we will need to include these in our understanding of evolutionary success. Of course, doing so raises the question of what to do when conflicts arise. How shall we handle cases where one aspect of success increases at the expense of the other, say, a complex species that is extinction prone, perhaps on account of its complexity? Is such a species successful?

I will address these issues, but the discussion begins here with the various alternative ways to understand success. In what follows, I outline a value-basis scheme, covering all six of the possible standards of value that could be invoked for success. I shall argue that in talking about success, we necessarily invoke one of these value bases. As will be seen, there are good reasons not to invoke more than one—at least, not more than one at a time. Further, I argue that the scheme is complete. If we reject all six, there is nowhere else to go.

The value-basis scheme is a mechanism for producing clarity, but it is also a kind of safety technology. Like antilock brakes, it helps to prevent the skids—here, intellectual skids—to which we are all prone. Not uncommonly in evolutionary studies, the discussion of a trend in some feature of the

evolutionary process starts with a well-articulated standard for assessing that feature, but then later, when attention flags, slips into using another, unstated standard. I have seen this in discussions of ostensibly non-value-related variables like complexity. One starts out with an understanding of complexity as, say, hierarchy, understood as the number of levels of parts within wholes in an organism, which when applied to the history of life reveals an increasing trend. And then the slip occurs. Seemingly out of nowhere, the claim is made that humans represent a new level of complexity because we have language. Perhaps language makes us complex in some sense, but it has no obvious connection to the stated standard, hierarchy. The same sort of slip occurs in discussions of evolutionary progress.

For evolutionary success, such a slip would occur if we start by adopting a standard of success like, say, population growth, applying it consistently over most of human history to demonstrate human success, but then conclude that later human efforts toward population control would, if effective, be further evidence of our success. In this hypothetical case, the skid is from a nature-based standard—population growth—to one based on human nature, our shared preference for plentiful resources and happiness. I am not challenging the use of any particular standard, nor any particular conclusion about human success, just pointing out the obvious: rigor and coherence require consistency, a determined and uncompromising value-basis consistency.

In what follows, I discuss the various alternative value bases and the reasons why all but two are not useful for present purposes. I then explore the two that could be useful, a human nature basis and a modified nature basis, pointing out some of the difficulties in applying the former and offering some lessons from the study of large-scale trends that could be useful in applying the latter. (As will be seen, Hourdequin [chapter 4, this volume] identifies essentially the same two value bases for success, in her terms, the ethical and the evolutionary approaches.)

2. Alternative Value Bases

A classification of standards, or value bases, has been developed by the political philosopher Robert McShea (1990). McShea identifies six bases, three of them human (the unique individual, culture, and human nature) and three humanly transcendent (God, reason, and nature) (see Figure 2.1). I start with

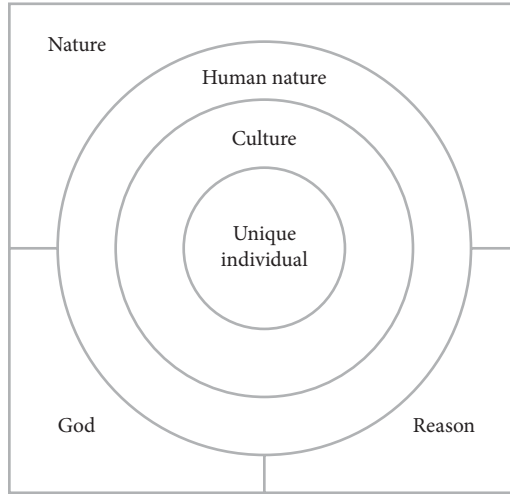


Figure 2.1 Six alternative value bases. Three are human (unique individual, culture, and human nature) and three are humanly transcendent (God, reason, nature).

Source: redrawn from R. McShea 1990.

the three humanly transcendent ones, dismissing them with only cursory arguments. I feel free to do this because I do not think anyone would advance and defend them in earnest in a discussion of evolutionary success. Mentioning them is important for completeness, however, to help make it clear that the value-basis classification is exhaustive and that there are no serious alternatives available beyond it.

God. A meaningful theoretical treatment of this value basis is beyond the scope of this chapter, and also beyond my competence. But I will point out a practical problem with it, one that strikes me as fatal. We cannot use God's preferences as a standard of success, because—putting aside the question of his existence—most of us have no direct way of knowing what God prefers. And reports from those claiming to have direct access to God are always open to doubt and to multiple interpretations. A decision that success is what God prefers will be followed inevitably by the question *What does God prefer?*, with no reliable answer forthcoming.

