

# Charles Darwin, Behaviorist

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*Optimal Instruction Systems*

In 1872 Charles Darwin, of earlier “Origin of the Species” fame, published a book titled *The Expression of the Emotions in Man and Animals*. On the back cover of the paperback edition I have, the blurb reads, “Darwin’s work of 1872 still provides the point of departure for research in the theory of emotion and expression.” That may be true for the discipline of ethology, as Konrad Lorenz states in his preface to the edition that I have. It does not appear true, however, for either psychology or for behavior analysis. Lorenz comments that psychology has largely ignored Darwin’s work in the area of emotions and their expression. This ignorance likewise appears evident with behaviorists who express some interest in the study of emotions. When discussing emotions they may fail even to extend a courtesy reference citation to Darwin’s book. To the degree that this is so, it is tragically ironic, especially because it turns out that Darwin was something of a behaviorist, though not in the modern sense of course. That’s what this brief essay covers.

Darwin began his study of emotions and their expressions in 1838, a full century before B.F. Skinner’s magnum opus, *The Behavior of Organisms*, was published. Darwin used as his research basis the study of infants, the insane, and animals. He had people judge photographs taken of various expressions and then had the judges decide what the expressions represented and which emotions were being exhibited. He selected infants, insane people, and animals as objects of study mainly because, as he contended, they do not have means or methods of concealing their emotions. Also, Darwin tried having people judge expressions in the paintings and drawings made by great artists, but discovered that these illustrations did not work very well as sources of information for subjects to judge.

While not a behaviorist in the sense we have come to know and appreciate, we cannot fault Darwin for that difference since his book was published about 70 years before Skinner’s 1938 book. Darwin lived and worked long before any behaviorist paradigm appeared, let alone Skinner’s. Accordingly, much of Darwin’s writing seems quaint, out-of-date, and even archaic. Nevertheless, Darwin did anticipate modern behaviorism to a rather surprising extent. This anticipation comes with respect both to the scientific methods he used, concepts he used, and how he wrote about his subject matter.

First, Darwin’s work focused on behavior. He studied the movements of the organism, human and animal, and the emotional expressions produced by movement. He even used the term “movements,” which later became a keyword in Skinner’s 1938 definition of behavior, and likewise Lindsley’s 1964 definition of a movement cycle. Moreover, Darwin observed that the movements characteristic of emotion were often “slight” and “fleeting.” The term “slight” indicates variations of behavior along an amplitude dimension, and specifically action at a lower end of an amplitude scale. The opposite of “slight,” at the other end of such a scale, would include actions identified as “extreme” or “loud.” Darwin also arranged for subjects to judge photographs illustrating the large-scale movements and extreme expressions, too. So, here we see an important reference to an amplitude scale of behavior, which, interestingly enough, behaviorists have yet to recapitulate or even to rediscover.

Darwin’s observation about some emotions being “fleeting” connotes the brevity of many movement cycles. The cycle is here one instant, gone the next. To some degree this observation anticipates the behavior analytic use of equally fleeting responses—a bar press is here one instant, gone the next. Thus it alludes to the methodological problem of how to capture and then record such fleeting events so they can be measured and analyzed. Skinner’s eventual answer to that problem was through the development of an operant research chamber that contained a useful, reliable manipulandum. Pressing a bar was fleeting, but the event record and counter increment persisted. “Fleeting” also alludes to the value of frequency as both a universal measure and a dimension of behavior, because a “fleeting” expression is one that occurs in time and can be counted, if it is directly measured of course. A “fleeting” emotion is also one that can repeat, so perhaps its frequency would be as important as its amplitude.

Second, while he did not know about behavior–event relations as we now know them, Darwin does refer to “stimuli” in his book. I found that rather interesting when reading the book. Of course, the word “stimulus” is an old Latin one, which goes back to the agrarian culture of ancient Rome. Back then, Roman farmers used “stimuli,” which were sharp, pointed sticks, to prod cattle to move. The farmers needed to move cattle through chutes in order to count them, for purposes of buying and selling. So, they had to have some means to get the cattle to move into and through a chute. A “stimulus” did the job, producing the desired “response.” Prod the animal with the sharp, pointed stick, and it moved. So, culturally, the notion of “stimuli” being used to prod an organism into action—to elicit or to evoke a particular, desired response—has been around for quite some time. In any event, Darwin used some of the same terminology that we use, though in that earlier, more restricted usage more pertinent to an “S–R” paradigm rather than to Skinner’s.

