Review of David Huron, *Sweet Anticipation*: Implications for Composers

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ABSTRACT: *Sweet Anticipation* is partially devoted to explaining why listeners have a positive response to music that they can successfully predict. The book also presents evidence that the pleasure felt when expectations are met is especially great when these expectations are unconscious. I give examples from popular and classical music of consciously and unconsciously recognizable material and explore what Huron's findings might mean to composers.

[1] Many composers of modern classical music shudder to have their music described as "accessible," which they consider a euphemism for "suitable for mass consumption" or even "pandering to the masses." Such composers organize their pitches, rhythms, and timbres according to non-traditional systems, usually with complex results (for example, Boulez's use of chord multiplication). It would be difficult, however, to find a composer who would *not* want her work performed and appreciated, if only by a select few. These few are typically those educated in the sphere of art music, and herein lies the musico-cognitive question: if those who appreciate modern art music are typically performers and scholars—those who approach these pieces by reading them in score and examining their theoretical underpinnings—one may wonder to what degree this music would be comprehensible without such aids. As a composer myself, I approached *Sweet Anticipation* seeking cognitively- and psychologically-based perspectives on just what kind of organizational structures the listener is capable of perceiving. Of course, having the listener be able to "follow" a piece is not always relevant to a composer's artistic goals, nor are all clearly-organized pieces audibly rewarding. In *Sweet Anticipation* Huron acknowledges that "there is no requirement that musicians create music that listeners find pleasing or pleasurable . . . Moreover, even if musicians aim to create an overtly pleasing psychological effect, there are many ways of achieving this goal without making use of expectation-related phenomena" (239–240).

[2] Whether or not a composer aims to please, however, she usually seeks an awareness of how her piece will be received by listeners: will the key moments be recognized as such? Will there be a sense of inevitability, a feeling of satisfaction? What will be the role of surprise? *Sweet Anticipation* explains the way in which many such responses to music are tied to expectation —whether listener predictions are rewarded, to what degree, and when. Beyond the issue of musical expectation, Huron also discusses how particular kinds of sound (such as low-pitched, loud sounds) evoke certain physiological responses (such as fear) due to millennia of evolutionary adaptation. In this review, I will focus on only one listener reaction—what the book describes as satisfaction or pleasure—and what Huron's findings may mean for composers.

[3] *Sweet Anticipation* describes the evolutionary significance of the human brain being attuned to the near future (59ff): "The capacity to form accurate expectations about future events confers significant biological advantages. Those who can predict the future are better prepared to take advantage of opportunities and sidestep dangers . . . Accurate expectations are adaptive mental functions that allow organisms to prepare for appropriate action and perception" (3). Given the survival advantage of making accurate expectations, Huron argues that

> it would be reasonable for psychological *rewards and punishments to arise in response solely to the accuracy of the expectation* [italics original] . . . Psychological evidence in support of a predication response is found in the classic work of George Mandler. An abundance of experimental research has affirmed the importance of this response. In fact, this response is considered so important in the extant literature on expectation that it is commonly referred to as the *primary affect* [italics original] (12–13).[(1)]

[4] One of Huron's most substantial contributions to the cognitive science of music perception is the application of such general theories of expectation to the realm of *musical* expectation. It is generally acknowledged that listeners tend to exhibit greater preference for a piece once it becomes familiar, and Huron provides experimental and anecdotal accounts of such observations dating back to Aristotle (131). This penchant for familiar music is often attributed to the so-called "auditory exposure effect" (134ff). According to Huron, however, it is not mere repetition that makes a listening experience more pleasurable, but the fact that the brain rewards itself for its increasing ability to correctly anticipate the next notes of a piece (138). "It is accurate prediction that is rewarded—and then misattributed to the stimulus [the music]. If the view I have offered here is right, then 'exposure effect' is a poor label for this phenomenon. A more appropriate label would be the 'prediction effect'" (139). Huron provides ample support for his argument. Most tellingly, the dominant occurs more frequently than the tonic in Western music, but listeners "enjoy" the tonic more because it is more predictable. Were it really the exposure effect that makes the familiar pleasant, we would prefer the sound of the dominant to the sound of the tonic (134ff).