Reason. This value basis will not work either. Touted since the Enlightenment as *the* guidepost for secular thought, reason turns out not to offer any value guidance at all. As Hume demonstrated, no values follow logically from any set of facts (at least, none with any content to them; cf. Singer

2015). I am, and Hume was, using “reason” here in the narrow sense of strict logical entailment, the sense that has guided empirical science for centuries. Nothing about the better and the worse, nothing about what constitutes success and failure, is logically entailed by anything we know or anything we could learn about the world. It is said that Kant found a route to values based on reason, but it is doubtful that he was using reason in the modern sense, and certain that he is not using it in Hume’s sense. In any case, it is hard to see how his moral conclusions (e.g., the good is a good will) will help us understand evolutionary success.

Nature. Nor will nature work as a value basis, because, as discussed, it is—we believe today—value-neutral. Things just happen, or do not, and the fact of their happening or not happening says nothing about whether that outcome is good or bad. Or at least, to put it more circumspectly than is necessary, if nature has values, then—as for God—we have no way of knowing what they are. Notice that a notion like “degree of naturalness” will not help here. Everything that happens is natural, and everything that happens is equally natural, leaving no room for distinctions among things or events, of some as being more natural than others. In any case, even if there were some principled way to make such distinctions, the fact-value gap, the logical disconnect identified by Hume between values and the natural, would remain (Buchanan and Powell, chapter 12 in this volume). It may be natural for me to care very little about the welfare of strangers, but that does not make it good for me to do so.

There might seem to be another way to salvage the nature basis: by combining it with reason. Perhaps we can apply reason to things or events in nature to get values. To this option Hume again delivers a one-punch knockout. Things and events in nature are, in Hume’s language, “original existences” that have no “representative quality.” A hiccup or a thunder roll is an event, or a “thing,” if you like. It is an existence, not an idea or a representation of anything. And reason can be applied only to ideas or representations. Only these can have logical entailments. To say that some value standard is logically entailed by some thing or event is a category mistake (Hume [1740] 1978; Shaw 1998).

For those who accept Hume’s view, this will end the discussion. For those who do not, there is a practical problem. If nature has values, there is no logic that demands that they also be our values. If nature is somehow discovered to value complexity, there is no reason that we cannot instead value simplicity. As a practical matter, nature’s values would have no authority over us.

Still, there is more to say about the nature value basis, because while the nature-value disconnect is technically absolute, a connection can be made if we are willing to adjust our understanding of the word “value.” Instead of asking nature what it values, which nature answers with a hollow silence, we can ask what nature “values” in the sense of *supports* or *promotes*. Not just winning or adaptation, as discussed earlier, but *everything* it supports or promotes, by whatever mechanism (with consequences alluded to earlier and discussed more later). We are now using the word “value” in a metaphorical sense, which saves it from the fact-value-gap objection. Thus, by this value standard, one could meaningfully propose that nature “values” entropy, meaning only that it consistently promotes the production of entropy. In this view, our mission in the study of evolutionary success is to discover what evolution tends to support or promote. I shall call this the nature “value” basis, with the quotes to remind us that the valuing is metaphorical.

There is an apt remark by Huxley in his 1936 paper on evolutionary progress: “Any purpose we find manifested in evolution is only an apparent purpose. If we wish to work towards a purpose for the future of man, we must formulate that purpose ourselves” (Huxley 1936, 604). Substituting “value” for “purpose,” the remark nicely expresses the artificiality, the as-if quality, of the nature “value” basis, harmless provided we keep in mind that it is not the real thing. The remark also carries us forward to consideration of the three human value bases in the next three subsections.

The Unique Individual. We could adopt a value standard that says there is no standard of value higher than individual preferences and intuitions. In the present context, that would mean evolutionary success is what I say it is. Of course, that standard will be valid only for me. You will have your own standard, and it will be valid for you. If I say success is population growth, and you say success is improved efficiency of resource use, then I am right for me and you are right for you, and there is no way to settle the disagreement. So we have a problem, and it is the same problem raised earlier for a cultural basis, namely value relativism.

