How Hume's Philosophy Informed Radical Behaviorism

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Abstract The present paper analyzes consistencies between the philosophical systems of David Hume and B. F. Skinner, focusing on their conceptualization of causality and attitudes about scientific behavior. The ideas that Hume initially advanced were further developed in Skinner's writings and shaped the behavior-analytic approach to scientific behavior. Tracing Skinner's logical antecedents allows for additional historical and philosophical clarity when examining the development of radical behaviorism.

Keywords Causality · Hume · Logic · Radical behaviorism · Skinner

The historical investigation of a philosophical system can help to identify the roots of that system and put it into the context of other worldviews. Identifying the philosophical antecedents to radical behaviorism may help to define the system itself, clarifying its position among other philosophical systems. Philosophies can be conceptualized as complex systems of verbal behavior; as such, describing their antecedents and consequences may yield a better understanding of the system itself (Baum 2005; Skinner 1957). When describing this type of venture, Lattal and Chase (2003) wrote:

Differences in ... intellectual positions, are easy to find. The better criterion in terms of constructing a theory of learning or an epistemological position is that of its similarities or connections to extant positions, particularly similarities that expand and develop those extant themes (p. 7).

B. F. Skinner and his intellectual kin developed a science of behavior and the underlying philosophy of that science (i.e., the experimental analysis of behavior and radical behaviorism, respectively). In what follows, we identify consistencies between the positions of David Hume, an 18th-century Scottish philosopher, and Skinner. We

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aim to do this by describing the historical context for Hume's writing before describing contributions from Skinner, and by comparing the verbal behavior of these important thinkers. While there have been previous investigations of the interaction of the ideas advanced by Hume and Skinner (e.g., Vargas 1982), the present analysis expands upon this tradition and elaborates on their respective views of scientific behavior.

The Early Modern Period

Associated with the early modern period (1600–1800) of philosophy, the classical empiricist movement valued objective verification and experimentation as a means to achieve logical conclusions (Hunt 2007; Thomson 2002). The rediscovery of Aristotle's logical and scientific works more than 400 years prior set the occasion for this empirical awakening (Thomson 2002). Religious scholasticism was at the limits of its utility. Incorporating a provident God into incompatible philosophical positions proved challenging and occasionally disastrous (Hunt 2007; Muckler 1963; Thomson 2002; Alexander and Numbers 2010). As an alternative, philosophers began to conceptualize the world in terms of quantitative principles: size, shape, and motion (Thomson 2002; Heilbron 1982, pp. 22–47). This was a departure from the medieval belief that reality was a hierarchical, organic whole (i.e., holism). Prior to the philosophical contributions of the classical empiricists, it was acceptable to anthropomorphize the causes of natural events and to take these explanations at face value (e.g., inclement weather was an expression of divine anger).

The classical empiricists (Hume and John Locke, for the purposes of this argument) are classified as such because sensory experience was the foundation of their epistemologies. In contrast, classical rationalists held that humans ascertain information about their world through an inborn, non-experiential mechanism. For some, this force of reason was divinely inspired. Scientists, philosophers, and mathematicians such as Rene Descartes, Gottfried Leibniz, and Baruch Spinoza held that knowledge was intrinsic, at least to some degree originating from a source other than sensory experience. For these thinkers, behavior could occur somewhat independently of sensory input or any other model of learning (i.e., behavior could originate via intuition) (cf. Lovejoy 1930; Thomson 2002). Without a model of learning or an account of behavioral processes, these rationalist philosophies could be considered metaphysical dualism, a position which behavioral scientists, at least, would reject (Hayes and Brownstein 1986). Empiricism perturbed religious sensibilities, and scientific investigations of human behavior were avoided for fear of aversive control (e.g., excommunication, eternal damnation).