[5] Of course, as anyone who listens to enough popular music can attest, there are limits to the pleasure of predictability. Successfully foreseeing a very likely event (e.g., the stepwise resolution of a leading tone) gives us only modest satisfaction. Many composers therefore add enough musical surprise to save their works from being banal, but not so much as to make them sound utterly random. Peter Westergaard described this compositional balance in his *Introduction to Tonal Theory*, stating that we prefer to understand a given note, line, or combination of lines in the simplest and most consistent way possible, yet at the same time a listener's interest "will be more engaged by the set of notes he has to work harder to understand" (252).

[6] Strategies that navigate between these two extremes of predictability and unpredictability produce good—though not necessarily great—music. How to explain those sublime moments when a piece takes a turn that sounds at once both surprising and inevitable—even to a listener who has never heard the piece before? Huron offers one possible explanation, backed by dozens of studies on the exposure (prediction) effect: a conscious expectation satisfied is rewarding, but an *unconscious* expectation satisfied is even more so (132ff). How might the unconscious brain know what is to come while the conscious brain remains oblivious? Huron summarizes experimental findings on why we might later favor a certain stimulus (e.g. a tone, image, or a melody) without consciously remembering our first experience of it. Such unconscious recognition occurs when (1) the stimulus is extremely brief—on the order of milliseconds; (2) there is a delay of days or weeks between presentation of the stimulus and test of preference;[(2)] or (3) the stimulus is not perceived because the listener's conscious brain is distracted by another task. For example, listeners later exhibit preference for melodies that were presented to them subliminally (132ff).[(3)]

[7] This third finding has enormous implications for composers. If a composer can find a way to plant a musical idea in listeners' unconscious minds, he can thrill them when it returns later. Of course, his task is complicated by the fact that listeners have different perceptual abilities as a result of cultural exposure, formal training, or perhaps even genetics. For a secondary feature of a piece such as bass line, a listener may be (1) consciously aware of it, (2) unconsciously aware of it, or (3) miss it entirely. To achieve maximal listener satisfaction the composer would aim for the second outcome, but the means to achieving this goal would vary with the intended audience of a work. For example, few classically trained musicians would list Pachelbel's Canon as one of their favorite pieces. The work is more popular with the general public, who tend to focus on the melody while the cycling bass line and harmony are perceived only subconsciously. Trained musicians are consciously aware of the repetition and derive less satisfaction from predicting it.

[8] This technique of playing upon unconscious expectation is also used by film composers when creating entirely original scores (i.e. when scoring films that are not part of a series and so do not contain recognizable musical material). When a

musical theme is introduced and then repeated throughout such a film, each time that theme begins the audience becomes more and more successful at subconsciously predicting how the theme will continue. (These predictions usually remain subconscious as the audience is busy attending to other elements of the film. Indeed, moviegoers may not notice the presence of underscoring at all!) It may be that a film score's repetitiveness is enjoyable not so much due to any regular association between a given musical theme and a related plot theme or character—though such leitmotivic correspondences can be emotionally effective—so much as the subconscious exposure (prediction) effect. In fact, too strong a correspondence between musical theme and plot theme could actually *inhibit* audience enjoyment of score, as it might lead to *conscious* recognition of musical repetition ("here's that love music again!"). Huron's point is that musical repetition is most attractive when we do not know that we are experiencing it: "conscious recognition of the stimulus actually *inhibits* the exposure effect" [italics original] (133).

[9] The value of unconscious recognition has also been appreciated by composers of musicals. Perhaps one reason for the vast popularity of *Les Misérables* is that its creators, librettist Alain Boublil and composer Claude-Michel Schönberg, completely avoid two standard elements of the genre: the overture and the reprise. [4] Audiences are aware that an overture is a preview of tunes from the show, and a reprise is also instantly recognized as direct repetition. (A reprise, especially, can come across as a rather transparent ploy to get a song stuck in our heads.) In *Les Misérables*, Schönberg plants musical material in the listener's mind during one song and brings it back several numbers later in an unrecognizable context—with different lyrics, tempo, instrumentation, and sung by a different character. A few of the many examples: about 20 seconds of music sung by the Bishop near the beginning of Act I ("Valjean Forgiven") becomes Marius's three-minute solo near the end of the musical ("Empty Chairs and Empty Tables"); Valjean's "Who Am I" in Act I returns as the big choral number before intermission ("One Day More!"); and the brief Fantine/Valjean duet at the dying woman's bedside in Act I comes back as Eponine's "On My Own" in Act II. [5] It would probably take multiple hearings for the average *Les Misérables* aficionado to consciously be aware that the musical is in fact highly repetitive.