But for the unique individual value basis, relativism is not the worst problem. The worst is what might be called value instability. In Shakespeare’s *The Taming of the Shrew*, Petruchio bullies his new wife, Katherina, threatening to abort their journey home unless she accedes to his absurd declarations, first insisting that what is obviously the sun is actually the moon, and then reversing himself and declaring it to be the sun. Katherina in frustration finally concedes, saying (in a heavily ironical tone), “Then, God

be bless'd, it is the blessed sun. But sun it is not, when you say it is not. And the moon changes even as your mind." Success is population growth when you say it is population growth, and it is population control five minutes later when you say it is population control, and it changes even as your mind.

No one holds or would seriously defend the unique-individual position, although in my experience it is subtly present in a fair amount of casual value discussion.

Culture. Cultural values are less variable than individual values, but as discussed, the problem of relativism remains. We would like our study of evolutionary success to be objective, at least in the sense of cross-culturally stable. If it is not, we will be faced with some awkward problems. For example, suppose we adopt a standard of success based on some value that is widely accepted in our shared culture, say, success as technological sophistication. And suppose we then go on to conduct studies and develop an extended discourse around that notion, with technological sophistication understood in some operational way, perhaps as tool use. It will be embarrassing when someone from another culture comes along and says that technological sophistication, by their cultural standard, signifies failure. Their culture values simplicity. With a cultural value basis, we have no way to argue that they are wrong. Indeed, they are right, for them. And from their perspective, and from that of every single other culture that disagrees with us, our efforts will have been pointless. (The notion that culture can be separated out as distinct from other sources of value, such as human nature, is fraught in a number of ways, of course, and I address some of them in next section.)

3. The Human-Nature Value Basis

The human-nature value basis says that the good is what human beings approve of. A culturalist will object that we have few or no shared values, and will point to the sometimes huge differences among cultures in behavior, language, and conceptual categories, as well as in the stories and myths that underlie our understanding of the world. Defenders of the human nature basis will want to debate the extent of these differences but can cheerfully acknowledge that many of them are real, while pointing out that most have no bearing on the degree of *affective* similarity among people. For value judgments, the critical commonality across cultures is not in what people say, do, and think, but in their wants, preferences, and cares, or what Hume

called the sentiments. (See Hume [1740] 1978; for modern treatments of the human-nature value basis, see McShea 1990; Ruse 1986; Midgley 1978.)

How can behavior, language, and so forth vary so much, while the sentiments vary so little? Affective reactions are situation-specific, keyed to the details of how the situations that evoke them are understood. And those understandings can vary enormously among cultures. A crowd stands to sing the national anthem, saluting the flag waving above them, with spirits soaring in the shared experience of a common heritage and purpose, while someone from a radically different culture looks on bewildered, puzzled by the lyrics in an alien language of course but also by all the attention directed to a bit of cloth curiously mounted on a stick. The affective responses differ, but that is because the understanding of the context differs. Shared experiences of a common heritage and purpose evoke roughly the same affective reaction in people everywhere; it is just that the symbols and contexts that evoke that reaction vary, and indeed are sometimes unique to a given culture. Likewise, there are characteristically human responses to loyalty and cheating, compliments and insults, empathy and threats; it is just that the words and situations that constitute loyalty, threats, and so on can differ enormously among cultures. The same is true over a wide swath of contexts, on matters related to children, friendship, kinship, cooperation, reciprocity, play, and social status. (See Brown 2004 for many, many more.) Corrected for differences in understanding, we have broadly similar sentiments, the human nature position claims.

Thus, here is how the human-nature value basis handles the question of evolutionary success. Success is what humans generally approve of. And a successful species, including our own, is one with properties and capacities that elicit a favorable response from our shared affective nature.

Apparent Difficulties. Using a human-nature value basis, a different kind of relativism comes into play. Values become species-relative. Following Hume, the human nature basis understands values as secondary qualities, like sound, color, and odor. And affective reactions differ among species just as the perception of sounds, colors, and odors does. Each species has what might be called an affective profile, the total stimulus-specific and situation-specific repertoire of sentiments. And just as each species has a unique profile of perceptual capabilities, each also has a unique affective profile. An orange smells different to a chimp than it does to a housecat. And lion feelings about other lions are different from tiger feelings about other tigers. (Lions' affective responses are highly social, while tigers are the epitome of antisociality.)

And to the extent that species' affective profiles are different from each other, values will be different. If black widow spiders could make value judgments and speak, they would disagree with us about how to treat mates, and there would be no principled way to settle the matter. In the present context of a discussion of the meaning of success, species relativity is certainly a weakness, but not much of one given that we are the only species that is presently able to participate in the conversation (so far as we know).