Classical Empiricism

Hume's work emerged in the context of empiricism, which was an antecedent to modern sciences (Lovejoy 1930; Thomson 2002). The philosophers Bacon, Hobbes, Locke, and Hume all shared epistemologies and concern about the important questions that the sciences should answer. In prescribing these "important questions" with ideas about the nature of "knowledge" itself, they prescribed behavioral repertoires for all

scientists. The classical empiricists described what it means to engage in scientific behavior (i.e., knowing about the world via sensory experiences). For example, Hume wrote, in defining his “science of man” (1738/1961):

It is evident, that all the sciences have a relation, greater or less, to human nature...Even Mathematics, Natural Philosophy, and Natural religion are in some measure dependent on the science of MAN... and are judged of by their powers and faculties (p. 9).

In other words, Hume expresses in this quote that science is a human activity. This quote stresses the importance of the practitioner of science and his or her repertoire of scientific behavior. What Hume called activities are tantamount to what Skinner called behavior and, hence, are amenable to Hume’s proposed “science of man” (i.e., his philosophical system) the aims of which *prima facie* resemble behavior analysis. We are not aware of another classical-era thinker that so clearly stated that all sciences are dependent on the “powers and faculties” of the individuals engaging in the behaviors we call science.

Prominent behavior analysts, in the development of the philosophy of radical behaviorism, echoed this claim. For example, Skinner (1953) wrote, “Science is first of all a set of attitudes” (p. 12). Moore (1985) wrote, “Science entails the behavior of scientists” (p. 62). And Catania (1993) wrote, “A behavior-analytic philosophy of science must begin not with assumptions about truth and knowledge but rather with the behavior of the scientist” (p. 449).

Another important writer to emerge out of the classical empiricist movement was John Locke. Locke’s iconic “*tabula rasa*” or “white paper” argument set the framework the philosophy of radical behaviorism:

Let us then suppose the mind [at birth] to be, as we say, white paper, void of all characters, without any ideas. How comes it to be furnished? . . . I answer, in one word, from *experience*. In that, all our knowledge is founded; and from that it ultimately derives itself (Locke, as quoted in Hunt 2007, p. 84).

This is a mentalistic explanation of learning, with a reified mind as a white paper, void of all characters, that is influenced by experience. Despite this reification, it is important to value this contribution in light of the apparent incompatibility with radical behaviorist thought. Humans tend to be “common sense dualists” in that the concealed nature of the brain’s processes (and operant behavior) leads us to the belief that there must be a mind or soul that cannot be seen but operates on a level beyond physical things (Skinner 1977). Until behavioral, biological, and neuroscientific technologies afforded us the opportunity to formulate a more accurate account of behavior, mentalistic explanations were the only explanations available (Bloom 2004).

Locke and Hume traced the origin of human behavior to a “mind,” but their parsimonious and environmentally based account of how learning occurs through experience was compatible with a behavioral perspective. Without this contribution, scientific accounts of human nature may not have developed as rapidly as they did, and the foundational assumptions of all sciences (including radical behaviorism) may have been compromised. For example, the focus on empirical processes (rather than other

ways of knowing), the reliance on experience in drawing conclusions about the world, and the descriptions of causality which resulted from the work of these thinkers would not have necessarily developed in the same way.

Cause and Effect, from Hume to Skinner

In this section, we will trace the development of Skinner's conceptualization of causality, identifying conceptual antecedents in the work of Hume and Ernst Mach. Mach's contributions to the philosophy of radical behaviorism have been previously discussed (Skinner 1979/1984; Moxley 2005), but we include him here as a parallel to our inclusion of Locke's contribution to the philosophy of classical empiricism. Both served to influence Hume and Skinner, respectively. Their inclusion should illustrate the broader context in which the writing of both Hume and Skinner took place, but is not meant to be a stand-alone or exhaustive reference. This discussion of causation will illustrate the influence Hume's ideas had on the development of science in general and behaviorism in particular.

