

# Analytic, Descriptive and Prescriptive Components of Evolving Jazz: A New Model Based on the Works of Brad Mehldau

Mark E. Baynes

Music Department., Music and Audio Institute of New Zealand (MAINZ), New Zealand  
markb@tpp.ac.nz

## ABSTRACT

Jazz has steadily evolved from its inception in the late 19th century to the present. As is the case for other genres, musicological analytic research on jazz evolution has lagged behind its practice; consequently, there is a paucity of in-depth descriptive and analytic research on the music of recent innovators. Among the most recent examples of this evolution, the works of Brad Mehldau as a solo/ensemble pianist and as a composer arguably embody some of the most compelling innovations in the field. Non-academically oriented jazz writers and fans have consistently assigned these works vanguard status, but Mehldau's output has not yet been sufficiently examined to prescribe performance methods. This paper contains (1) a descriptive analysis of improvisation contained within Mehldau's music, and definition of a new analytical lexicon derived from a holistic study of consonance, dissonance and (2) research into perceived motivation in music by cognitivists such as David Huron and Leonard Meyer.

## I. INTRODUCTION

This paper contains a detailed analysis of improvisation contained within the music of jazz pianist Brad Mehldau. It defines and exemplifies a new approach to jazz analysis derived from holistic study of consonance and dissonance (Parncutt & Hair, 2011), and research into perceived motivation in music by cognitivists such as Huron (2006) and Meyer (1956).

Bradford Alexander Mehldau (born August 23, 1970) is an American jazz pianist and composer. Though Mehldau's early training was primarily classical, his interest in jazz began early on; he played in his high school jazz band and won the Berklee College 'Best All-Around Musician Award' in his first year.

Mehldau started jazz study in 1998 at New York's New School for Social Research under Fred Hersch, Junior Mance, Kenny Werner, and Jimmy Cobb. Cobb soon hired him to play in his band, Cobb's Mob. Mehldau joined Joshua Redman's quartet during the mid-nineties recording albums such as *Timeless Tales for Changing Times* (Joshua Redman, 1998) and *Captured Live* (Joshua Redman, 1994); the musical bond formed between Mehldau and Redman is still strong today.

Mehldau formed a piano trio in 1994, recording his first album, *Introducing Brad Mehldau* (Warner Bros.) in 1995. Mehldau has regularly recorded and toured with his trio ever since.

## II. ANALYSIS

In *Issues in the Analysis of Improvisation: A Structuralist Approach to the Work of Brad Mehldau* (2005), Wood reminds us that normative methods of jazz analysis are inadequate in their ability to provide information regarding motif, rhythm, and thematic development. Wood cites Mark Levine's popular book *The Jazz Theory Book* (Levine, 1995) as an example of

educational material containing analytical biases towards harmony and chord-scale relationships. Wood highlights devices such as motif, melodic fragments, repetition, range and rhythm in Mehldau's improvisations via transcription, and by doing so outlines the need for analysis that incorporates the entire gamut of improvisational devices that Mehldau has in his employ.

In *Motivic Strategies in Improvisations by Keith Jarrett and Brad Mehldau*, Page (2009) examines Ekkehard Jost's concept of Motivic Chain Association (MCA), a broad concept that encompasses audible motivic relatedness between elements of a melodic line. *Reconstructing Tonal Principles in the Music of Brad Mehldau* (Arthurs, 2011) examines several performances using Schenkerian analytical methods. Arthurs argues that some of Mehldau's music requires classical analysis, which distinguishes his music from mainstream jazz.

Wood, Page and Arthurs all recognise the need to analyse Mehldau's music using tools borrowed from other disciplines. However, Mehldau also adheres to some harmonic and melodic concepts that are commonplace in mainstream jazz (Baynes, 2012, p. 80). A multidisciplinary analytical approach is seminal for a thorough understanding of Mehldau's music.

