



## A Functional Analysis of “Aesthetic”: A Commentary on Mechner

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### Abstract

In his target article, Mechner provides a bio-behavioral analysis of effects called “aesthetic.” He then examines hundreds of such effects across a wide range of literary, artistic, and scientific disciplines and concludes that they consist of a composite of elements that produce what he calls “surprise-tinged” emotional responses in individuals with an appropriate learning history. In my commentary, I first suggest an operational, or functional, analysis of some of the terms Mechner uses in his analysis, including “surprise,” “familiar,” and “priming.” I then provide a brief functional analysis of stimuli we call “aesthetic,” “artistic,” or “beautiful.” In so doing, I use my own history with music and as a musician to address two general questions about behavior we call “aesthetic”: what kinds of responses occur and under what circumstances, and what kinds of learning histories might be responsible for them? Although I identify some problems with Mechner’s interpretation, for example, that he introduces several vague concepts and often opts for explanations that are circular and that do not identify basic behavioral principles, in general I commend him for tackling such a complex topic in such a thorough and thoughtful manner.

**Keywords** Aesthetics · Functional analysis · Operant conditioning · Respondent conditioning · Music

### Introduction

In his monograph-length article, Francis Mechner (2018) offers a bio-behavioral analysis of effects that can be called “aesthetic,” in which he examines hundreds of such effects across a wide range of literary, artistic, and scientific disciplines. According to Mechner, “A behavioral and biological analysis of aesthetic phenomena requires an examination of the stimulus, the response, the devices responsible for their interactive effects, and the evolutionary origins of these effects” (p. 3). He concludes that these effects consist of a composite of elements that, acting together (which he calls “synergetic brews”), produce emotional responses in individuals with the appropriate learning history. These are fundamentally different than, although evolved from, emotional responses evoked by biologically significant events; moreover, the aesthetic effects evoked by these synergetic stimuli have reinforcing properties.

Mechner’s article obviously represents a significant amount of time and energy over decades of thinking and is admirable not only in that respect, but also in its scope, its commitment to the analysis, and its effort to bring together a wide range of scholarly works from many areas. I admire Mechner’s attempt to deal with an extremely difficult and complicated subject matter—what it means to appreciate a work of art and how individuals come to do so—and the complex repertoire of behavioral and neural responses involved.

There are a couple general issues with respect to Mechner’s article that do not make the job of a commenter an easy one. First, the article is very long and complicated with many headings and subheadings. Second, Mechner introduces many new terms and concepts that I found difficult to operationalize. Therefore, I will restrict my commentary to a few select topics in the broader context of a radical behavioral perspective, and conclude with a brief analysis of music based on my own musical history and behavior.

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### A Radical Behavioral Approach

In my introductory psychology course and, indeed, in all my courses, I make a distinction between asking about the meanings of certain psychological terms versus asking about the

variables that evoke the terms as verbal responses. For example, rather than asking what memory is or how it is defined, which smacks of reifying memory, and even of essentialism, I teach students to ask what “memory” is; in other words, what variables evoke, or cause someone to say, “memory.” This involves asking what someone is doing, or what behaviors can be observed and under what circumstances, when we say that a person is remembering. This tactic follows from Skinner’s (1945, 1957) position that a psychological term—indeed, any term—is more parsimoniously viewed as a verbal response, and understanding the response’s meaning is tantamount to identifying its controlling variables.

Thus, my approach to understanding the terms used when speaking of aesthetics would be to identify what variables control the verbal response “aesthetic” or, in particular, such responses as “beautiful,” “magnificent,” or “amazing.” Of course, this is generally what Mechner sets out to do. However, he assumes three additional conditions: (1) that the verbal responses are accompanied by what he calls “surprise-tinged” emotional responses evoked by “stimuli that are composites of multiple elements that ordinarily do not occur together and whose interaction, when appropriately potentiated, is transformative” (p. 1); (2) that the stimuli are biological in origin; and (3) that they can assume reinforcing properties. These conditions complicate the exercise of operationally analyzing the relevant terms.

