Revista Mexicana de Análisis de la Conducta • Mexican Journal of Behavior Analysis
2019 | Núm. 1 • junio | No. 1 • June | Vol. 45, 132 - 141
http://dx.doi.org/10.5514/rmac.v45.i1.70874

AUTHOR'S REPLY TO THE COMMENTS MADE ON "SUCCESSIVE APPROXIMATIONS TO SELECTIONISM: SKINNER'S FRAMEWORK FOR BEHAVIOR IN THE 1930S AND 1940S"

RESPUESTA A LOS COMENTARIOS SOBRE "APROXIMACIONES SUCESIVAS AL SELECCIONISMO: EL MARCO DE SKINNER PARA EL COMPORTAMIENTO EN LAS DÉCADAS DE 1930 Y 1940"

Monalisa de Fátima Freitas Carneiro Leão
Universidade Federal do Pará / Faculdade Aldete Maria Alves

Marcus Bentes de Carvalho Neto
Universidade Federal do Pará

Abstract

The comments made to our article "Successive approximations to selectionism: Skinner's framework for behavior in the 1930s and 1940s" suggest that the terms 'selection by consequences' or 'selectionism' require clarification. This response to the commenters will reiterate some crucial aspects in the characterization of selection by consequences as an explanatory mode, alternative to those traditional explanations of the psychological phenomenon, such as those mechanistic. Thus, these comments attempt to clear up the defining historical aspect of selectionism, as well as to elaborate some of the nuances that contribute to the concepts of variation and probability in Skinner's writings. Finally, the central argument of the original article

is iterated, namely that there are not enough indications to suggest that Skinner was already a selectionist in the initial decades of his scientific productivity.

Keywords: B. F. Skinner, selection by consequences, behavior analysis

Resumen

Los comentarios a nuestro artículo "Aproximaciones sucesivas al seleccionismo: el marco de Skinner para el comportamiento en las décadas de 1930 y 1940" sugieren que los términos 'selección por consecuencias' o 'seleccionismo' deben clarificarse. Esta respuesta a los comentaristas reitera algunos aspectos cruciales en la caracterización de la selección por consecuencias como un modo explicativo alternativo a las explicaciones tradicionales de los fenómenos psicológicos, basadas, por ejemplo, em el mecanicismo. Por lo tanto, estos comentarios intentan aclarar el aspecto histórico definitorio del selectismo, así como elaborar sobre algunos de los matices que contribuyen a los conceptos de variación y probabilidad en los escritos de Skinner. Finalmente, se repite el argumento central del artículo original, a saber, que no hay suficientes indicaciones para sugerir que Skinner ya era un seleccionista en las décadas iniciales de su producción científica.

Palabras clave: B. F. Skinner, selección por consecuencias, análisis de la conducta

Selection by consequences, or, eventually, selectionism, have been frequently adopted as critical elements to differentiate the explanatory behavior-analytic proposal from other, more traditional, explanations of psychological phenomena variously labeled, for example, essentialism (Palmer & Donahoe, 1992), physicalism (Leão & Laurenti, 2009), mentalism (Zilio & Carrara, 2008), and mechanism (Cruz & Cillo, 2008). Nonetheless, the comments on the article "Successive approximations to selectionism: Skinner's framework for behavior in the 1930s and 1940s" suggest that in addition to the adoption or not of a selectionist perspective in the first decades of Skinner's career being a controversial subject, it also is debatable whether this principle had an impact on explanations of behavioral phenomena, such as effectiveness and plausibility of scientific analogy between ontogenic selection by consequences and Darwin's concept of natural selection in evolutionary biology.

Other authors have emphasized this problem, criticizing the characterization of behavior analysis as a primarily selectionist science. Tonneau and Sokolowski (2000), for instance, suggested that even though the selectionist analogy and the

proposal of selection by consequences had great impact in behavior analysis through academic debates and textbooks, there is no empirical research program that supports such analogy, nor is there research substantiated by selectionism. Would it be, then, productive to persist on debating this theme? The controversies around the matter extend to the difficulty of characterizing the term *selectionism* itself. Glenn and Madden (1995), for example, in exploring parallels between an explanatory behavioral proposal and the evolutionary organic theory, declared that: "Although *selectionist* is an adjective often applied to the behavior-analytic paradigm, the serious work of explaining what that means has barely begun" (p. 249). We agree that the concept of selection by consequences demands conceptual clarifications, because in the behavior-analytic literature this term is given several meanings. Furthermore, it is believed that such debates would foster consequences in the methodological and philosophical realms of behavior analysis.