Due to a lack of an existing multidisciplinary analytical framework merging analytical tools found within both jazz and classical traditions, a new model has been devised which incorporates elements of consonance and dissonance (hereafter referred to as C/D) as defined in *Consonance and Dissonance in Music Theory and Psychology: Disentangling Dissonant Dichotomies* (Parncutt & Hair, 2011). It also draws from discourse on rhythmic C/D in *Expressive Asynchrony and Meter: A Study of Dispersal, Downbeat Space, and Metric Drift* (Yorgason, 2009), and *Metric Dissonance and Hypermeter in the Chamber Music of Gabriel Fauré* (Vonfoerster, 2012).

## III. MODEL OF CONSONANCE AND DISSONANCE

'There is surely nothing in the language of discourse about music that is more burdened with purely semantic problems than are the terms consonance and dissonance' (Tenny, 1988, p. 1). From a historical standpoint, three scholarly disciplines have been responsible for most of the theories of C/D to date (musicology, science and psychology), and treatments of C/D can be traced back to the Pythagorean era. Musicologists, scientists and psychologists have described C/D using terminology suitable to their field, and consequently it is often difficult to ascertain standard definitions. The main theories can be broadly separated into two camps: natural and cultural. Natural theories on C/D include acoustic and psychophysical sonorities based on Pythagorean law, the harmonic series, and localised vertical sonorities between two or more pitches.

Natural dissonances are also described as sensory dissonances in *Sweet Anticipation: Music and the Psychology of Expectation* (Huron, 2006, p. 311). Cultural theories of C/D are based on learnt cultural experiences and cognitive processes including temporal relationships on a horizontal level (Parncutt & Hair, 2011, p. 119). Cultural dissonances are defined by Huron (2006) as tension dissonances, and relate to perception of tension and resolution from study of recordings and scores from a horizontal or temporal perspective. In accordance with definitions by Parncutt and Hair, cultural and tension dissonances will be described as horizontal, and sensory and natural dissonances will be described as vertical.

With the plethora of terms associated with C/D (such as tension and relaxation, stable and unstable, nature and culture, sensory and cultural, bottom-up and top-down, implied and realised, rough and smooth), it is easy to understand the semantic problems that Tenny (1988) refers to above. In a traditional sense dissonance is related to an individual sonority containing two or more pitches; however, the terms consonance and dissonance can be used to describe a bigger picture, a larger perspective including everything from small units, to phrases, entire pieces, and even styles relating to the musical tendencies of an individual performer or group. It seems to be tacitly understood by many that the underlying principle of tonal music is derived from harmonic motion, in particular the tonic-dominant-tonic relationship. By considering tonic to be consonance and dominant to be dissonance it is possible to view most tonal music as following a consonance-dissonance-consonance schematic norm; this is the foundational premise on which it is possible to build an analytical model.

If C/D relationships are commonly associated with harmonic (and via inference melodic) events as suggested by most Western music theorists (e.g. Kamien, 2011), then to be thorough, a full investigation of other fundamental aspects of music (e.g. rhythm, form and style) should be observed through a C/D lens also. For this purpose, we borrow rhythmical definitions of C/D as demonstrated by Vonfoerster (2012) and Yorgason (2009). Parncutt and Hair (2011) remind us that more figurative definitions of C/D require further study. This study not only considers aspects of C/D pertaining to harmony, melody and rhythm, but also includes other C/D events such as form and culture.

For this reason, I have divided discussion on C/D into (1) individual sonorities (sensory or natural C/D), (2) harmony, (3) melody, (4) rhythm, (5) form, and (6) culture. In accordance with my proposed analytical model, a holistic C/D framework has been adapted from Parncutt and Hair (2011), which broadly alludes to a vertical/horizontal/rhythmic/organic/cultural model, allowing for discussion of complex C/D relationships.

Enquiry into Brad Mehldau's music has prompted 'why' questions, the answers of which have helped devise heuristic improvisational tools, drawing on insights from the relatively new field of cognition, in particular the work of David Huron (2006).

## IV. MUSIC AND THE PSYCHOLOGY OF EXPECTATION

Understanding Mehldau's manipulation of C/D has required (1) an understanding of cognitive processes derived from enculturation to Western tonal musical principles, (2) biological impulses inherent to human nature, and (3) how these relate to musical perception on both small and large scales. Huron (2006) divides cognitive processes relevant to this study into prediction response/effect, reaction response, appraisal response, and contrastive valence/limbic contrast. Huron's theory governing expectation is called ITPRA.