Hume's treatment of causality is one of the most important parts of his legacy to radical behaviorism. Hume described three processes by which we come to associate ideas. We propose that ideas can be considered synonymous with behavior. These means are resemblance (i.e., similar stimuli elicit or occasion similar responses), contiguity (i.e., that we could expect the sun to rise tomorrow), and cause and effect (i.e., when *x* happens, *y* tends to coincide). Hume (1748/1957) wrote:

The hearing of an articulate voice and rational discourse in the dark assures us of the presence of some person. Why? Because these are the effects of the human make and fabric, and closely connected with it. If we anatomize all the other reasonings of this nature, we shall find, that they are founded on the relation of cause and effect...Heat and light are collateral effects of fire, and the one effect may justly be inferred from the other (pp. 41–42).

The main proposition within this passage is that all causes and effects are discoverable by experience (Hume 1748/1957). One could infer that, for Hume, the causes and effects of human behavior are discoverable; after all, Hume gave humans the same status as the rest of the animal kingdom. Throughout his *Treatise of Human Nature* (1738/1961), he maintained that we are not exempt from the rest of nature, and to separate ourselves from it has aversive consequences for understanding our place in the natural world.

In *Science and Human Behavior*, Skinner (1953) commented that the terms cause and effect were outmoded in contemporary science. Instead, he suggested that a better way of speaking of causal processes in modern science was to refer to correlated changes in the independent and dependent variables. These correlated changes should occur within a rigorous experimental framework with demonstrated experimental control (i.e., the holding constant of extraneous factors). Skinner stated that there was no danger in using the terms cause and effect; however, he thought that “functional relations” were more relevant for scientific discourse. Chiesa (1994) suggested that “behavior (the person) stands in a dependent variable relation to environmental events

as independent variables... radical behaviorism looks for causal relations in the interaction between behavior (the person) and environmental contingencies” (p. 122). Chiesa’s distinction maintains the parallel structure in the language of cause and effect and the language of functional relations. These ideas had roots in Hume’s writings and are traceable through the work of other philosophers. Echoing Hume’s notion that causal factors can be discoverable via experience, Mach (1914), wrote:

For us, therefore, the world does not consist of mysterious entities, which by their interaction with another, equally mysterious entity, the ego, produce sensations, which alone are accessible. For us, colours, sounds, spaces, times... are provisionally the ultimate elements, whose given connexion it is our business to investigate (p. 29).

In the excerpt above, Mach rejected the mediating mental structure because of what such accounts lack in explanatory power. This outright rejection of “mysterious entities” is part of his move towards the functional relation preferred by Skinner. As such, Skinner echoes this view in his 1977 essay *Why I am Not a Cognitive Psychologist*. Similarly, Hume rejected mysterious explanations. As Chiesa (1992) suggested, “notions of agency, force, or necessity of connection are superfluous” in his analysis (p. 1289). Hume’s dislike for anything other than direct experience to dictate our knowledge of physical events is apparent in this passage from *An Inquiry Concerning Human Understanding* (1748/1957):

We fancy that, were we brought on a sudden into this world, we could at first have inferred that one billiard ball would communicate motion to another upon impulse, and that we needed not to have waited for the event in order to pronounce with certainty concerning it. Such is the influence of custom that where it is strongest it not only covers our natural ignorance but even conceals itself, and seems not to take place, merely because it is found in the highest degree (p. 43).

In this excerpt, Hume recognizes that not only would we have no conception of causality, were it not for directly experiencing the billiard ball striking another, resulting in the causal chain of billiard ball “A” communicating motion to billiard ball “B” unfolding as such. He also recognizes that events are such an ordinary part of experiencing life that learning contingencies seems to not take place at all. It is in this ignorance of clear causality that rationalism and other mysterious, mentalistic explanations of human nature can have alleged validity.

What Hume omits in this discourse is that oftentimes the initial stimulus (cause) is temporally removed from the effect that it induces. This makes the task of defining causal chains a difficult one in practice. Most events in everyday life are far more complex and interwoven than a game of billiards. However, this should not discourage attempts to understand the complexity of human behavior.