Replying positively to the question above, following the same line of argument as Moore (2018), when he asked "Why, then, is selectionism important in behavior analysis?", we also assume that, firstly, selectionism is an explanatory principle that allows the behavior analyst to reach her scientific objectives: prediction and control of behavior phenomenon without having to resort to metaphysical notions. In Skinner's (1947/1999) words:

> The discovery that the environment, in acting upon the organism, could be regarded as a causal agent in the direction and control of behavior, and the realization that it was therefore possible to dispense with fictitious inner controls marked the beginning of a science of behavior. (p. 320)

The prominence of the role of the environment in determining behavior, often discussed in relation to the possibility of controlling such phenomena, along with Skinner's first allusions to the evolutionary theory in the scope of defending the legitimacy of his science, indicate that the first signs of the process of constructing a selective function of environmental events were linked to the inclusion of his science in the frame of natural sciences of the time. Moreover, selectionism is important not only from a pragmatic point of view, but also from a philosophical viewpoint, considering that selection by consequences is an explanatory principle that allows extraction of the main philosophical commitments of Skinner's science. For instance, using the selectionist principle enables the defense of an indeterministic interpretation of Skinner's writings (see Laurenti, 2009), as well as a conceptual-

ization of control that is different from that of classical mechanics. Skinner (1981) expanded on this last subject, as he also did at other times, when he mentioned the possibility of intervening in our own evolutionary process:

> It is often said that the human species is now able to control its own genetics, its own behavior, and its own destiny, but it does not do so in the sense in which the term control is used in classical mechanics. It does not for the very reason that living things are not machines: selection by consequences makes the difference. (p. 504)

For that reason, countering the arguments of Burgos (2018), that selection by consequences is not incompatible with mechanistic views and, in agreement with Skinner's contention that selectionism is what sets behavior analysts apart from other explanations of psychological phenomenon, it is with great satisfaction that our discussion of the origins of the causal mode of selection by consequences in Skinner's work – has facilitated the earlier-published comments on selectionism.

The comments also attest, however, to how psychology and, in this case, behavior analysis, remains an area of conceptual confusion in relation to selectionism. Inevitably, as in any science, ambiguities, contradictions, gaps and imprecision are expected, circumstances that even justify turning these confusions into objects of study. The difficulty in conceptualizing and demonstrating distinct interpretations of principles and expressions makes the dialogue, which is inherent in theoretical research such as this one, even more fruitful. This limitation in the scope of definitions for several concepts, like 'mechanism', 'selectionism', 'determinism' and 'probability', often used in behavior-analytic writings, was highlighted by Marr (2018), when he argued that we simplified such terms in our article (Leão & Carvalho Neto, 2018). Indeed one of the most notable challenges in conceptual research is to adequately clarify the various terms presented. In spite of that, as each concept was used, we tried to describe the interpretation adopted in the article. Because ours was a particular interpretation, we do not claim to exhaust all possible interpretations of the concepts we discussed.

The notion of probability is an example. It particularly demands clarification, because this term has several meanings. In our article (Leão & Carvalho Neto, 2018), this term is interpreted differently from the way that Ribes-Iñesta (2018) used the term. Skinner (1957/1992) noted that the basic datum in behavior analysis is not the response itself, but the probability of that response occurring at a particular

point in time. On another occasion, Skinner (1989) mentioned that an operant is also a probability. Leão & Carvalho Neto (2018) defined probability in a way that departs from the mathematical meaning of the term, especially as it refers to a frequency theory of probability. The concept of probability seems to be further clarified in Skinner's system through the idea of a tendency or disposition: to say that a person "has" in their repertoire an operant is to affirm that there is a high probability or a tendency for this person to behave in a certain way (Lopes, 2004).