I have not yet mentioned the lively and growing literature on emotion and the long-running debate on whether there is a set of universal emotional responses shared among all people in all times and all places (Ekman 2009), or whether emotions are more plastic, varying with culture and personal experiences (Barrett 2017; Haidt 2007). The human nature view points out that emotions are strong, eruptive responses, and that the responses that underlie value judgments are often calmer, more properly called wants, preferences, cares, and so on. They are what Hume called the calm passions. Thus, the debate over emotion is only partly relevant in a discussion of values. In any case, whatever the very real differences in affective profile among cultures and among individuals, we know that strong similarities remain, as evidenced by, again, the characteristically human responses to loyalty and cheating, compliments and insults, empathy and threats, and so on.

The human nature basis is easily confused with emotivism. Emotivists argue that there is only one possible motivation to make a value statement, and that is the occurrence of a feeling, and from this they conclude that feelings and value judgments are trivial and of no consequence (Ayer 1950). The human nature basis agrees with the premise but not with the conclusion. To the extent that feelings are consistent within an individual over a lifetime, and to the extent that they are shared among all people, they offer a stable and enormously consequential value basis.

The Culture–Human Nature Separation. There are good reasons to worry about the conceptual separation between culture and human nature, indeed to worry that neither, as popularly understood in recent times, is quite real. Thankfully, while the debate about their reality has been entertaining (e.g., Pinker 2003; Sahlin 2008), I do not need to enter into it here. Here, culture versus human nature is my shorthand way of referring to the depth of entrenchment (Wimsatt 1986) or the embeddedness of the affective profile in a developmental system (Oyama 2000). With the phrase “human nature,” I am referring to those aspects of the affective profile that are less variable than others, less easily modified, and more foundational in the development of

human psychology. Variants arising in these tend to have more downstream developmental consequences (Wimsatt 1986). Sentiments arising from culture are those that are more variable and more easily modified, with fewer downstream consequences. Thus, the view of human nature intended here is roughly Hume's ([1740] 1978), a view that, as Lewens (2018, 16) nicely puts it, "enables us to make general claims about what members of *Homo sapiens* are typically like, and the ways in which they may be similar to, and different from, the typical members of other species." In my terms, it is a view that acknowledges the deeply entrenched similarities among the actual and potential developmental trajectories (*sensu* Ramsey 2018) of all human affective profiles, while allowing for more shallowly entrenched differences among cultures and deeper differences between humans and other species. Importantly, the human nature it points to has no essence, no precultural existence, and no necessary special role for genes in its etiology.

For political and moral purposes beyond this volume, quite a bit hinges on the claims of the human nature basis being true. In particular, it gives us a place to stand in judgment on the abhorrent practices of other cultures. Using a cultural value basis, if some culture practices ritual maiming of its members, we would have to concede that the practice is right, for them. In any case, my main purpose here is not to proclaim the superiority of the human nature view. Rather it is to make the more modest claim that human affective profiles are broadly similar, and to the extent that they are, agreement is possible on what constitutes success and failure.

Exactly What Is Our Shared Human Nature? It turns out to be very difficult to say exactly what the human affective profile is and therefore what constitutes success. Partly the problem is that we lack a good vocabulary for describing preferences, feelings, and affective responses generally. Partly it is that calm affective responses are just vague, at least as seen from the perspective of an introspective mind. Describing them is like describing the shape of a cloud as seen from the perspective of a window seat in a plane flying through it. And then of course, there are the differences in understanding among individuals and cultures, evoking different affective responses from our shared feeling profile. When it comes to seeking agreement on our shared values, all of these are troublesome enough. But more troublesome still is the incompleteness of our knowledge about ourselves. We seek happiness, but we often do not know what will make us happy. This will be especially problematic for our judgments about human success. It might seem reasonable to say that success is efficiency of resource use, because efficiency

is a sensible way to sustain happiness over the long term for a large number of individuals. But the demand for efficiency may also lead to a restriction on the expression of human potential. It could cramp our style. If both sustainability and the unleashing of potential are values for us, what combination of the two is best? What combination will evoke a positive affective response in a human being? One could argue that we simply do not know ourselves well enough to answer questions like that.

But these are problems in application, not in theory. The human nature position is that some degree of value agreement is possible in principle, and—most important—the shared affective profile is where defenders of any particular standard of success need to target their argument. What this means in practice is that proposals for success need to be pitched in a way, and at a level of abstraction, that transcends individual and cultural differences. Perhaps success concerns health, not income? Or might success be the degree of satisfaction of basic human needs, not habitat expansion? It is not that income increase and habitat expansion are bad. It is that it would, I think, be hard to get substantial agreement on them across individuals and cultures.