[10] Repetition (especially undetectable repetition) seems to be a relatively easy and effective way to make popular music popular. Huron describes other predictable musical events that occur even in concert music, such as a descending line continuing to descend or a melodic leap followed by a step in the opposite direction (77ff).Yet these techniques may seem overly conventional to composers in search of new musical language. Would it be possible to use the exposure (prediction) effect to make a complex post-tonal piece likable on first hearing—not just by other specialists, but by the general public?

[11] To approach the question, it is helpful to consider that there are in fact many ways in which listeners predict musical events. Huron describes four kinds of musical expectations: schematic, veridical, conscious, and dynamic, all operating in parallel (219ff).

[12] Schematic expectations are "auditory generalizations" (225). They are based on years of listening and "are absorbed with little or no conscious awareness by listeners" (72). Huron credits the work of Robert Gjerdingen in applying schema theory to musical genres (216). [6] No formal musical knowledge is needed for schematic expectations; they are "broadly enculturated patterns of events. Different schemata may exist for different styles or genres, as well as for common patterns (like major and minor) that cross stylistic boundaries" (231). One of Huron's illustrations of schema involves harmonic progressions in baroque and reggae. After performing a statistical analysis of the relative frequencies of the IV-V and V-IV progressions, he discovered that

> in the baroque context, the V-IV progression is somewhat surprising, whereas in the context of reggae, the same V-IV progression is commonplace. If the listener is to correctly anticipate the progression of acoustical events, she must somehow bracket or segregate two different sets of expectations . . . It is the ability of brains to form multiple schemas that provides the psychological foundation for distinguishing different styles and genres. Without this foundation, baroque and reggae would meld into a single general musical schema. Our experiences with baroque harmony would interfere with our ability to accurately predict harmonic progressions in reggae, and vice versa (203–4).

Huron also notes that schematic expectations are ingrained; for example, a deceptive cadence will continue to sound deceptive even when a listener knows exactly when it will occur in a given work (226).

[13] Veridical expectations [7] are work-specific; listeners predict what is to come based on previous exposure to a particular piece. Huron gives the examples of "Happy Birthday" or one's national anthem as music about which "the listener has complete knowledge of the ensuing events" (222). He also notes that veridical expectations may be tied to a specific

rendition: "For a listener familiar with a particular recording of some musical work, recordings of the work by a different performer—or even different recordings by the same performer—often disappoint. The most minuscule changes of performance nuance leap out as deviations from a personal 'norm'" (241). In other words, a listener may have general veridical expectations for "The Star Spangled Banner"—knowing its melody, harmony, and lyrics—as well as rendition-specific veridical expectations for the Jimi Hendrix version—knowing at just what point the melody will dissolve into noise.

[14] Conscious expectations derive from extra-musical sources: information provided by other listeners or personal, encyclopedic knowledge of a style. Huron illustrates:

> You might read in a concert program that the next movement is entitled "Allegro." As a result, you might reasonably expect the ensuing music to be quick and lively. The liner notes of a recording might mention the sudden silence that follows after a massive crescendo . . . Experienced jazz enthusiasts will know that a bass solo is likely to be followed by a drum solo. Similarly, an experienced classical music listener is likely to expect the second movement in a multi-movement work to have a slow tempo (235–236).

[15] Dynamic expectations are created by the work itself: as we listen, we come to understand (consciously or subconsciously) the patterns of a piece. Huron states that typical ways to create dynamic expectations include "thematic, motivic, and figurative repetition, ostinatos, and sequences. But the most straightforward technique is to repeat large segments of musical materials several times within the work" (254).

[16] When cutting-edge composers eschew writing "predictable" music, they are actually avoiding only one kind of predictability: schematic.[8] It is often said that such music demands repeated hearings—the need for veridical expectations—or even that the music is in a "new language"—the need for new schematic expectations. In this sense, even avant-garde composers (e.g. Boulez, Babbitt, Carter) sense the need for predictability.

