

Skinner's Utilization of Evolutionary Biology to Explain Operant Behavior

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Abstract:

B.F. Skinner often discusses selection of behavior by consequences and contrasts that with natural selection as described in evolutionary theory. While this stance can appear to lend scientific credibility to behavior sciences, it also leaves room for improvement, and has a few inconsistencies. Skinner's appeal to evolutionary biology can also extend his interpretation of processes to seemingly become outside the science of behavior. It is evident that this theme is pervasive not only in *About Behaviorism*, but in most of his other works as well. This view is discussed along with its departure from assumptions of radical behaviorism.

Introduction

In B.F. Skinner's *About Behaviorism*, he indicates that operant behavior can be traced back to evolutionary processes. In making this claim, he is not stating that all operant behavior is inherent, or innate – rather he is stating that through natural selection, organisms have inherited (evolved with) certain species-specific behaviors; but more importantly they have inherited the ability to be changed by consequences. This process is aptly termed selection by consequences. Skinner discusses evolution first by stating that “environment made its first great contribution during the evolution of species, but exerts a different kind of effect during the lifetime of the individual...the combination of the two effects is the behavior we observe at any given time.” (Skinner, 1974, p. 19). This stance appeals not only to evolutionary biology, but also requires physiological support from the future, and has some circular explanations.

Interaction of the different levels of selection: Skinner's Stance

It is Skinner's stance that behavior cannot be studied separate from the environment, nor can the inherited genetics be ignored. Because of this, he appeals to evolutionary biology as an explanation and contrasts it with natural selection as the origin of behavior. Throughout *About Behaviorism*, Skinner makes reference to natural selection, selection by consequences, and eventually selection of contingencies in cultural practice, all of which he feels have consistencies and distinctions relative to each other (Skinner, 1974, P. 48). Accordingly, it is the contingency of reinforcement that produces novel behavior, much like natural selection described the origin of new species (Skinner, 1974, p. 246). It is important to determine which roles each type of selection plays in the acquisition and retention of operant behavior, and equally important to realize the ability with which we can manipulate the two types of contingencies (Skinner, 1974, p. 49).

Selection by consequences is championed by Skinner as the most important focus of the science of behavior for several reasons. The first is that operant behavior and its consequences are a part of selection by consequences which occur quickly and can be repeated. The contingencies of reinforcement can also be manipulated to demonstrate functional relations between operant behavior and its environment. Contingencies of survival cannot be easily manipulated, and the effects of them typically take multiple generations to occur. Observing these in any species but those with an extremely short lifespan quickly becomes difficult. Therefore, while natural selection plays a role in the occurrence, acquisition, and retention of operant behavior, it is the selection by consequences which is most amenable to experimental analysis (Skinner, 1974, p. 49).

This does not decrease the influence of the theory of evolution on the acquisition and occurrence of operant behavior. As stated earlier, Skinner posits that evolution is responsible for the genetic inheritance of the ability of an organism to be changed by consequences of its behavior, or susceptibility to reinforcement (Skinner, 1974, p. 52). Skinner utilizes natural selection to explain why stimuli serve as reinforcers:

"Salt and sugar are critical requirements, and individuals who were especially likely to be reinforced by them have more effectively learned and remembered where and how to get them, and have therefore been more likely to survive and transmit this susceptibility to the species" (Skinner, 1974, p. 52-3).

He goes on to state that it is not because of feeling hungry or feeling the need for food that one engages in food-reinforced behavior, rather, the condition (felt as hunger) would have been selected by natural selection as most immediately involved in operant reinforcement. (Skinner, 1974, p. 55-6) Natural selection is also used to explain more than just reinforcers! Skinner seeks to explain *perception* by indicating that evolution may have played a part as a the organism could then behave effectively to 'fragmented stimuli' (Skinner, 1974, p. 86).