Mach proposed a parsimonious resolution to this problem—the functional account of causation—which antecedes Skinner’s radical behaviorism. This way, we need not concern ourselves with the gaps in time between cause and effect, which tempt us to

infer mediating events and structures that cannot be explicitly proven through direct experience

One important aspect of *functional relations* is embedded in the term; these relations between events are functionally determined and are independent of structure (i.e., the way the change looks). That is, changes in one variable occur as a function of changes in another variable; the particular physical manifestation of the changes is largely unimportant. Skinner (1953) suggested that any conspicuous event that co-occurs with behavior could be misconstrued as a causal factor. In this way, he expands upon Hume's early attempts on the language of causation. Contemporaneous occurrence of events does not guarantee that there will be a functional relation. For the functional relation to be demonstrated, correlated changes must be demonstrated with sufficient levels of experimental control, regardless of the timing of participating events. Events entering into a functional relation may occur close in time or more distally.

Skinner (1953) proposed that the following classes of events could also be inappropriately granted causal properties in a non-scientific analysis: (a) structure of the individual (e.g., body shape), (b) psychic causes (e.g., an inner agent), (c) neurons/biological factors, and (d) conceptual causes that have no physical or mental location (e.g., using "because" statements such as "she sleeps because she is tired"). Additionally, Baum (2005) suggested that people could be seen as causal agents (incorrectly) when the controlling environmental factors seem obscure or are not immediately obvious. Note that in the above examples, the putative relation to behavior is generally structural and not functional, with the form of the alleged causal agent being more significant than what they do. A possible exception arises with item c (cf. Thompson 2007). Hume (1748/1957) gave voice to the ease of finding putative (but incorrect) causes, writing:

The generality of mankind never find any difficulty in accounting for the more common and familiar operations of nature; such as the descent of heavy bodies, the growth of plants, the generation of animals, or the nourishment of bodies by food (1748/1957, p. 80).

Here, Hume is bolstering his assertion that when controlling environmental factors that are not immediately apparent or conjoined closely in time, we often falsely attribute causation to an inner agent, a higher power, or "because" statements. He continued, contrasting simple, familiar operations of nature with more complicated matters:

It is only on the discovery of extraordinary phenomenon...that they find themselves at a loss to describe a proper cause, and to explain the manner, in which the effect is produced by it. It is usual for men, in such difficulty, to have to resort to some invisible intelligent principle...(1748/1957, pp. 80–81).

Hume is identifying a habit or custom of humans to simplify complex relationships and ascribe them to what he calls an invisible intelligent principle (a structure or god). This is a habit which, on the surface seems to make very difficult frameworks easier to

comprehend, but something that is dangerous to explanation of natural phenomena. Skinner (1977) wrote:

By its very nature operant behavior encourages the invention of mental or cognitive processes said to initiate action. In a reflex, conditioned or unconditioned, there is a conspicuous prior cause. Something triggers the response. But behavior that has been positively reinforced occurs upon occasion which, though predisposing, are never compelling. The behavior seems to start up suddenly, without advance notice, as if spontaneously generated. Hence the invention of such cognitive entities as intention, purpose, or will (p. 102).

Even though there may be some structural activity or correlated change as behavior is occurring, this change does not enter into a behavioral definition of a functional relation—it is beyond the scope of the causal statement. Changes in biological factors, for example, may be neither necessary nor sufficient for a specific functional relation to occur. That is, the set of relations in which the same biological processes are co-occurring may be large. For example, dopamine is released in the brains of new mothers when they view photos of their smiling infants (Strathearn et al. 2008). Dopamine is also implicated in drug-seeking behavior in rats (Saunders et al. 2013). Thus, this similar mechanism can underlie many topographically and functionally distinct responses, and the biological responses might be part of many particular operant classes. In seeking causes of behavior, then, the function of the behavior (and not structural correlates) should be considered. In describing functional relations between the environment and behavior, the inclusion of biological data in behavior analysis has been advocated (e.g., Elcoro 2008), as has the conceptualization of behavior as a biological system (e.g., Thompson 2007). Even with the expansion of the breadth of the discipline, the identification of functional changes should remain central to the discipline.