Exploring Skinner's notion of probability is crucial to the understanding of one of the processes of the selectionist principle – that of variation. Ribes-Iñesta (2018) contended that behavior is not a random process, at least not from the perspective of operant theory. Concerning this latter point, what is defended in the article is that with the concept of operant, it is recognized that operant behavior involves more flexible relations between action and context than do reflexes. That is, operant behavior presents regularities in terms of probability, but not of necessity (Leão, Laurenti, & Haydu, 2016), which demonstrates the incompatibility with a mechanistic view of causality. It was in this context that the process of variation was addressed as a casual process. The latter legitimizes the probabilistic nature of behavioral relations. In this context, Skinner (1953) explicitly appealed to the analogy between operant reinforcement and natural selection:

> We have seen that in certain respects operant reinforcement resembles the natural selection of evolutionary theory. Just as genetic characteristics which arise as *mutations* [emphasis added] are selected or discarded by their consequences, so novel forms of behavior are selected or discarded through reinforcement. (p. 430)

In opposition to the analogy itself, Ribes-Iñesta (2018) was incisive in asserting that the process of differential reinforcement of the operant does not support a selectionist view of Skinner's contributions. In response to Ribes-Iñesta's assertion, we concur with Palmer (2018) that analogy refers to a relation of similarity established among two or more distinct unities. Thus, it would not be an analogy were it possible to show point-by-point relations between operant conditioning and natural selection. That operant conditioning maintains the strength of certain classes of responses while making others disappear seems to be a clear example of selection in process. In Skinner's words (1984): "Operant conditioning is . . . the clearest evidence we have of the process of selection by consequences" (p. 503). Not only that, in describing differential reinforcement, Skinner (1937/1999) wrote,

for the first time, even if incipiently, about the origin of new responses. In a more systematic manner, he observed that "selection is a causal mode only in the sense of causing novelty – whether in the origin of species, the shaping of new operants, or the invention of cultural practices" (Skinner, 1984, p. 506).

Ribes-Iñesta (2018) proposed that "history, of any kind, does not account for or explain the happenings of present events", because it is impossible to ignore the circumstances affecting its occurrence. In Skinner's approach, the alternative nature of the explanatory selectionist principle is justified by connecting it to the view that scientific explanation is prominently historical. The reason for the latter, as Skinner (1981) emphasized is that: "only past consequences figure in selection" (p. 503). Therefore, it is the historical aspect of selection by consequences that makes selectionism incompatible with the mechanistic canons, which imply explanatory primacy for temporal contiguity between events. The latter invites the invention of mediating links in order to comply with the requirement of a spatial and temporal causal immediate relation (Chiesa, 1994/2006). That does not mean, however, that selection by consequences, depicted as a historical explanation, neglects the explanatory role of the immediate environment, but it does grant a fundamental role to the environmental history of the species, individual and culture.

Skinner (1981) understood the historical nature of this explanatory principle as one of the reasons why, historically, selection by consequences has been so neglected and poorly understood. Another reason for such neglect is probably related to the concept of variation itself, which also explains the late acceptance of Darwin's ideas regarding natural selection (Mayr, 2004). In a context in which a law-like order was understood as the basic reality to be investigated, and Newtonian laws as the only resources available for a scientific explanation of natural phenomena, appealing, at the time, to a casual process was almost the same as pushing away from the scientific endeavor and returning to the domain of metaphysics. We have suggested elsewhere (see Leão, Laurenti, & Haydu, 2016) whether the concept of variation has met some degree of resistance among psychologists, as happened in Biology. Moreover, the terms behavioral variability or variation are terms that require clarification in the area of behavior analysis.

On the latter topic, Ribes-Iñesta (2018) noted that "variation is not the same as variability in the sense of randomness" (p. 240) and that selection can only occur on variety, not on variation or variability. It is necessary, then, to clarify that the concept of variation employed in Leão & Carvalho Neto (2018) refers to the process that, complementing the selection process, originates new behavior. We consider

that such process is casual, given that: "new responses are generated by accidental arrangements of variables as unforeseeable as the accidental arrangements of molecules or genes" (Skinner, 1968, p. 180) or, in other terms, "variations are random and contingencies of selection accidental" (Skinner, 1990, p. 1207). Hence, variation as a casual process spawns the material on which selection operates. This material can be called behavioral variability. As many authors have suggested, such variability can be the product of not only chance, but of other processes, such as extinction and reinforcement itself (e.g. Antonitis, 1951; Neuringer, 2002). That said, as Ribes-Iñesta has argued, surely there is no availability or simultaneous variety of responses at the moment of reinforcement, however that is not needed because its effect is on the future behavioral disposition of the individual. Once we acknowledge that there is a certain level of variation in the responses that constitute an operant class, and because "operant" is a dispositional concept, invalidating the retroactive role of the consequences of behavior because of that does not make a lot of sense to us.