## A Brief Analysis of Some Terms and Concepts

### Surprise

Mechner uses the term “surprise” “as a stand-in for the entire wide and nuanced range” of emotional responses “encompassing pleasure and exhilaration; fear or sadness ... tears ... horror ... anger ... laughter; and other emotional responses,” and writes that “the term ‘surprise’ commonly refers to the covert emotional reaction when an expectation is not realized, an unexpected event occurs, or new information is received” (p. 20). Such emotional responses, however, do not ordinarily come to mind when one speaks of aesthetics, although works of art can certainly elicit emotional responses. Mechner does provide examples of stimuli that might evoke the emotional responses he calls “surprise,” however, his almost exclusive emphasis on the emotional responses themselves makes an analysis difficult. From a functional-analytic perspective, asserting that the term “surprise” is controlled mostly by covert or private emotional responses is problematic. For one thing, it is not possible to guess what emotion someone is experiencing based solely on physiological, or even behavioral, measures. To illustrate, there are two perspectives to consider. First, what would evoke the response “I am surprised?” Second, what would evoke the response

“She is surprised?” In the first case, part of the circumstances that might evoke “I am surprised” are what Mechner refers to as an emotional component. In the second case, those emotional components would not be relevant, and the response “She is surprised” would be evoked solely by the circumstances and the individual’s observed behavior. Understanding what is meant by “surprise” would therefore mean identifying the circumstances that evoke observed responses and then inferring collateral emotional responses. Mechner tries to accomplish this by listing “devices” that combine “to create synergetic brews whose elements may interact to generate aesthetic responses for appropriately primed individuals” (pp. 36–37). But these “devices” are themselves complex composites of stimuli that are difficult to identify. Mechner then writes: “Though aesthetic responses are essentially emotional and covert, they are always potentiated by operant behavior that sets the occasion for their occurrence” (p. 32). This claim recalls the James-Lange theory of emotion in which one first behaves and then feels the emotion, which would be difficult to test.

Either way, Mechner then compares surprising stimuli to stimuli that may have had survival value during our evolutionary history. Mechner further invokes the biological utility of surprising stimuli and their evolutionary origins when he writes: “Synergetic stimuli that evoke aesthetic responses tend to be reinforcing, via mechanisms related to their biological utility during our evolution” (p. 1). Mechner may be correct when he points out that the (novel) stimuli produced by behaviors we call “exploratory” or “curious” acquired their reinforcing properties during our evolutionary history, as such stimuli were more likely to be related to finding food, mates, etc. However, his contention that the reinforcers inherent in “daredevil activities, videogames, and gambling” and movie thrillers “may be due in part to the biological utility of learning to manage danger through experience gained when expectations generated in such situations are or are not realized, regardless of whether the dangers are real, simulated, or vicarious” (p. 19) is much more speculative.

In general, with some noted exceptions, Mechner’s contentions regarding evolutionary history remind me of an evolutionary psychological approach that I have questioned on several occasions (e.g., Schlinger, 1996, 2004), pointing out that they are “just-so stories” created after the fact to account for complex behavioral relations that can be more parsimoniously explained by operant and respondent contingencies. It is more likely, and more parsimonious, that many of the stimuli discussed by Mechner have acquired their reinforcing value through respondent contingencies in the lifetime of the individual. To put it in simpler terms, not everyone likes music or art or likes them in the same way; in other words, each person’s history of operant and respondent conditioning with music or art is different. For example, in addition to playing (acoustic and electric) guitar and singing and writing songs for the past several decades, I