Instead of the faulty terms that were often appealed to in pre-scientific discussions of causes, Skinner (1953) preferred to identify causes in the environment. Skinner used the word *contingency* to label the relation between behavior and environmental determinants. In the term contingency, dependency or causal linkage between response and reinforcer is expressed (Staddon 2001). The word contingency suggests that there is a functional relation between stimuli and behavioral changes. Zuriff (1985) suggested that a functional approach to causality does not require any hidden, mediating activities between the cause and effect; the order that is found in this approach is satisfactory for the purposes of behavior analysis.

In contrast, mechanistic thinking requires a continuous chain of causal events (Reese 1993). In spaces where events are not obvious, unobservable events need to be postulated to fill the gaps in the chain (Chiesa 1994). Skinner wrote, “Conditioning takes place presumably because of the temporal relation, only expressed in terms of order and proximity, of response and reinforcement” (Skinner 1948, p. 168). Thus, it is not necessary to postulate mechanisms such as memory systems, embedded within the temporal spaces between stimulus and response to account for changes in behavior. To seek intervening mechanisms may obscure the functional relations and divert experimental efforts. In this way, the goals of radical behaviorism and Hume’s philosophy diverge. Rather than viewing the description of causal chains

as paramount, radical behaviorism views the act or behavior itself in context and the prediction and control thereof to be the goal of science (Hayes and Brownstein 1986). It is adequate to stay at the level of functional relations to explain behavioral change, when working towards the goals of prediction and control of behavior.

The rejection of mechanism allows causes to be at a distance from their effects. Causes do not necessarily have to be contiguous to have effects, with functional relations existing across time. Taking a pragmatic approach, behavior analysts may not be interested in the events that may intervene during the temporal gap between the manipulation of the independent variable and the observed effects on the dependent variable. As long as order can be established, what happens in the middle (if anything) may not be relevant to the goals of prediction and influence of behavior.

While Hume's ideas did not occur immediately prior to Skinner's development of the functional relation, his ideas about the language of cause and effect (mechanistic as they were) occasioned a broader scientific tradition of understanding the world in terms of direct observables. Hume helped to emphasize the importance of science in the understanding of human affairs (Zuriff 1985). The means by which we satisfy our human impulse to order, predict, and control our environment (and ourselves besides) lie in how we discuss cause and effect.

More Parallels: Rationalism, Cognitivism, and Religion

Hume dichotomized philosophers into the “dogmatic rationalist” and those who adhere to the principles that he outlines (Hume 1748/1957). As the thesis of his *Inquiry Concerning Human Understanding* is pertinent to human affairs, he attempts to explicate previous attempts at “moral” philosophy—“moral” here is being used differently than in contemporary English. In this context, he means anything to do with human nature. For him, this meant the study of politics, ethics, history (e.g., the social sciences).

Hume was critical of anything to do with what he called “dogmatic rationalism”—a term to describe the philosophical emphasis that had been placed on the inborn potential of a human to rationally understand the world without a model of learning. As Hume saw it, such dogmatism was apparent in followers of religious faith as well as in the works of earlier philosophers. The underlying tone of many early modern period writings is that man enjoys a privileged position (distinct from and above the animal kingdom). Dogmatic rationalism appealed to the belief that we are somehow disparate from the animal kingdom, or that man is somehow special in his ability to reason. It did not make an empirical attempt to explain why, when, where, or how this distinction occurred. Hume (1748/1957) described rationalism as follows:

Here, indeed, lies the justest and most plausible objection against a considerable part of metaphysics, that they are not properly a science, but arise either from the fruitless efforts of human vanity...or from the craft of popular superstitions, which, being unable to defend themselves on fair ground, raise these entangling brambles to cover and protect their weakness (p. 20).