In addition to his comments about stimuli, Darwin wrote this rather interesting conclusion that relates to contingencies of reinforcement:

I have now described, to the best of my ability, the chief expressive actions in man, and in some few of the lower animals. I have also attempted to explain the origin or development of these actions through the three principles given in the first chapter. The first of these principles is, that movements which are serviceable in gratifying some desire, or in relieving some sensation, if often repeated, become so habitual that they are performed, whether or not of any service, whenever the same desire or sensation is felt, even in a very weak degree. (Darwin, 1872, p. 347)

Darwin's description would seem to anticipate both positive reinforcement ("gratifying some desire") and negative reinforcement ("relieving some sensation") respectively. Granted that his terminology bespeaks a hedonistic perspective about these processes, but even so, it is not far removed from our more functional descriptions of whether consequences are added or subtracted and whether the behavior increases or decreases as a result. Furthermore, Darwin's comment anticipates behavior having some sort of function ("serviceability"), not just some happenstance epiphenomenon. Next, he anticipates fluency ("often repeated, become so habitual"). And finally even anticipates schedules of intermittent reinforcement ("whether or not of any service, whenever the same desire or sensation is felt"). Not every instance of the movement cycle produces the same subsequent event effect, nor needs to do so. Responses that do not produce the subsequent event are "not of any service" in that regard. Overall, the concept of the functional relationship has some early dawning in this whole passage. The intriguing question is whether or not Darwin or contemporaries would have discovered the contingency of reinforcement more than a half century before Skinner's book arrived.

Darwin furthermore demonstrated the same commitment to the behavior of the organism as a whole that modern behaviorists have. Well, of course. The "organism as a whole" was articulated by Jacques Loeb as a scientific organizing principle, and also by a succession of later scientists including B.F. Skinner. But the foundation for this principle goes back at least to Darwin, if not further back. It would be more proper for me to observe that these later scientists demonstrated the same commitment that Darwin did to the organism as a whole. In any case, while Darwin concentrated on facial expressions, he did not limit his study to them. Indeed, where appropriate, he mentioned the movements and postures that the whole person exhibited when expressing an emotion.

When discussing the expression of emotions of animals, he likewise considered the whole organism. For example, Darwin's book contains some interesting, if perhaps amusing, drawings of cats arching their backs and puffing out their tails, with ears drawn back—the behavior of the whole cat, if you will. You can't get any more whole organism than that. So, the basis of Skinner's foundational principle of studying the behavior of the organism as a whole surely extends back to Darwin, even if by way of Loeb.

## **The Amplitude of Emotions and Their Control**

As noted already, Darwin also recognized, to some degree, the fact that emotions range along an amplitude scale. An example includes emotions evoked by humor: smiles, grins, chuckles, giggles, laughter, and the kind of "rolling on the floor belly laughter" at the high end of the spectrum. While these descriptors may seem to form a broken and discrete amplitude scale—and may well do so—they do denote the fact that the expression of the emotions varies in intensity. In today's world, with our emphasis on functional relationships, we might find that behaviors at different amplitudes also have different functions, much as behavior at different frequencies has different functions or effects. We might—and probably should—chart the behaviors of different amplitudes separately, as Og Lindsley (private communication, March 2001) suggests. We might find that the frequencies of high and low amplitude responses accelerate and decelerate independently of each other. Recall that amplitude is generally orthogonal to frequency and independent of it.

Skinner (1957), on page 438 in the chapter on "Thinking," suggested that vocalized verbal operants range along an amplitude scale. He arranged them top down, from shouting, which is vocalizing at the highest amplitudes, through normal conversation in the middle, down to subvocal speech and even further on down to verbal responses of "unclear dimensions" at the lowest amplitudes. Vocalized verbal behavior can and does vary in amplitude. We vary the amplitude of our vocalizing all the time. We speak "up" and "raise" our voice, and also we "lower" our voice and "pipe down." We subvocalize verbal operants so they will not be heard, in order to avoid punitive consequences were we to speak audibly. And indeed, modulating the amplitude of vocalized verbal behavior is something our culture deems important. We encourage children to read out loud when we are teaching them to read, but later on we want the same reading to occur silently, a reduction in the amplitude of the behavior below the level of producing sound.