have been listening daily to classical music. My mother often played classical music in our house when my siblings and I were young, and she took me to classical music concerts before I was old enough to know or appreciate what I was hearing. Although I had some formal training in college, I have spent thousands of hours listening to recordings, attended hundreds of concerts, and bought and followed music scores when listening, and, more recently, I attend and pen reviews of classical music concerts for my wife's culture website ([CultureSpotLA.com](http://CultureSpotLA.com)). The result of this long and extensive informal training is that I know many classical pieces by heart in the sense that I can sing the entire piece, know what key the piece is in, what the time signature is, and what instruments start playing and when. Thus, my listening behavior (see Schlinger, 2008, 2009), that is, my self-singing/humming, has a long history of conditioning. Someone without the history I have had would not have the same repertoire and would not be as familiar with classical music or claim to like it as much as I do. To say that the reinforcers for my listening behavior had their origins in our shared evolutionary history is true only in the broadest sense that all secondary reinforcers have their basis even if only indirectly in primary reinforcers. In my view, that is not very helpful in identifying the origins of those reinforcers.

Of course, we should probably ask what it means to like music. In other words, we must identify the behaviors someone engages in with respect to music—both respondent and operant—the circumstances that evoke those behaviors, and, in the operant case, the functional reinforcers. Again, there are two perspectives from which to evaluate whether someone likes music. Either the person says, “I like music,” or someone else says, “He or she likes music.” For example, I say I like music. But what controls my response, “I like music?” When I'm not listening to music, the variables controlling my response are usually someone else's question, “Do you like music?” When I'm listening to music, there are probably some emotional responses, but obviously there is also the music itself and whatever behaviors I am currently engaging in, such as singing. If I am asked to say whether someone else likes music, I would have to observe their behaviors and the circumstances in which they occur. I have no access to their emotional responses. In general, though, we would probably say that a person likes music if she listens to music frequently, plays a musical instrument, sings, attends concerts, etc. In other words, we can identify the behaviors that contact musical stimuli. To explain the origin of those behaviors and the maintaining reinforcers, we would have to know something about that individual's history with musical stimuli.

## Familiarity

The difference between my behaviors with classical and rock and roll music and someone else's is obviously a difference mostly in learning history. To put it simply, I have become

much more “familiar” with the music than another person, but of course, not as familiar as a trained classical musician, conductor, or professional rock musician. But what does it mean to be “familiar” with anything? Mechner addresses the concept of familiarity as follows:

What does it mean to have become familiar with a piece of music, a painting, a poem, or any other work? It means having learned some of its constituent concepts—musical, coloristic, phonological, or abstract—and the relations among them. We are familiar with a work when some of its features have become part of our concept repertoire. Again, it is important to keep in mind that such concepts are not necessarily verbal or cognitive—they can be purely visual, purely auditory, purely abstract, or various combinations of these. (p. 22)

This description is difficult to understand, especially from a behavior-analytic perspective. If we want to know what it means to call something familiar, it seems to me there are two related approaches. One is to try to identify the variables that evoke the verbal response “familiar”; in other words, carry out a functional analysis of the response “familiar.” We would do this by analyzing the behaviors that cause us to say that someone is “familiar” with something. Next, we can try to explain what makes some event familiar, and this can only be done by understanding the mechanisms responsible for the behaviors involved, whether they are operants or conditioned reflexes.

Mechner then states that we enjoy familiar works of art or music because “our moment-to-moment expectations as to what comes next are continuously confirmed and disconfirmed” (p. 22). In other words, this confirmation or disconfirmation, which Mechner calls refreshment, functions as reinforcement. But what behaviors are “expectations?” And how does confirmation or disconfirmation come to function as reinforcement? Simply stating that something functions as reinforcement is not sufficient; one must at least demonstrate how it became a reinforcer and what functions of antecedent events are altered (see Schlinger & Blakely, 1994).

Having claimed that surprise is a critical component of our aesthetic reactions, Mechner must then attempt to explain “why we continue to enjoy great works”; in other words, why we still have aesthetic responses in the absence of surprise. Ignoring for the moment what makes a work “great” and what “to enjoy” means, Mechner explains that, “Our concept repertoires change as a function of successive exposures to the work, the passage of time, intervening events, and neural activity. Thus, the next exposure to the work reinstalls its concepts in the altered concept repertoire environment” (p. 22). Unfortunately, this explanation seems circular. That is, the only evidence for the altered concept repertoire is that we continue to contact works of art.