Notice that the human-nature value basis does not line up perfectly with various claims that have been made for a universal morality, nor does it necessarily contradict the notion of moral pluralism (Buchanan and Powell, chapter 12 in this volume). The central claim of the human nature basis is that what is shared are the context-specific, individual-level, human sentiments. Morality, in contrast, might be understood to have more to do with the language, social norms, laws, and institutions that grow up around those sentiments. Great variability in the latter is consistent with much less variability in the former.

I shall have no more to say about the human nature basis. I am no more qualified than anyone else to articulate the contents of our shared affective profile or to judge which aspects of it will be useful in assessing our success. Here my point has been mainly that it offers a perfectly good—albeit species-specific—value basis, that we can meaningfully ask about the degree to which humans have been successful by the standard of our shared preferences.

4. Evolutionary Success and Value Bases

The Six-Part Scheme. I do not expect that the value-basis scheme I am using here will be uncontroversial. Nor do I claim that it is the only possible starting

point for a discussion of values and of evolutionary success. It is especially appropriate here, I think, because it highlights the contrast between “values” in the metaphorical sense, the sense in which the evolutionary process can value something, and all other possible value bases. Also, it reveals the number of possible value bases to be fewer than might be expected, simplifying the search for an appropriate one for a discussion of success. And, happily, it reveals that there is a value basis, the human-nature value basis, for which general agreement on values is the expectation.

Identifying an Implicit Value Basis. In some cases, arguments about evolutionary success wear their value bases on their sleeves. Consider standards of success like a species’ ability to expand its habitat, grow its population, and transform its environment. None of these mentions fitness or natural selection, but they are pretty clearly invoking a nature-based “value” standard. They are understood to be things that the process favors. For other standards, it is difficult to know. What value basis is implicitly invoked by an argument that success is the ability of a species to influence the course of its own evolution? Or an argument that success is complexity of social organization? Or that success is sustainability? The question is whether the person making the case is invoking personal values, or some set of cultural values, or values that most humans in most times and places would assent to. I have no special insight to offer here and am happy to offload to others the problem of situating particular existing arguments in the value scheme. My interest is more prospective: we can avoid the issue of retrospectively situating an argument if we simply start with a value basis. That is, in beginning an investigation into evolutionary success, we should begin by choosing a value basis.

The Incommensurateness of Value Bases. Imagine a species that wipes out its competition and is therefore successful by the nature standard, but in doing so threatens the planet’s diversity, leaving us inclined to call it unsuccessful by the standard of human values. There is no contradiction here. Different standards of value can yield different judgments. Nor is there any way—even in principle—to settle the matter, no way to decide whether that species is actually, at bottom, successful or unsuccessful. The reason is that value bases are incommensurate. They are assessments by different standards, with no necessary relationship among them. They address success in different senses. Hourdequin (chapter 4, this volume) also treats her evolutionary and ethical value bases as independent of each other. And see Desmond (chapter 13, this volume) on the gap between population size and ecological dominance and the things “humans actually care about.”

The same point can be framed as a warning against slippage. We cannot begin by arguing that humans have been successful because we have prospered by the standard of the evolutionary process (nature in the metaphorical sense), as evidenced perhaps by our increasing population size and resource use, and then support this claim with evidence that human happiness has risen (human nature basis). For one thing, there is no reason to think that evolutionary processes favor our happiness. They may sometimes, but they need not always, or even usually. But in any case, whether or not they do, the two value bases are non-overlapping alternatives, and as a matter of logic, success by one standard is not evidence for—or even relevant to—success by the other.

Completeness, Exclusivity, and Objectivity. The value bases are a classification, a way of ordering concepts. There are only six (or seven if we include the nature “value” basis, with value understood in the metaphorical sense). McShea (1990) argues that the classification is complete in that every value theory falls into at least one of the six categories. Marxism is culturalist in that values are considered to be nothing more than cultural reflections of the means of production in a society. Utilitarianism has a reductionist human nature basis, identifying the pursuit of pleasure and avoidance of pain as our only morally significant sentiments. Ideal-observer theory (Firth 1952) is a modern human nature–based theory in that the observer implicitly requires a generalized human affective profile. In other cases, the correspondence is less obvious. See McShea (1990) for further discussion.