### A. ITPRA

ITPRA is a theory of expectation developed in David Huron's 2006 book *Sweet Anticipation: Music and the Psychology of Expectation*. ITPRA is grouped into pre-outcome and post-outcome phases based on psychological responses to expectation arguably governed by complex biological systems. ITPRA is an acronym for Imagination, Tension, Prediction, Reaction and Appraisal, where IT (imagination and tension) are pre-epoch events and PRA (prediction, reaction, and appraisal) are post-epoch. Focusing on post epoch events, PRA theory can be used to describe many events but is particularly suited to the performing arts where expectation helps to shape emotional experiences (p. 356).

### B. Prediction Response/Effect

Huron (2006) argues that by creating highly predictable music a performer can evoke a positive emotional state or valence. Repetition of an event results in high predictability; this predictability is rewarded by our biological system and we feel a positive valence. Interestingly, Huron incorporates the psychological tendency of misattribution to the prediction response creating the prediction effect, stating that the limbic reward from successful predictability is misattributed to the music itself; in other words, Huron argues that recognition of repetition in music makes us feel like the event itself is providing positive or negative valence (p. 141). Predictive qualities of improvisational music are therefore of paramount importance in aiding emotional responses in music.

### C. Reaction Response and Appraisal Response

Huron (2006) writes that 'when a stimulus appears, a "quick and dirty" response is evoked. This reaction response is defensive in function. At the same time, a slower process of cognitive evaluation is initiated that takes into account complex social and situational factors. This appraisal response is able to inhibit or facilitate the initial reaction response, or evoke a wholly different response... The distinction between fast and slow response reflects the neurological embodiment of two usually contradictory goals: (1) the needs to respond as quickly as possible to dangerous circumstances, and (2) the need to judge as accurately as possible the value of some event or situation' (p. 358). Knowledge of the reaction response can be seen as the primary motivator in creating musical surprise, a musical event that violates expectation on an organic or cultural level. In addition, Huron reminds us that 'for a fast reaction response to remain effective in dealing with danger, it must be protected from habituation or unlearning. Reaction responses must be evoked reliably, even when there is an overwhelming history of false alarms' (p. 359).

Even after repeated listening, a work can still provoke surprise in the listener. Huron (2006) reminds us that on a biological level, surprise in itself is never initially a good thing: 'the rapid response to surprise assumes the worst... our physiological reflexes reveal that biology is deeply suspicious and pessimistic: bodies don't like surprises' (p. 21). In contrast, the appraisal response is slower and is aimed at gauging accurate assessments of the event. In music, surprise can be a way to evoke arousal and attention towards a particular musical event (from a hard-wired biological reflex). Huron states that surprise acts as an emotional amplifier (p. 39), as the initial reaction response providing musical focus from which the appraisal response can derive valence.

#### **D. Contrastive Valence/Limbic Contrast**

'I have noted that there are different expressions of surprise and that these expressions echo the primordial behaviours of fight, flight and freeze. Musical surprises are capable of initiating these responses, but the responses themselves are short-lived because an ensuing appraisal ultimately judges the stimuli as nonthreatening... Instead, the listener is left with a corresponding response of frisson, laughter, or awe... the pleasure associated with these responses arises from limbic contrast – a phenomenon I've called contrastive valence. Pleasure is increased when a positive response follows a negative response. While surprise is biologically bad, surprise nevertheless plays a pivotal role in human emotional experience' (Huron, 2006, p. 39).

#### **E. PRA**

Huron (2006) states that 'not all repetitions lead to the prediction effect, and not all violations of expectation lead to contrastive valence. Repetition can lead to (unconscious) habituation and to (conscious) boredom. Violations of expectation can lead to irritation and annoyance' (p. 365). Huron's enquiry into music and cognition serves to inform creative practice. As with any musical tool, overuse can lead to saturation.

These caveats notwithstanding and all things being equal, one can conclude that complex levels of valence (often contrastive) make up most musical experiences; so combining elements that create valence through predictability AND contrastive valence through reaction and appraisal is generally considered a good thing.