As Baum (2018) observed, the change in treatment of the process of variation in Skinner's writings was crucial to the development and consolidation of a selectionist perspective in the explanation of behavioral phenomenon. In fact, most of the commenters agreed that the initial characterization of stimuli and responses as "generic" did not necessarily imply the attribution of a positive role to variation, as would be required for a selectionist account. In other words, asserting the generic nature of responses is not enough to suggest that Skinner was already a selectionist in 1930. As Palmer (2018) pointed out, under the selectionist outlook, the process of variation, as well as variability, is fundamental, and is not just a nuisance that masks the strictly regular nature of phenomena. As we attempted to show, the formulation of a selectionist model to explain the behavioral phenomenon happened gradually in Skinner's writings. Even if we support the idea that selection by consequences was not a characteristic of his early writings, we cannot, as it was not our objective, specify a point in time when Skinner became a full-blown selectionist.

We are left with resuming this historical journey, in order to investigate other aspects related to the construction of the principle of selection by consequences in Skinner's work. In a review examining Skinner's explanation for the origin and nature of variation, outlining parallels between the changes used to explain such process in the history of biology, Leão, Laurenti, & Haydu (2016) showed that the decades of the 1950s and 1960s, as Moore (2018) also suggested, are important periods is Skinner's development of a selectionist position. This is the case because

after these decades one observes the beginning of a view in which the complementarity between the processes of variation and selection become the explanatory core of Skinner's model. This is explicitly affirmed in his seminal article, *Selection by Consequences* (Skinner, 1981). Looking back over the work leading up to this article, we can see how the emergence of the concept of operant, with the changes in the statute of the variation process, and with increasingly more evident links to the evolutionary analogy, the selectionist model progressively became enmeshed in Skinner's ideas about the science of behavior.

References

Antonitis, J. J. (1951). Response variability in the rat during conditioning, extinction, and reconditioning. *Journal of Experimental Psychology, 42*, 273-281.

Baum, W. M. (2018). Selection and B. F. Skinner: Comments on "Successive approximations to selectionism: Skinner's framework for behavior in the 1930s and 1940s," by Leão and Neto. *Revista Mexicana de Análisis de la Conducta*, *44*(2), 244-248.

Burgos, J. E. (2018). Selección por consecuencias, causalidade y essencialismo: comentarios sobre Leão y Neto. *Revista Mexicana de Análisis de la Conducta*, *44*(2), 261-269.

Chiesa, M. (2006). *Radical Behaviorism: The Philosophy and the Science*. Boston: Authors Cooperative.

Cruz, R. N., & Cillo, E. N. P. (2008). Do mecanicismo ao selecionismo: Uma breve contextualização da transição do Behaviorismo Radical [From mechanicism to selectionism: A brief contextualization of the radical behaviorismo transition]. *Psicologia: Teoria e Pesquisa, 24*(3), 375-385.

Glenn, S. S. G., & Madden, G. J. (1995). Units of interaction, evolution, and replication: Organic and behavioral parallels. *The Behavior Analyst, 18*, 237-252.

Laurenti, C. (2009). *Determinismo, indeterminismo e behaviorismo radical* [Determinism, indeterminism and radical behaviorismo] (Unpublished doctoral dissertation). Federal University of São Carlos, São Carlos, São Paulo.

Leão, M. F. F. C., & Laurenti, C. (2009). Uma análise do modelo de explicação no behaviorismo radical: O estatuto do comportamento e a relação de dependência entre eventos [An analysis of the expanatory mode in radical behaviorism: The

status of behavior and the dependence relationship between events]. *Interação em Psicologia, 13*(1), 165-174.