McShea also argues that the bases are exclusive. For us that means that while a given standard of success may claim to be founded on more than one value basis, the cost of doing so is inconsistency and incoherence. For example, a notion of success claiming to be founded both on human nature and culture falls apart in every case in which the value judgments of a culture contradict those of human nature. The contradiction cannot be finessed. Nor can some other value standard—like God—be invoked to resolve it. One solution, to shift value bases as needed, may seem pragmatic and has the added advantage of drawing on academic virtues like cleverness and intellectual flexibility. But the cost is incoherence. To invoke multiple value bases or to shift value bases is to have no value basis at all. McShea (1990, 29) writes:

The possible bases are ultimately incompatible with each other; an ethical theory that attempts to stand on two or more of them is in trouble. We know, especially from the history of religious value theory, that when Reason,

God, Nature, and the unique individual conscience are appealed to as though they must concur, endless paradoxes follow. The easygoing assumption that all or several bases can contribute faithfully to a single method for the determination of correct value judgments can be maintained only on the further assumption that they so concur only for “men of good will.” It always turns out that “good will” is the sole real basis, and a worthless one at that. One of the tragedies of human political life is the impossibility of institutionalizing means for identifying “men of good will.”

Finally, it may be obvious, but is perhaps worth stating anyway, that there is no objective way to choose among the value bases. A value basis is a way of framing the discussion of value questions, and not the sort of thing for which there could be evidence. When we choose among them, we do so only on the basis of their usefulness or appropriateness in the pursuit of some purpose of ours. Thus, in arguing against some of the value bases—God, reason, nature (in the literal sense), the unique individual, and culture—I have assumed that readers of this volume share to some extent a common purpose: the investigation of aspects of evolutionary success that are knowable and stable, both over time and among individuals. Based on these desiderata, I have argued that only two qualify, that only two are potentially useful, and that therefore we have only two to choose from: nature (in the metaphorical sense) and human nature.

In the next section, I turn to nature, discussing the sorts of things that the evolutionary process has been said to “value” in the metaphorical sense.

5. What Nature “Values”

Adopting a nature “value” basis, what might evolutionary success consist in? What does nature support or promote? I know of no list of candidate variables for evolutionary success per se, but there is a modest literature in macroevolution on large-scale directionality that might offer some help here. Figure 2.2 shows a list of candidates for trends extracted from that literature, offered here as a possible starting point for thinking about evolutionary success. Some of these arose in the ongoing discussion of evolutionary progress in macroevolutionary studies, but most arose as part of the broader and value-neutral discussion of trends. For all variables on the list, an evolutionary rationale has been offered for why a trend is expected. In most,

Variables Argued to Show a Large-Scale Trend

- Body size (Bonner 1988; Payne et al. 2009)
- Fitness, in the sense of extinction resistance (Van Valen 1973)
- Autonomy (Rosslénbroich 2014, this volume)
- Ability to sense the environment (Ayala 1974)
- Information about the environment (Adami Ofria, and Collier 2000)
- Intelligence (Jerison 1973)
- Evolvability (Altenberg 1995; Kirschner and Gerhart 1998)
- Versatility (Vermeij 1973, this volume)
- Developmental burden, entrenchment (Reidl 1977; Arthur 2010, Wimsatt 1986, Gould 1989)
- Energy expenditure and basal metabolic rate (Bambach 1993)
- Energy intensiveness (Vermeij 1987, 2013, this volume)
- Energy rate density (Chaisson 2010)
- Entropy
 - Energetic interpretation (Wicken 1987; Weber et al. 1989; Salthe 1993)
 - Statistical-mechanical interpretation (Brooks and Wiley 1988; Brooks et al. 1989)
- Ecospace occupation (Knoll and Bambach 2000)
- Ecological dominance, ability to control the environment (Huxley 1942)
- Diversity (Sepkoski 1978; Sepkoski et al. 1981)
- Complexity
 - Horizontal: number of part types (Valentine Collins, and Meyer 1994; McShea and Brandon 2010)
 - Vertical: number of levels of organization, nestedness, hierarchy (Pettersson 1996; McShea 2001)

Figure 2.2 A sampling of variables that have been said to show a trend in evolution at the large scale, over much or all of the history of life. These are presented here as candidates for what the evolutionary process “values” (in a metaphorical sense). Citations are mainly founding documents rather than most-recent studies.

natural selection is thought to be the driving force. For some, the driver could be diffusion away from a minimum, the spread of life away from a lower-bound toward higher values (McShea 1994). Both mechanisms imply that increase is favored or promoted by the evolutionary process. For only three variables has a trend actually been documented quantitatively at the scale of all life over its entire history: body size, energy rate density, and complexity in the sense of hierarchy.