In my opinion, throughout his article Mechner has gone beyond the basic principles of operant and Pavlovian learning and introduced new and, at least to me, difficult to understand concepts (e.g., concept repertoire, power amplification) to explain the phenomenon of interest. But one concept that Mechner implicates in his analysis of aesthetic behavior that I did find somewhat helpful is *priming*.

## Priming

Mechner begins his discussion of priming as follows: “Most biological systems, ranging from individual neurons to societies and nations, respond to a synergetic stimulus complex only when they have received some preparatory priming” (p. 29). In the discussion of the importance of priming in aesthetic responses that follows, Mechner talks about exposure to a work as a form of priming. He begins with the following statement about our sensory systems: “Many aesthetic effects in the arts rely on the neurally hard-wired non-cognitive perceptual elements of the visual and auditory systems—priming via genetics” (p. 29). This claim goes without saying: the prerequisites for enjoying music or art are our auditory and visual sensory systems. I would distinguish, however, between what we sense and what we perceive. Sensation, or transduction, is the conversion of energy in the form of stimuli into neural impulses. But what is perception? According to Skinner (1953), “Our ‘perception’ of the world—our ‘knowledge’ of it—is our behavior with respect to the world” (p. 140). If we undertake an operational analysis of the response “perception” by asking what behaviors occur and under what circumstances, we see that what we speak of as perception is most likely simply behavior under stimulus control (Schlinger, 2009). For example, if I am said to visually perceive my computer keyboard, one would observe me looking at it, typing on it, etc. If I am said to auditorily perceive music one might observe me singing or humming along with it, moving my hands or feet, and so forth. It is true that some of the elements of visual and auditory stimuli (e.g., lines, edges, motion, pitch, timbre, and loudness) that we learn to perceive (i.e., operantly respond to) may indeed be hardwired in the sense that specific neurons “detect” these features and fire (i.e., the stimulus features are sensed or transduced), in the absence of operant contingencies involving these elements. However, we would not say that an individual “perceives” anything until the individual’s behavior interacts with these stimulus elements and produces reinforcing consequences, that is, the behavior becomes discriminated.

Mechner acknowledges that “a certain amount and type of exposure” distinguish individuals who appreciate great works of art or music; in other words, those individuals have had different priming (i.e., learning) histories. I have no problem with using the term “priming” in this context or with Mechner’s assertions that “Most great pieces of music must be heard multiple times; great paintings require viewing time;

and great poems must be studied to be appreciated fully” (p. 30). Of course, we must operationally define what we mean by “appreciate” or “study” in terms of the relevant behaviors and their controlling variables. And, perhaps more important, we must describe what the individual is doing when he or she is hearing the music, viewing the paintings, and studying the poems. But when Mechner then states that “It is during such exposure that the necessary concepts and relations can attain the functionality thresholds required for the intended synergetic interactions and aesthetic impact” (p. 30), he loses me. My preference would be to attempt to provide a more molecular interpretation of how such exposure conditions the responses to works of art or music in certain individuals. To that end, we might ask how the devices used to create what Mechner refers to as aesthetic effects work at the level of operant or Pavlovian contingencies. Two of the 16 devices he describes that are inherent in all art forms “to create synergetic brews whose elements may interact to generate aesthetic responses for appropriately primed individuals” (pp. 36–37) are repetition and symmetry, both of which, according to Mechner, can create expectations, the nonrealization of which can evoke surprise. My own anecdotal experience with music seems to support Mechner’s general suggestion that these devices can evoke surprise vaguely defined as a particular kind of emotional response. But we are still left to wonder about the basic mechanisms underlying these devices.

