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SELECTION AND B. F. SKINNER: COMMENTS ON LEÃO AND NETO (2018)

SELECCIÓN Y B. F. SKINNER: COMENTARIOS SOBRE LEÃO Y NETO (2018)

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Skinner's views about selection evolved. Leão and Neto show convincingly that his selectionism was at best nascent in the 1930s and 1940s. Their arguments persuade me that no concept of selection by consequences may be found in Skinner's published writings in those decades.

No one should be surprised by the authors' conclusions, because Skinner's project in the 1930s and 1940s was to establish the possibility of a natural science of behavior. He aimed to find methods and ontological commitments that would produce orderly and reliable data. To this end, he recognized the need to deal with the evident variability in behavior.

Leão and Neto make the case that his initial characterization of stimuli and responses as "generic" did not necessarily assign a positive role to variability, as would be required for a selectionist account. Instead, he initially viewed variability as a problem for his project and attempted to explain it away by appealing to the impossibility of identifying all causal factors of behavior.

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Leão and Neto show that Skinner's writings during the two decades contain ambiguities that suggest his view of variability might have been changing. Likely he began to see that variability was necessary for selection, but he did not clearly make the parallel between natural selection and behavioral selection until 1953.

Leão and Neto point out that their conclusions contradict statements by Palmer and Donahoe (1992), "Skinner, by characterizing the units of analysis as generic in nature, established his science squarely within the selectionist paradigm" (abstract; p. 1344), and, "Skinner's analysis of behavioral units establishes his science squarely within a selectionist paradigm" (p. 1347). To be fair to Palmer and Donahoe, one should acknowledge that their article aimed, not to clarify Skinner's evolving selectionism, but to expose and criticize essentialism in modern psychology, advocating selectionism instead. Thus, their presentation of selectionism is not Skinner's, but their own.

Palmer and Donahoe (1992) use the word "establish," which is perhaps open to interpretation. Possibly they only meant to suggest that Skinner's asserting the generic nature of responses showed the beginnings of a selectionist view. Possibly they never meant to suggest that Skinner was a selectionist even in 1930.

Leão and Neto make clear that Skinner was not a selectionist from the start. If Palmer and Donahoe (1992) were saying that, they would have been succumbing to the "presentist" error that historians warn about: that past events cannot be said to lead up to present events. Hindsight distorts the actual historical changes—here, the evolution of Skinner's selectionism. At best, Palmer and Donahoe were pointing to a necessary component of what later became Skinner's selectionism. If someone possesses a car, they also possess an engine, but someone who possesses an engine cannot be said to possess a car.

Although Skinner (1981) finally enunciated selection by consequences unambiguously, his presentation contained one confusing feature and was incomplete in at least one important way. The confusing feature was his usage of the word "class." The missing piece was competition.

As Glenn, Ellis, and Greenspoon (1992) explained, Skinner's failure to distinguish between a class and a population has led to confusion among behavior analysts. A class is an abstraction, a set of defining properties that determine only whether a thing is an instance or not. A class cannot do anything. Skinner's (1938) definition of the operant made it a class, but the population of responses that actually occur is not a class; the population is concrete and is what gets the lever actually pressed. The difference between a class and a population led Catania (1973) to dis-

tinguish the "definitional" operant from the "functional" operant. Catania, however, still called the functional operant a class, instead of a population. Selection requires, not a class, but a population (Baum, 2017a, 2017c, 2018). Classes are eternal, but populations evolve.

Populations evolve because members compete with one another, sometimes directly, but usually simply due to differential reproduction (aka, "transmission" or "recurrence"; Baum, 2017a, 2017b). If taller giraffes leave more offspring than shorter giraffes, the giraffe population grows taller. The analogy between natural selection and behavioral selection requires analogous competition.

Skinner was hampered by his insistence on discrete units of behavior ("responses") and strengthening by response-reinforcer contiguity. He could acknowledge that when some response variants increase, others may decrease, but he attributed the increase and decrease to differential reinforcement or extinction of less-reinforced variants. Due to his characterization of behavior as composed of discrete responses, he failed to recognize the necessity of the relation between increase and decrease.

This necessity arises because the size of a population is limited. In populations of organisms, the available resources in the population's environment sets the limit, called the "carrying capacity" of the environment. If the carrying capacity is 1000 giraffes, and the number of tall giraffes increases from 300 to 400, the number of shorter giraffes must decrease from 700 to 600. Thus, if taller giraffes increase in a giraffe population, shorter giraffes *necessarily* decrease in the population.

In behavioral selection, the limit analogous to carrying capacity is set by time. Skinner's reliance on discrete responses failed to acknowledge that behavior takes time. The limit on behavior arises because time is always limited, and behavior takes up all the time available (Baum, 2013; 2018). A day contains only 24 hours, the time one can devote to work is limited, and the length of an experimental session is limited. Every creature is on a time budget; if foraging takes up more time, other activities, such as caring for offspring, must take up less time. If a person spends more time working, other activities, such as socializing with friends, must take up less time.

The necessity of considering competition among activities for time in behavioral selection implies a change in how we view behavior. Discrete responses must give way to temporally extended units of behavior. I call those temporally extended units *activities* (Baum, 2002, 2013). Rather than operant activity consisting of discrete events (responses), operant activity occurs in episodes that take up time and vary

in length (Baum, 2010; Gilbert, 1958). The operation of a microswitch is not a unit of behavior; rather the operations of a microswitch afford a reliable indicator of the time spent engaging with ("pressing") the lever (Baum, 1976; 2013).

Instead of discrete responses, a behavioral population consists of episodes of an activity. Every activity is composed of parts that are themselves activities, albeit on a smaller time scale (Baum, 1995, 1997, 2002, 2013). The parts of an activity vary, and they constitute a population. Much of my waking time is spent working. Part of working is going to work. I may go to work by riding the bus or by driving. If I drive, I may drive on the highway or on back roads. If I drive on back roads, I may drive through Smithton or drive a different route. The episodes of going to work, driving to work, and driving through Smithton all constitute populations (Baum, 2013, 2017a, 2017b). All are subject to selection.

Selection by consequences had more implications about the science of behavior than Skinner dreamed of, but Skinner surely pioneered a selectionist view of behavior. Leão and Neto have documented some early features of Skinner's writings that were necessary for his later selectionist view.

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