Skinner utilizes natural selection, almost ironically, to refocus the perspective that causes of behavior are 'in' the organism. While it may appear that by appealing to evolution and thus genetics, that one would be looking inward, Skinner instead argues that one must look at the environment and its interaction with genetics – "speech, logic, or mathematics have not been a part of the human environment for a long enough time[and thus not evolved as innate traits], we must question any effort to attribute introspective self-knowledge to a nervous system especially adapted to that purpose." (Skinner, 1974, p. 239) Rather, he says, these behaviors have been built on features that had evolved for other purposes, he appeals to future physiologists to explain this.

Accordingly, physiologists of the future will enable us to look at the physiological structure that explains *why* behavior is shaped as it is. Until then – he satisfies himself that selection by consequences is helpful in prediction and control of operant behavior. In comparing selection by consequences to natural selection, Skinner decries purpose, intent, and drives (Skinner, 1974, p. 63). As such, he states that natural selection is not a process by which species evolve *in order to* adapt, but rather that mutations occur randomly (in fact, many more mutations are harmful than beneficial) – that it is in fact the environment selecting these mutations rather than intent of the species to survive (Skinner, 1974, p. 63). It is Skinner's stance that selection by consequence is most in line with the behavioristic value of prediction/control.

His critics make the case that he focuses only on prediction and control, and consequently behaviorism misses the true essence of humans. They contend that sciences such as humanistic psychology, ethology, and anthropology –like the theory of evolution, provide a historical account. They try to borrow the scientific validity of evolution, and as such – validate their 'science' – which they purport completely captures the entirety of being human. Skinner retorts that "theory of evolution is not a science, but rather an interpretation of a very large number of facts, using several relevant sciences, among them genetics and ecology, both of which are or may be predictive and manipulative" This is consistent with his

view of selection by consequences as an interpretation of facts using the science of behavior, rather than a science in and of itself (Skinner, 1974, p. 248).

Skinner explains that as evolution has moved antecedent intentional design into the past, and brought forth the subsequent selection of human genetics; so has selection by consequences relegated antecedent intention/purpose to psychological history and brought into current science the subsequent selection by contingencies of reinforcement. (Skinner, 1974, p. 246). This seems to be one of, if not, the largest contributions by Skinner to psychology and behavior science.

Problems Incorporating Evolutionary Biology Without Losing Behaviorism's Identity

Skinner presents selection by consequences as the individual-level parallel to the species-level of natural selection. However, there are some problems with this analogy. Skinner's comparison of natural selection and that of selection by consequences has some distinct departures, one of which is the transmission across identities. In natural selection, traits are transmitted across generations in a species. In selection by consequences, there isn't any transmission, as the selection only affects that individual organism. There is an instance in which Skinner does appear to attempt to bridge this gap by discussing the ability of selection by consequences to transmit different repertoires based on different contingencies; and that this is the 'identity' of a person (Skinner, 1974, p. 185).

Skinner compares other views of 'causality' such as structuralism and existentialism to radical behaviorism and declares the psychological scene 'not encouraging' (Skinner, 1981, p. 504). He states that structuralism neglects selective contingencies as they focus on development and organization.

One of the biggest problems invoked by appealing to evolutionary biology in regards to operant behavior is that evolutionary biology focuses on the structure of the organism, (and to some extent how the genes are expressed – phenotype) while behaviorism eschews structural analysis of behavior and focuses

on function. It appears that here, the two parallels depart drastically. The study of human behavior cannot be reduced to the structure of genes and physiology, as that is similar to the very problems he has stated as concerns in current psychology. While all parallels need not have complete correspondence, it is important that in areas they depart, this departure does not transfer it into a field that Skinner himself criticized.

