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What Evolutionary Biology Does To Explanation

In order to see what evolutionary biology does to explanation, we're going to join a philosopher-scientist and her student walking in the park. The student, let's imagine, stops at a particular tree and asks of a particular leaf: "Why is this leaf green?"

Half in jest and half with insight, our instructor might reply that the greenness of the leaf is a feature of the way we use language: in this case, 'green' is part of the definition of 'leaf', so that if the object in question were not green (and possessed of a certain shape, thickness, texture, location, mass, etc.) it would not be a leaf. In this framework, where the statement "this leaf is green" is figured as analytic (true in virtue of the meanings of the terms involved), this **linguistic** description counts as explanation. However, it's probably clear to everyone that this is not the framework in which the question was asked, so after some urging the instructor launches into a different kind of explanation:

Having described the general picture of light being reflected from the leaf and received by the eye and brain, we can imagine the instructor will assume that the student wants to know more about what is going on in the leaf to produce green. The surface of the leaf, the instructor explains, contains pigments that reflect certain wavelengths of light and absorb others. The instructor is well-versed in chemistry, so when the inevitable "why do these pigments reflect green light?" comes, she can describe how the chemical properties of the molecules might produce such a reflection, and on to what physical properties might produce such chemistry. In parallel, a description of the functioning of the student's eye/brain complex (what is going on in the student to produce green) might be in order, beginning with high-level neurological description and proceeding down the biology, chemistry, physics hierarchy as it applies to eyes and brains. Here, obviously, the instructor is providing a **reductionist** description, proceeding hyperprecisely through contexts of scientific understanding until the student is satisfied that the description is explanatory. We can see that this type of description counts as explanation once a level is reached which is terminational

relative to the student (suppose she trusts everything after biochemistry, so descriptions below that level are not required), or most generally terminational relative to the current understanding of the scientific community (i.e., once the most basic understood level is reached and the only answer to repeated “why?” questions is “because that’s the way it is,” an explanation common to particle physicists and frustrated parents of young children).

The student and instructor might continue on through the park, both satisfied with the exposition, but to make things interesting let’s assume that the student pauses, confused, and then explains that the description given is not exactly what she had in mind. “Sure,” she says, “I basically knew *how* the leaf is green, I mean what it means physically for the leaf to be green, but I didn’t want to know *how*. I wanted to know *why*.” Ah. The instructor realizes that she’s misunderstood the question: the why required is a special use of the word ‘why’, carefully defined in opposition to ‘how.’ The student is looking for something deeper: she wants to know for what *purpose* the leaf is green, toward what end. (In Aristotelian language we might say that scientific reduction has determined the *efficient*, *formal*, and *material* causes of the leaf’s greenness; the elusive *final* cause remains unexplored.) To satisfy her, the instructor is going to have to come up with something that counts as an explanation now that the stakes have been thus raised: a **teleological** description, that is, one which deals in goals and purposes, and (by implication) something which possesses these goals. One clear way out would be to refer to a big humanoid something which intends for the leaf to be green and has the overarching power to make it so (I’ll not use the c-word), but we’ll assume that the instructor has political or intellectual commitments that make this position untenable; she has to find another description.

Straying momentarily from the narrative, let’s consider what it is about teleology that makes it seem like such a different category of explanation, that makes us all know specifically what is meant by an over-emphatic “but why?” Teleological explanation by definition involves purpose, and therefore intention, and where do we have to learn about intention but from ourselves? We learn about teleology not by studying physical phenomena, but by participating in human social relations that require it as a special category. Imagine if a schoolchild, after punching a peer at

recess and being asked by his teacher “why?” were to answer that electromagnetic impulses traveled along his spine and into his arm which ultimately caused an influx of calcium ions into his neuromuscular junctions which resulted in the contraction and expansion of certain muscle fibers which, in combination with the specific quantum states of the other child’s constituent particles, resulted in him getting punched. This, obviously, is not what the teacher is looking for. She wants to know not *that* or *how* the punch occurred but *why*: Was it his intention to punch his classmate, or was it an accident? Did he want to / mean to / intend to make the punch, or not? Quite a lot stands to be lost or gained on the resolution of this question, for the child brought in during recess, for the citizen standing before a judge in a court of law, for a subject in any relation which contains the concept of individual responsibility. Any system which privileges the category of the individual in active decision-making is necessarily going to privilege the category of teleological explanation.

So back to the narrative, where, luckily, our instructor is ready. She has decided to graft intention to the *tree*, describing how the tree *wants* to produce sugar, because it *wants* to survive, and photosynthesis in green leaves is an efficient way to accomplish this (and the tree always *wants* to use the most efficient means available). The student nods, satisfied that some kind of intention has entered the picture: she has her teleology. But she also understands that this attribution of tree-intention is metaphorical: nobody thinks that trees really want anything, it’s just that they exhibit behavior that invites this comparison. The student, naturally, wonders what the mechanism for this behavior might be. Luckily, the instructor is also well-schooled in evolutionary explanation, so she can outline such a mechanism, referring to the magical heritability—selection pressure—variation (‘h-s-v’) triad and describing how these factors conspire to produce purposeful behavior. In fact, she discovers that she can identify intentional behavior at a variety of levels (e.g., the gene, the individual tree, the ‘species’), wherever she can produce a viable evolutionary mechanism.

But it soon becomes apparent that these explanations are actually reductionist: she has managed to construct ‘intention’ from reduction-explainable h-s-v. It seems odd that teleology could seem to appear in a reductionist description. But then what of the paradigm example of intentional behavior: human intention? The evolutionary explanations that produced teleology in the

tree must also apply to the human case—to human genes, human individuals, the human ‘species’. It seems that evolutionary description lays claim to explaining human behavior (including intention), rendering the foundation of teleological explanation not so special after all. So how can we recover this special category of explanation?

The answer, of course, is that we cannot. Evolutionary biology is all about conflating reductionist (r-) and teleological (t-) explanation, which it does both by showing that phenomena which seemed to require a t-explanation are actually explainable via r-explanation and by dismantling the reductionist/teleological split at human intention, which was the model for t-explanation in the first place. Now this conflation is interesting in itself, but what is more interesting is a important implication. Since no amount of investigation in evolutionary biology can recover a reductionist/teleological split (or, equivalently, can recover the status of the individual human as a special category), any sociobiological argument that proceeds from biology to a conclusion that requires this divide (e.g., on how a particular individual human should act, or how a group should act, or anything that privileges an individual with rights or responsibilities or any special significance at all) is crucially flawed. In fact, since the divide is lost at the moment that the appeal to biology is made, sociobiology undermines itself, is its own undoing.