## A Brief Analysis of My Musical Behavior

Given my difficulty with some of the novel terms and concepts in Mechner’s analysis, allow me to briefly suggest how I would approach the interpretation of stimuli we call “aesthetic,” “artistic,” “beautiful,” etc. As I indicated earlier, I would follow Skinner’s (1945) operational (i.e., functional) analysis of these and other responses. For me, the questions about behavior we call “aesthetic” are: (1) “What kinds of responses are involved, and under what circumstances do they occur?” and (2) “What kinds of learning histories are responsible for them?” As I am most familiar with music, I will offer a brief analysis of my own musical behavior. Let me start with the kinds of responses to music that can be observed.

My responses to music are many and varied. Excluding playing the guitar, my musical behaviors primarily involve a lot of vocal (and subvocal) behavior in the form of singing and humming. Not only do I sing and hum when I listen to music, but also when I imagine it (Schlinger, 2009).<sup>1</sup> These behaviors are the result of thousands of hours of hearing (sensation) and listening (perception). When I first hear a piece, I don’t have a

<sup>1</sup> As I argued in my article (Schlinger, 2009), auditory imagining is parsimoniously interpreted as subvocal talking when imagining hearing speech, and subvocal singing or humming when imagining hearing music.

listening repertoire with the piece, that is, I am unable to sing it unless it contains similar elements as other pieces I have already learned to listen to, which is almost always the case. A good pop song with a catchy hook (which is more and more a rarity these days) conditions listening (i.e., singing) much more quickly than a much longer classical piece, and certainly more quickly than many contemporary classical pieces that are virtually impossible to hum or sing.

In addition to singing and humming, I also move my hands as in conducting the piece or, if I am at a concert, my head and sometimes my feet. Moreover, I cannot dismiss the possibility of engaging in visual behavior (imagining), although I am not aware of any specific examples other than imagining which instrument is playing if I am listening to music at home. Some people report imagining various scenes when listening to music, for example, pastoral scenes when listening to Beethoven's Symphony No. 6 ("The Pastoral") or Richard Strauss's "Alpine Symphony." Sometimes we talk about "concentrating" on a piece of music. That probably involves more than just singing or tapping one's foot or moving one's hands or head because those behaviors can all occur and we can still be said not to be concentrating. For example, when I listen to music either live or in my living room and I am not concentrating, I find that I am talking about (and visually imagining) something else. Focusing on or paying attention to (i.e., talking or singing to oneself about) only the music is difficult and requires special training, perhaps in a manner similar to learning to meditate.

My (sub)vocal responses to music may be compared to echoic and intraverbal behavior (Schlinger, 2009). For example, when I listen to (and not just hear) a familiar piece of music, I echo the melody (or harmony) either overtly or covertly. If the piece has lyrics, I echo both the melody and the lyrics. Analogous to intraverbal behavior, if I listen to a few notes of a familiar piece of music, I can sing the upcoming melody (or harmony or lyrics). For pieces with which I am familiar, I need only listen to a small sample. Hearing the upcoming melody or lyrics then reinforces my intraverbal-like singing or humming. Of course, these repertoires require a significant learning history involving operant and respondent learning inherent in some of the "devices" Mechner mentions.

Mechner writes that "In listening to music, aesthetic responses generally occur at points where something unexpected and surprising happens" (p. 43). For Mechner, aesthetic responses are "surprise-tinged emotional responses." Thus, he seems to focus mostly on the physiological components of a much wider constellation of behaviors that we might call "aesthetic." There is no question that unexpected or surprising turns probably evoke emotional responses and, as a result, reinforce listening; but for me, so does a whole range of other features in a musical piece, including other musical devices that Mechner mentions, such as melodies and harmonic

progressions, rhythm, theme and variations, repetition, the development section, the coda, and the *leitmotif*. Also, one can only be surprised the first time something unexpected occurs, so we must be able to account for the continued listening and emotional responses after the surprise has worn off.