Because emotions can be and are expressed vocally, as well as by facial and bodily expression, they can vary

along a similar amplitude scale as the one Skinner suggested for vocalized verbal behavior. Likewise, our culture demands that people modulate their emotions, just as it does with the loudness of speaking. We expect people to control their rage, or to temper their anger. We ask them to “calm down,” where down implies a reduction in amplitude. We ask them to lower their voice, or to not raise it, which are again demands about modulating amplitude.

One of the various criticisms leveled against behaviorists and against behaviorism concerns the question of “control” of behavior. Behaviorists are charged sometimes with being “controllers,” and wanting to “control” behavior. (We do, but primarily as a means to understand it scientifically.) Yet, in the everyday world, the same people who might level such criticisms not only have no problem with wanting others to modulate amplitudes of speaking and emoting, they demand it. Our culture may have great difficulty accepting that all operant behavior is controlled, but we have little difficulty knowing and expecting that speaking and emoting can be and need to be controlled. We insist that speakers speak up! We insist that angry people calm down! So, perhaps recognition that the amplitude of emotions can be controlled, and often needs to be controlled, where such control is both accepted and desired in our culture, can be our entrée into gaining wider acceptance of the science. If so, then Darwin’s study could help pave the way, for his work has immediate application as a point of departure for further scientific study of the control of emotions.

## Conclusions

In recognizing Darwin’s book on emotions and their expression as a useful precursor to our science and as something yet still relevant and worthy of review, we should not miss one irony. Our science has as its epistemological cause-and-effect basis the concept of selection by consequences. This differs from physical cause and effect. It also descends from Darwin’s other work on the natural selection of species. Species originate by way of the operation of natural selection at a biological level. Likewise, operant behavior changes by such a selectionist modality at a behavioral level, as do cultural practices at a cultural level. We owe discovery of this means of cause and effect directly to Darwin and his *Origin of Species* book. However, ironically, the concept of selection by consequences is not clearly evident in Darwin’s book on emotions and their expression. He did not discern the fact that behaviors arise and go away in the same way lifeforms do. So, we could quibble and say that Darwin, of all people, was not a selectionist when it came to behavior, but that might be unfair given that he did live and work before there was even much of a glimmer that be-

havior ever could be a subject matter in its own right, studied scientifically, with respect to application of selection by consequences.

While one cannot retrospectively make Darwin into either a radical behaviorist or any other kind of modern behaviorist—and that is not my intent—it should be clear that his contribution does anticipate the eventual rise of behaviorism along some important venues. Moreover, it should be clear that his book and what it covered would be useful reading as a starting point for the study of emotional behavior, even if much of what Darwin said is now considered obsolete. Not all of it is obsolete, and his methods and observations seem strikingly modern at times. If nothing else, his emphasis on watching the actual behavior and in noticing subtle aspects of behavior ought to be taken as useful advice, if for no other reason than emotions are not simply “psychological states” of being nor are they coterminous with “private events.” Rather, emotions are responses of the whole organism, often highly overt, public, and visible in their expression, and thus not usefully relegated to “states of being” whether psychological or otherwise. We make an equally serious blunder to whatever extent we cast emotions solely or principally into the category of private events. Darwin’s book stands as strong testimony that emotions are behavior of the whole organism, and as a rule are quite public and visible and are anything but private events. They are actions, elicited or evoked, varying in amplitude and frequency, that have some important effect or other salient function. Our task as scientists is to study them for what they are, and where necessary to help develop an applied technology of controlling emotions and their expression.

Adding Charles Darwin to the pantheon of behaviorists that includes B.F. Skinner and Ivan Pavlov and others would not be doing wrong. In fact, it would be the right thing to do. We credit Darwin for selectionism. He contributed directly to the study of behavior. We should credit him for that, too.✦

## References

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