### **V. CATEGORIES OF CONSONANCE AND DISSONANCE**

C/D relationships are divided into five categories: vertical, horizontal, rhythmic, organic and cultural. These categories of C/D are ordered in terms of perceived size, starting with literal and small-scale (vertical) and becoming more figurative and large-scale (cultural).

#### **A. Vertical C/D**

Vertical C/D describes sonorities consisting of at least two pitches containing identical (or near identical) onsets (starting at the same time). Categorisation of vertical C/D includes single notes (against a harmonic backdrop), dyads, triads and diagonal C/D (i.e. arpeggios) where the primary function is harmonic.

Single notes, dyads, and chords that are considered dissonant to the underlying harmonic structure (often falling on structural locations e.g. downbeats) are found regularly in Mehldau's improvisation. Notes that can be considered dissonant are notes that contradict the harmonic function of the chord. Dissonant dyads are notes that form an interval of a minor or major second, minor or major seventh, or minor or major ninth. Dissonant dyads contain vertical sensory dissonance (roughness) when isolated (Helmholtz, 1863), and for the most part also contain single notes described as dissonant in relation to the harmonic structure at onset.

#### **B. Horizontal C/D**

As defined by Parncutt and Hair (2011, p. 150), any C/D can be considered horizontal if sounded on a temporal level. Therefore, horizontal C/D can apply to phrases, chord progressions, rhythm, form, and style. In fact, any form of C/D that is not vertical can be considered horizontal. For analytical discourse, this paper separates elements of horizontal C/D relating to rhythm, organicism and culture from other horizontal dissonances, and limits the definition of horizontal C/D primarily to tonal movement. The advantages of this are practical; it is then possible to discuss rhythmical C/D separately from tonal C/D. A passage can then be described in more complex terms; for example, a phrase may contain a high level of rhythmic dissonance such as metric asynchronicity or have a disjunct metric feel, but be horizontally consonant (diatonic). It allows extremely dissonant sections of music to be labelled as containing vertical, horizontal, rhythmic, and organic dissonances, making comparisons more formally structured.

Horizontal C/D is categorised into consonant melodicism, dissonant melodicism, motif, call and response, chromaticism, linear tonality, and perceptual dissonance.

1) *Consonant Melodicism*. Copland (2009) writes of the difficulties associated with describing melodic material: 'We cannot even say, with any degree of surety, what constitutes a good melody. Still, most people think they know a beautiful melody when they hear one. Therefore, they must be applying certain criteria, even though these might be unconscious. Though we may not be able to define what a good melody is in advance, we certainly can make some generalisations about melodies that we already know to be good, and that may help to make clearer characteristics of good melodic writing' (p. 41). Many jazz texts such as Burton (2012), Galper (2005) and Ligon (2001) describe melodic improvisation as being important without detailing specifics about how 'good' melody is formed. Discussion of melodic material is usually related to motif and motivic development (e.g. augmentation, inversion, retrograde inversion) without addressing psychological affect. In *Melodic Improvising*, Middleton (2005) argues that 'Any improviser, beginner or advanced, can increase the interest level and emotional impact of his or her solo by focusing on its melodic development rather than on merely trying to express the complexities of the harmonic progression' (p. 8).

Liebman (2005) describes consonant melodies as containing a smooth contour usually consisting of conjunct intervals. 'A melody should have a clear shape or contour with a defined beginning and ending. A truly satisfying melody should be able to stand alone without any harmonic or rhythmic

accompaniment and still portray expressive content. Some melodies are very song-like, easily absorbed by the listener, mostly consonant, and can be considered lyrical. Others may be more abstract and not as singable' (p. 46). In *Fundamentals of Musical Composition* (1967), Schoenberg defines singable melodies as 'containing relatively long notes; smooth linkage of the registers; movement in waves, more stepwise than by leaps; avoidance of augmented and diminished intervals; adherence to the tonality and its most closely related regions; employment of the natural intervals of a key; gradual modulation; and a cautious use of dissonance' (p. 98).

Borrowing from *Modal Jazz, Composition and Harmony, Volume 2* (Miller, 2002), examples of characteristics found in romantic melodies include the use of leaps of a major or minor sixth, other intervallic skips for drama, use of flat sixths at cadences, lyrical intervallic quality, enhancement of cadential resolution via non harmonic notes, melodic chromaticism, balanced three-part motivic statements, and cadential suspension (p. 30).