[12] In a way, the longstanding debate on how to get mainstream audiences to accept modern concert music is a debate on how to make the music predictable, in the manifold sense that Huron clarifies for us. Composers like Schoenberg argued that with enough exposure (especially in childhood), listeners would internalize new systems such as the dodecaphonic system—in other words, this was an argument for the nurturing of new schematic expectations. Another idea is that if a new work gets enough performances and radio airtime, the public will grow to like it—in other words, these proponents want to strengthen veridical expectations. Finally, there are those who believe that audiences will appreciate new music once they are properly educated (e.g. through pre-concert talks)—in other words, this group pushes for greater conscious expectations.

[13] These three methods are all ways of promoting a new work or its "musical language" (schema) once it has been created. Therefore, they are all somewhat out of the purview of the composer. For example, in the case of veridical familiarity, "apart from bribing DJs to play your music, or performing opportunistic encores, there is a little a musician can do to influence a listener's physical exposure to a work" (242). The fourth method of giving listeners a sense of where a piece is headed—the creation of dynamic expectations—is work-specific. If composers are to write using challenging musical language (outside of familiar schemata), this is arguably the best way to proceed. Huron writes:

> Since uniqueness *must* involve some departure from schematic norms, the only way to ensure that "markers" sound "in-place" is to place them in the context of dynamic expectations. This means that some sort of repetition is needed. Instead of creating an identity for a work by introducing distinctive one-time events, a better approach is to repeat the markers frequently. That is, "markers" ideally should consist of distinctive musical patterns that are repeated frequently . . . [which] should be introduced soon after the piece begins . . . In the language of Western music, examples of such patterns include *themes* and *motives* (265).

This bears out the teachings of almost any classically trained composition instructor: state the "issue" of the piece at its outset; create for each piece its own "soundworld"; write each composition according to its own "rules." The idea is that a piece will sound unified as long as it explores a limited set of musical ideas (however broadly that set is defined). This is the hallowed Craft of Composition, and it is based essentially on creating dynamic expectation in the listener. Huron offers Harry Partch as an example of a composer who wrote "strikingly novel music"—in a 43-note scale and using novel instruments—yet whose works are accessible and pleasant to most listeners because of their use of dynamic expectation (236).

[14] The effectiveness of dynamic expectation in getting audiences to open up to new music should strike the contemporary composer as good news: if a piece develops according to its own particular laws and structure, listeners should be able to

follow. And yet what of those highly organized pieces that sound random on first hearing (or even on later hearings)—pieces whose organization is can be intellectually understood from the score but not necessarily heard? Huron argues that the brain grasps some structures more readily than others, regardless of how much musical training a person receives. He writes of several studies indicating that listeners (including, in one study, professional theorists) have difficulty discriminating different pitch-set relationships, stating that these studies "imply that certain forms [kinds] of pitch-related representations may be difficult or impossible to form in the adult human auditory system, in the same way that it is difficult or impossible for most adults to acquire AP" (121–2). Note that Huron is *not* demeaning the work of theorists who study such pitch-set relationships:

> A representation does not have to have a perceptual basis is order for it to be useful. For example, a useful representation may pertain solely to the means of musical composition. As I have argued elsewhere, there are plenty of structures in music that have nothing to do with human perception, and that does not make these structures somehow vacuous, wrong-headed, or unworthy of investigation (121).

[15] Must composers therefore abandon composition with hexachordally combinatorial pitch class sets and similar constructs as compositional devices if they wish audiences to be able to follow their music on first hearing? Not necessarily. Composers could use any pitch system (or even random pitches) and still create dynamic expectations using more readily-discernable patterns for other parameters of the piece. The most obvious strategy is to use basic rhythmic schemata, creating predictability with pulse, accent pattern or note values. Huron mentions that Partch's forays into new scales and instruments did not leave his music less accessible because "the meters and rhythmic patterns are recognizably Western, and many fast-paced passages are very predictable rhythmically . . . Partch's music follows conventional Western practice in its motivic organization" (268). Other composers whose works exemplify the strategy of using rhythm as an anchor for more unpredictable harmonies might include Hindemith, Musgrave, and Moravec. Huron also suggests "texture, treatment or timbre" as ways to lead listeners through a piece, though he admits that "in most cultures, the number of distinct instrumental combinations is quite small" compared to the vast possibilities of pitch and rhythm (266). In the 21st century, the limitations on timbral possibility have been all but obliterated thanks to advances in computer technology. Perhaps within the schema of timbre composers will have a great deal more possibilities to explore, writing electroacoustic works (with or without traditional instruments) that go beyond the realm of traditional Western music, yet are still accessible to listeners through consciously or subconsciously discernable patterns of timbre.