For many of these variables, a trend has been documented nonquantitatively (e.g., ecospace occupation and energy intensiveness) or at some lesser temporal or taxonomic scale (e.g., complexity in the sense of part types in animals over the 500-million-year-long history of the group).

Importantly, the list is incomplete. Other variables not on this list could be favored by the evolutionary process: dispersal ability and geographic range, population size, adaptability, and many others. (See the introduction to this volume and indeed, all of the papers in it.)

This volume introduces a new project, with intriguing possibilities for new discoveries but along a road that is full of potholes and deep ditches. In the hope of helping future explorers to avoid these hazards, here are some lessons from the study of large-scale trends.

1. *One Value Basis but No Single Standard of Success.* As mentioned earlier, natural selection is not the only driver of directional change in evolution. In other words, fitness is not the only thing that the evolutionary process favors. Most of the entries in Figure 2.2 have some direct connection to fitness (e.g., ability to sense the environment, energy intensiveness, ecological dominance), but others have only an indirect connection or none at all. Developmental entrenchment arises from the way development is structured, and the increase in hierarchy may be the result of diffusion away from a lower bound. As discussed earlier, the ZFEL has no connection at all, producing a tendency for diversity and complexity to increase even if selection is entirely absent. Given the multiplicity of things that the process could favor, and the inevitable conflicts among them, it seems likely that no single standard of success will be possible. Unless we somehow devise a kind of grand unified theory of evolution (McShea 2015) that somehow combines all traits that trend into, say, a single equation, there will be no way to know how to weight them. And there will be no evolutionary bottom line, no summary statistic that estimates an overall degree of success by the nature “value” basis. At the end of our evaluations, we will likely be able to say of a given lineage something like this: it is very successful by one standard, less so by another, and hardly at all by a third.

2. *Timescale and Taxon Dependence.* Complexity in the sense of part types increases at the scale of all animals, where a trend has been documented in the maximum number of cell types (Valentine, Collins, and Meyer 1994). But at a smaller taxonomic and temporal scale, within vertebrates, and in a different kind of structure, skull bones, there is a decreasing trend (Sidor 2001). The same goes for whatever variables we discover are relevant to success. If some variable increases, say, on the timescale of human history, that does not mean it must also increase on the timescale of human evolution. If it increases in the human family, the hominids, that does not mean it must also increase in the evolution of *Homo sapiens*.

3. *Trends and Tendencies.* Nature “valuing” something is a *tendency*, a propensity. Whether or not that tendency produces an actual *trend* is a separate matter. A trend is net directional change in some variable, such as the mean or the maximum. A tendency refers to a propensity or force—the oomph, so to speak—that can underlie a trend. Thus, a graph showing a rise in the stock market over the past 90 years is clear evidence for a trend but not clear evidence for a tendency, for the existence of factors—such as increasing productivity or increasing population—driving it upward. Stocks could, in principle, increase by chance alone, even on long timescales. Conversely, the existence of a tendency does not guarantee the occurrence of a trend. My leaning against my house imparts a tendency for it to slide away from me (or fall down), but contrary forces resist, so it does not budge. There is a tendency but no trend. The distinction is crucial to coherent discussion of the causes of trends. For present purposes, the lesson is that not everything nature “values,” not everything the process promotes and supports, will show an actual trend, and not everything that shows a trend is what the process promotes.

4. *Maxima and Variances.* Consider a population consisting of multiple groups, and suppose that the number of groups is increasing over time. Suppose further that our standard of success is energy or resource usage at the group level, and that the maximum is increasing. In other words, the level of energy usage of the most successful group in existence rises over time. The envelope of group success is expanding upward, so to speak. Faced with these data, the temptation might be to conclude that some force, some upward tendency, is at work, driving energy usage higher. But in fact that need not be the case. For one thing, the trend could be due to chance. But there is another possibility, one that does not involve any increasing tendency. When the number of groups is increasing, the expectation in the absence of a tendency is that the system will sample an ever larger portion of the distribution of possibilities. That is, as the number of groups increases, rarer group phenotypes with more extreme energy usage will be sampled. Thus, in expanding systems, a rising maximum is the null expectation and therefore by itself tells us nothing about the existence of underlying tendencies. This issue has arisen in the study of long-term trends in hierarchy, intelligence, and more (McShea 1994), where maxima get attention all out of proportion to their significance. In the study of trends, null models are a useful way to test for underlying tendencies, and in particular to determine whether an observed trend lies outside the distribution expected from a random-walk

model (Hunt 2006). (Other approaches, such as those based on maximum likelihood, are also useful in this context.)