Leão, M. F. F. C., Laurenti, C., & Haydu, V. B. (2016). Darwinism, Radical Behaviorism, and the role of variation in Skinnerian explaining behavior. *Behavior Analysis: Research and Practice, 16*, 1-11.

Leão, M. F. F. C., & Carvalho Neto, M. B. (2018). Sucessive approximations to selectionism: Skinner's framework for behavior in the 1930s and 1940s. *Revista Mexicana de Análisis de la Conducta*, *44*, 1-24.

Lopes, C. E. (2004). Comportamento e disposição [Behavior and disposition]. Em: M. Z. S. Brandão, F. C. S. Conte, F. S Brandão, Y. K. Ingberman, V. M. da Silva e S. M. Oliane (Orgs.) *Sobre Comportamento e Cognição, vol. 13* (pp. 39-43). Santo André: ESETec.

Marr, M. J. (2018). Selection is a mechanism: commentary on Leão y Neto. *Revista Mexicana de Análisis de la Conducta*, *44*(2), 248-252.

Mayr, E. (2004). *What makes biology unique?* New York, NY: Cambridge University Press.

Moore, J. (2018). Commentary on Leão and Carvalho Neto (2018): "Successive approximations to selectionism: Skinner's framework for behavior in the 1930s and 1940s". *Revista Mexicana de Análisis de la Conducta*, *44*(2), 224-232.

Neuringer, A. (2002). Operant variability: Evidence, functions, and theory. *Psychonomic Bulletin & Review, 9,* 672–705.Palmer, D. C. (2018). Further Thoughts on Skinner's Selectionism. *Revista Mexicana de Análisis de la Conducta*, *44*(2), 253-260.

Palmer, D. C., & Donahoe, J. W. (1992). Essentialism and selectionism in cognitive sciense and behavior analysis. *American Psychologist*, *47*, 1344-1358.

Ribes-Iñesta, E. (2018). The nonexistent link between the logic of reflex and the ideology of natural selection: Comments on Carneiro and Bentes' "Successive approximations to selectionism: Skinner's framework for behavior in the 1930's and 1940's". *Revista Mexicana de Análisis de la Conducta*, *44*(2), 233-242.

Skinner, B. F. (1953). Science and human behavior. New York: The MacMillan Company.

Skinner, B. F. (1968). *The technology of teaching*. New York, NY: Appleton-Century-Crofts.

Skinner, B. F. (1981). Selection by consequences. *Science, 213*(4507), 501-504.

Skinner, B. F. (1984). Some consequences of selection. *The Behavioral and Brain Sciences*, *7*, 502-510.

Skinner, B. F. (1989). Recent issues in the analysis of behavior. Columbus: Merrill Publishing Company and Bell & Howell Information Company.

Skinner, B. F. (1990). Can psychology be a science of mind? *American Psychologist*, *45*, 1206-1210.

Skinner, B. F. (1992). *Verbal Behavior*. Cambridge, MA: B. F. Skinner Foundation. (Trabalho original publicado em 1957)

Skinner, B. F. (1999). Two Types of conditioned reflex: A reply to Kornorski e Miller. In V. G. Laties, & A. C. Catania (Eds.), *Cumulative record*: definitive edition (pp. 465-471). B. F. Skinner Reprint Series. (Original text published in 1937)

Skinner, B. F. (1999). Current Trends in Experimental psychology. In V. G. Laties, & A. C. Catania (Eds.), *Cumulative record: Definitive edition* (pp. 316-329). B. F. Skinner Reprint Series. (Trabalho original publicado em 1947)

Tonneau, F., & Sokolowski, M. B. C. (2000). Pitfalls of behavioral selectionism. In *Perspectives in ethology: Evolution, culture and behavior* (Vol. 13, pp. 155-180). New York: Kluwer Academic/Plenum.

Zilio, D., & Carrara, K. (2008). Mentalismo e explicação do comportamento: aspectos da crítica behaviorista radical à ciência cognitiva [Mentalism and behavioral explanation: Aspects of radical behaviorist critique of cognitive science]. *Acta Comportamentalia, 16*(3), 399-417.

Recibido Mayo 1, 2019 /
Received May 1, 2019
Aceptado Julio 29 1, 2019 /
Accepted July 29, 2019