Let me return to the concept of exposure and the role of reinforcement in conditioning the operant responses—verbal and nonverbal—that comprise what we might call "aesthetic." We can kill two birds with one stone—automatic reinforcement. One might assume that automatic reinforcers are conditioned by pairing them with other reinforcers, but much of the evidence in early language learning in human infants and songbird learning does not seem to support this hypothesis. In both examples, prolonged exposure to the sounds of the language or song over a wide range of situations seems sufficient to endow those sounds with reinforcing properties such that when infants or birds make sounds that approximate the ones they have heard (i.e., have parity with; Palmer, 1996), they are automatically strengthened. Moreover, such automatic reinforcement shapes the sounds—phonemes or notes—into more formal words or songs (Schlinger, 2010).

Thus, it seems reasonable to assume that frequent and prolonged exposure to music is sufficient to establish the sounds as conditioned automatic reinforcers for the behavior (e.g., singing or humming) that produces similar sounds. Perhaps, if such exposure occurs early and often enough in life, it might even lead to someone having perfect pitch. Thus, it may not be only the unexpected or surprising moments in a musical piece, but many features such as the melody, harmony, and tempo changes that function as automatic reinforcers for the behaviors of listening. For example, when one can sing or hum the melody or harmony or the part played by a particular instrument in an orchestra, automatic reinforcement in the form of parity occurs. Thus, one can be said to "know" the piece. It may also be these features that alone or synergetically evoke verbal responses such as "amazing" "beautiful," or "incredible," as I often say when listening to my favorite pieces. It is possible that when we speak of some work of art as "aesthetic," we are referring to a constellation of such operant and respondent verbal and nonverbal responses. Of course, there are also emotional responses, but they are difficult to identify and analyze separately.

## Conclusion

Mechner has essentially given us a monograph on what it means to call something "aesthetic." It is an admirable achievement in which he offers a bio-behavioral interpretation of the topic. The final product pulls together research and thinking from a variety of sources and represents a significant investment of time and energy. One may quibble with specific parts of it, as I have done, but Mechner's magnum opus will

stimulate much thinking and, one hopes, experimental research. Toward that end, he has provided numerous “research topics for experimental analysis” which could keep a generation of master’s and doctoral students busy. I have tried in a modest way to address a few of the points in his article, focusing on my own experiences with music. I hope that I have in some small way contributed either to Mechner’s analysis or to the overall discussion of aesthetics by behavior analysts.

## References

- Mechner, F. A. (2018). Behavioral and biological analysis of aesthetics: Implications for research and applications. *The Psychological Record, 68*, 1–72.
- Palmer, D. C. (1996). Achieving parity: The role of automatic reinforcement. *Journal of the Experimental Analysis of Behavior, 65*, 289–290.
- Schlinger, H. D. (1996). What's wrong with evolutionary explanations of human behavior. *Behavior and Social Issues, 6*, 35–54.
- Schlinger, H. D. (2004). A review of *The science of romance: Secrets of the sexual brain* by Nigel Barber. *The Psychological Record, 54*, 163–166.
- Schlinger, H. D. (2008). Listening is behaving verbally. *The Behavior Analyst, 31*, 145–161.
- Schlinger, H. D. (2009). Auditory imagining. *European Journal of Behavior Analysis, 10*, 77–85.
- Schlinger, H. D. (2010). Behavioral vs. cognitive views of speech perception. *Journal of Speech Language Pathology: Applied Behavior Analysis, 5*, 150–165.
- Schlinger, H. D., & Blakely, E. (1994). A descriptive taxonomy of environmental operations and its implications for behavior analysis. *The Behavior Analyst, 17*, 43–57.
- Skinner, B. F. (1945). The operational analysis of psychological terms. *Psychological Review, 52*, 270–277.
- Skinner, B. F. (1953). *Science and human behavior*. New York, NY: Macmillan.
- Skinner, B. F. (1957). *Verbal behavior*. New York, NY: Appleton-Century-Crofts.