Intuition can be a poor guide for variances, as well as for maxima. As discussed, the ZFEL says that the accumulation of accidents among lineages produces a tendency for them to become more different, that is, for diversity to increase. Diversity is a variance measure, and the ZFEL applies to every feature that varies. So the expectation in the absence of selection is increase in all variances, from variance in body size and intelligence to variance in energy usage. A null model has been devised that takes this into account, enabling us to detect and measure any forces at work, such as selection, as departures from the null expectation (McShea, Wang, and Brandon 2019).

5. *Non-Trend Patterns*. Evolutionary success is inevitably about trends, in particular increasing trends, but this focus should not prevent us from seeing other temporal patterns. Interesting discoveries about evolutionary success await those on the lookout for decreasing trends, truncated trends, stasis, and periodicity as well. In large-scale evolution, interesting non-trend patterns include the large-scale ecological stasis that locked up certain paleocommunities on timescales of millions of years (Morris et al. 1995), the failure of hierarchy to increase since the advent of highly individuated bryozoan colonies about 480 million years ago (McShea 2001), and the now confirmed 27-million-year periodicity of mass extinctions (Melott and Bambach 2010). For present purposes, the message is that in addition to looking for success, by whatever standard, we could usefully attend to failure, stability, and cycling. The forces governing success are doubtless complex, and investigating their varying expression under different circumstances can only help us to understand them.

6. *Success by the Nature Standard Could Be Miserable*. I made this point earlier, but it is so routinely ignored in discussions of evolutionary progress that it is worth repeating here in this discussion of success. Using a nature-based “value” standard, not all increasing trends will be cause for celebration. That is, not all will be successes by a human-nature value standard. From Figure 2.2, evolutionary trends in diversity and ability to sense the environment sound like something we might value. But trends in ability to modify the environment, complexity in the sense of part types, and ecological dominance are probably a mixed bag. Consider just the human manifestations of these three trends. Modifying the environment to accommodate human economic needs often seems to come at the expense of our aesthetic needs. Complex technology raises our standard of living in a number of ways, but

this complexity often has unintended consequences. And ecological dominance puts diversity and perhaps ecological stability at risk.

The point is that human success by a nature “value” standard could be a disaster by the standard of a human nature value. Not all trends in what nature “favors” will sit well with the human affective profile. Of course, as discussed, the two standards are incommensurate (as is every value standard with respect to all others). We should not expect them to agree, nor is there anywhere to turn to resolve the inevitable contradictions.

6. Conclusion

Stephen Jay Gould (1988, 319) once wrote, in a paper on evolutionary progress, that progress is a “noxious, culturally embedded, untestable, nonoperational, intractable idea.” Presumably he would have said the same about evolutionary success. I think if we take this as a statement about intellectual history, about how the discussion of progress has gone (and by implication, how the study of success could easily go), Gould was right. But at least some of these problems are fixable, both for progress and for success. Science is exceptionally good at devising operational measures for vague concepts, making them tractable, and making hypotheses about them testable. If we can devise operational measures for happiness (as in psychology) or complexity (as in biology), surely we can operationalize success, at least by the standard of what the process “values.” Operationalization might also obviate the charge of noxiousness. And as for cultural embeddedness, I have argued that this can be avoided by adopting either a human nature or nature (metaphorical sense) value basis. Thus, in an upbeat frame of mind, a possible comeback to the Gouldian critique is this: evolutionary success *can be* a scientifically wholesome, value-basis-specific, testable, operational, and highly tractable idea.

Of course, problems remain. In a downbeat mood, we must admit that the process might turn out to “value” many things, and it will be difficult to know in what proportion to weight them, with the result that any assessment of overall success by the nature standard would remain elusive. Also, the human-nature value basis makes agreement on values possible in principle, but does not make it easy or even realizable in fact. Finally, success by the human nature standard will likely remain forever in tension with success by

the nature-based “value” standard. And those seeking a single answer to the question of human success will be forever disappointed.

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