[16] One other message that composers may extrapolate from Huron's theories of musical expectation is the caveat that repeatedly playing a passage may make a composer a poor judge of how it really sounds. If a composer plays a section of music enough times (be it a series of tones, chords, phrases, etc.), it will sound pleasing to him because he has developed veridical expectations that are rewarded—and reinforced—each time he plays that section of music. The problem is that the composer may thereby falsely assume that he has created *dynamic* expectations—that these measures indeed naturally and logically follow one another and "belong" in such an order. The danger of such a misunderstanding provides further support for the importance of teachers and trusted colleagues in evaluating one's work.

[17] *Sweet Anticipation* is not only a substantial contribution to the field of music cognition but a goldmine of information for composers. Once composer-readers have understood the concepts of conscious and unconscious expectation (which are presented clearly and in great detail for those who have studied only basic psychology), they will find Huron's exploration of the phenomenon of listener expectation extremely instructive, learning how composers create such reactions as tension, humor, surprise, fear, and awe. If nothing else, composers should learn how to create listener expectations the better to choose if and when to thwart them.

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Discography

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Footnotes

1. Huron includes this "Prediction Response" as part of his general theory of expectation, abbreviated ITPRA: Responses of Imagination, Tension, Prediction, Reaction, and Appraisal (3ff).
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2. A longtime family friend of the reviewer has used this technique "thousands of times" on her young piano pupils. She plays them a new (classical) piece without revealing its title and asks if they are interested in learning it; if they aren't, she waits three weeks and presents it again as a "new piece," whereupon the student is very likely to want to pursue it.
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3. Huron describes an experimental method used by William Wilson, who "employed a so-called *dichotic* listening task where the left and right ears heard different sounds. Tone sequences were presented to one ear and spoken language was simultaneously presented to the other ear. Participants received a transcript of a spoken story, which they read aloud in unison with the recorded speaker. However, the text and speaker often diverged, and participants were required to identify all of the errors in the printed text as the task continued. . . This task proved to be very effective in forcing participants to ignore the melodies heard in the other ear. When later asked to identify which melodies they had heard during the exposure phase, participants performed at a chance level. Despite the distractor task, Wilson's listeners exhibited a clear preference for those melodies they had heard during the exposure phrase" (134).
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4. The one partial exception to this is "Do You Hear the People Sing?" from Act I, which returns (albeit with somewhat different lyrics) at the last part of the Finale. However, the second appearance begins much differently from the first—here it is without introduction, a cappella, and pianissimo—so it is quite likely a few seconds before the audience *consciously* recognizes the music.
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5. The "On My Own" music also comes back as Valjean dies (near the end of Act II). Other examples of hidden repetition in the musical: "Work Song" (Prisoners) comes back eight numbers later to underscore "Confrontation" (Javert/Valjean); "What Have I Done?" (Valjean, Act I) is transformed with some contrasting musical sections and becomes "Javert's Suicide" in Act II; "Lovely Ladies" (Sailors/Whores, Act I) returns as "Turning" (Townswomen) in Act II; and the chord progression to Javert's three-minute "Stars" (Act I) is nearly the same as the one underlying the five-minute "In My Life" (Cosette/Valjean/Marius/Eponine, Act II).
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6. Huron notes that Gjerdingen, in turn, built on Leonard Meyer's concept of normative archetypes (216).
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7. Huron acknowledges psychologist Jamshed Bharucha as the first to apply the term *veridical* to musical expectations (224).
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8. One could also argue that the dearth of repeat signs in the work of many such composers also eschews a particular kind of dynamic expectation.
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