As indicated above, Skinner will often indicate that certain characteristics (that effect behavior) most likely evolved due to some other reason during natural selection. This explanation is completely speculative without a way to determine its veracity. While almost all of Skinner's kickbacks to natural selection and physiology are specious, they don't have scientific validity. They require too much inference, and there isn't a way to empirically determine (or observe) the contingencies of survival that selected these characteristics. Skinner himself states that 'natural selection of a given form of behavior, no matter how plausibly argued, remains an inference.' (Skinner, 1966, p. 1208) This type of ad-hoc reasoning does not appeal to scientific observation or empirical analysis, and thus weakens his stance. By creating these statements of effect of natural selection, Skinner may be distracting future scientists from studying important components of human behavior that may actually be an effect of something other than evolution.

Skinner also discusses the organism's susceptibility to reinforcement as inherited, and thus, a product of natural selection (Skinner, 1974, p. 48). The problem is then determining what 'susceptibility to reinforcement' means. Reinforcement itself can only be a historic description of operant behavior's relation to the environment, rather than a causal factor. When discussing how to determine what a reinforcer 'is' Skinner explains that they are a result of evolution (Skinner, 1974, p. 52). Now, one must look to evolution to explain not only the inherited susceptibility of being reinforced, but also to determine what any of the reinforcers would be. When discussing feelings, Skinner also indicated that they were the result of evolution. This is circular in that he indicated, for instance, that the condition felt as hunger is the result of

natural selection. He gives no reason other than it isn't a need-reduction (Skinner, 1974, p. 55-6). The problem arises when the question is asked, '*How would one know this?*'

By contrasting natural selection with selection by consequences, Skinner comes dangerously close to suggesting that the key to prediction and control of behavior is seated within physiology. However – he does indicate that while the physiologist of the future will be able to make the science of behavior more complete (as it will plug the gap left by the historical account operant conditioning currently utilizes), it is not the solution, as it is not at the level of analysis which will allow for the more effective prediction and control of behavior. (Skinner, 1974, p. 235-6)

Skinner's requirement of measurement (rate of responding) as an indicator of probability has been utilized in the science of behavior. However – it cannot be translated from natural selection. Its measurement is one of genes and traits. Skinner agrees that 'no matter how important the heredity of an organism in determining its behavior, it could not be changed after conception' (Skinner, 1984, p.103).

Skinner's stance on the physiologist of the future can easily be interpreted as a weakness in his theories. It can appear as if he is stating that no matter what happens, until physiology can explain why, we will have an incomplete science of behavior. This may lead people to believe we should stop investigating behavior and wait for physiologists. As the physiologist is currently not capable of explaining how organisms are changed, it is not apparent that this 'changed organism' is indeed anything more than a construct of Skinner's to carry the past into the future.

Conclusion

While there are several inconsistencies, incomplete analyses, and some circular reasoning in Skinner's analysis of selection by consequence, this by no means discredits its utility in the science of behavior.

Skinner would have had a stronger case had he stated that since we do not have the technology, we cannot know whether an organism is changed by consequences, but that to appeal to this physiological stance lends itself to a scientific analysis that will eventually be corroborated or disproven. In that sense, Skinner's theory of changed organisms is very helpful. Upon further investigation, it appears that it is not Skinner's intent for behaviorists to discontinue advancing the science of behavior, nor does it indicate that without physiologists of the future, we will be unable to effect positive change on a global level. (Skinner, 1974, p. 236) He is only indicating that until a physiologist can explain how an organism is changed by his environment, we will be unable to explain why that changed organism behaves differently in the future. To clarify this misunderstanding, he exclaimed, "what he [physiologist] discovers cannot invalidate the laws of a science of behavior, but it will make the picture of human action more nearly complete." (Skinner, 1974, p. 237)

Although the 'changed organism' theory may only be a construct -- it does have strength in that everything remains physical. He does not invoke other types of things. His explanation is seated in biological science, and he is hopeful that the future physiologists will be able to explain/validate it. While this is an incomplete explanation, and in fact, may be completely fallible, it does add to the view of causal factors in human behavior by moving the focus from within the organism (on inner traits/feelings) to the environment.

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