Be it “fruitless efforts of human vanity” or “craft of popular superstition” (i.e., religion), both interfere with empirical understanding of human behavior. Skinner criticized the concept of autonomous man (i.e., man as the origin of his own behavior, man qua man, a relic from dogmatic rationalism) in *Beyond Freedom and Dignity*. Romantic notions of freedom and dignity only appeal to the popular imagination and do little to further scientific knowledge, as Skinner (1971) suggested: “People object when scientific analysis traces their behavior to external conditions and thus deprives them of credit and the chance to be admired” (p. 71).

In *Why I Am Not a Cognitive Psychologist*, Skinner (1977) dichotomized the discipline of psychology into cognitive and behavioral approaches. In pointing out the flaws in the cognitive (or mentalistic) approach, he posited that the terminology of mentalism does little more than to take environmental events and internalize them. Memory, for example, does not require the existence of a file structure in the brain; describing the behavior-environment interactions might be sufficient to predict and control behavior. Relying on these internal surrogates distracts from a concise and precise understanding of the world. Skinner admits that the study of human and animal behavior lends itself to the creation of these internal surrogates because, oftentimes, the contingencies maintaining a behavior are not immediately apparent or may be distant in time and space (Skinner 1977).

The treatment of religious behavior is another similarity between the ideas of Hume and Skinner. Hume also took a functional approach to understanding religious perspectives. Using the ceremonies of the Roman Catholic religion as an example, he wrote:

The devotees of that superstition usually plead in excuse for the mummeries, with which they are upbraided that they feel good effect of those external motions, and postures, and actions in enlivening their devotion...which otherwise would decay, if directed entirely to distant and immaterial objects (Hume 1748/1957, pp. 64–65).

Here, Hume is identifying several behavioral principles that help establish religious belief. The rituals of Catholicism place adherents under stimulus control—in other words, the set of rule-governed behavior which we term “being Catholic” and the devotion to that behavior is, in Hume’s language enlivened by the presence of ritual (i.e., going to church on Sunday). It is this stimulus control, the social contingencies that enable religious behavior to be maintained. It also seems that Hume had some grasp on the concept that delayed consequences are less efficacious than immediate ones, necessitating such ritual. The decreasing efficacy of delayed reinforcers (i.e., that commodities or rewards lose effectiveness as a function of time) has been exhaustively discussed (e.g., Madden and Bickel 2010).

Toates (2009) offered a contemporary, behavior-analytic view of religious practice: “Much religious practice might be understood in terms of forgoing immediate reinforcement in the interests of long-term reward, as mediated by a rule-governing process” (p. 150). In a reflection on religion, Skinner (1987) wrote:

Science, not religion, has taught me my most useful values, among them intellectual honesty. It is better to go without answers than to accept those which merely resolve puzzlement. I like Bertrand Russell’s reply to Pascal’s wager.

Pascal argued that the consequences of believing in God were so immense that only a fool would not believe, but, said Russell, suppose God values intellectual honesty above all else. He has given us shoddy evidence of His existence and is planning to damn to hell all those who believe in Him on the strength of it for the sake of the glittering prize... I have no fear of supernatural punishments, of course, nor could I enjoy an eternal life in which there would be nothing left for me to do, the task of living having been accomplished.

Although the language is shaped by the historical period, the interpretation of what maintains religious ritual and belief is identical.

Conclusions

We have traced the theoretical development of the ideas presented by Hume and their influence on Skinner. Selected contributions of each were contrasted to provide clarity in the development of radical behaviorism. Hume, a pioneer in many areas—humanism, atheism, skepticism, and empiricism—created an intellectual environment where radical behaviorism could exist. Skinner's radical behaviorism relies on the rejection of a reified self (and the invisible explanatory constructs necessary for such a self), of which originated in the writings of Hume. In addition, Hume offered an objective, peerless account of religion and religious philosophy, a notable achievement for his time and one that set the occasion for subsequent thinkers.

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