Consonant melodicism is defined as melodic improvisation pertaining to the combination of definitions from Liebman (2005), Schoenberg (1967) and Miller (2002): singable, self-supporting, wave-like (contour sensitive), largely diatonic melodic writing with a romantic bent. It is to be noted that any non-dissonant diatonic melody will be considered consonant, but borrowing from Robert Hatten's (1994, p. 36) definition of markedness, particular attention will be focused on melodic improvisation that pertains to a model as defined by Liebman, Schoenberg and Miller.

2) *Dissonant Melodicism*. Dissonant melodicism is easier to define. Both Liebman and Middleton describe melodic dissonance as containing larger intervals (either diatonic or chromatic). Angular melodic lines are disjunct, and don't follow established musical contours such as post-skip reversal (gap fill). Meyer (1956) states that 'if weak shapes have resulted largely from exaggerated segregation of stimuli (e.g., extreme distance between pitches, excessive temporal disjunction, or both), then the mind will prefer to regard the stimulus series as being incomplete... further developments will be expected to complete what was incomplete' (p. 162).

3) *Motif and Call and Response*. Huron (2006) states that 'repetition in music causes the repeated musical patterns to make the transition from short-term to intermediate-term memory. Musical repetition acts like an involuntary form of conscious memorization. It is perhaps no surprise that a musical motive is both (1) the shortest distinct unit of repetition in a work, and (2) the most memorable feature or characteristic of a work' (p. 229). As stated earlier, for Huron 'commonly experienced sounds or sound patterns are more likely to evoke a positively valenced affect' (p. 366). A motif is a repeated sound pattern. Huron (2006) reminds us 'repetition can occur at many temporal levels, from long-term repetition of entire sections of music to brief motivic repetition' (p. 262). Call and response can also be considered a consonant due to the positive valence created via repetition.

4) *Chromaticism*. Huron (2006) states, 'Chromatic notes are highly unstable, they evoke strong expectations... when a chromatic note is resolved, there is a sense of pleasure evoked even when the resolving pitch is also somewhat unstable' (p.

165). Chromaticism can be defined as a horizontal dissonance, as it is melodically and harmonically destabilising.

5) *Linear Tonality*. According to Ludmilla (1994), 'linear tonality... refers to a pull of a key centre as a result of melodic movement, not necessarily dependant on harmonic conglomerates' (quoted in Liebman, p. 172). Categorical placement of linear tonality is in the horizontal section of C/D; improvisation pertaining to harmonic superimposition can be found in the organic C/D section. Although these elements are similar, linear tonality is considered a horizontal dissonance and has a smaller impact, whereas harmonic dissonance acts in direct violation of the harmonic strophe, and is therefore considered an organic dissonance.

6) *Perceptual Dissonance*. The term 'perceptual dissonance' was coined by Parncutt and Hair (2011, p. 150) to describe 'the independent motion of voices in a Bach fugue – called auditory stream segregation in auditory psychology and regarded as the (near-)opposite of perceptual fusion'. Examples of perceptual dissonances include (but are not limited to): two (or more) concurrent melodic lines as found in contrary and polyphonic motion, and melodic passages where the contour approaches an extreme of tessitura (horizontal sonorities that challenge the referential norm either on a local or a global level).

Rhythmic, organic and cultural C/D are also horizontal, as they occur across a spatiotemporal plane. However, for ease of categorisation and analytical discourse, this paper separates elements of horizontal C/D relating to rhythm, organicism and culture from other horizontal dissonances, and limits the definition of horizontal C/D primarily to tonal movement. The advantages of this are practical; it is then possible to discuss rhythmical C/D separately from tonal C/D. A passage can then be described in more complex terms; for example, a phrase may contain a high level of rhythmic dissonance such as metric asynchronicity or other disjunct rhythmic feel, but be horizontally consonant (diatonic and/or conjunct). It allows extremely dissonant sections of music to be labelled as containing a combination of vertical, horizontal, rhythmic, and organic dissonances, making comparisons clearer.

### C. Rhythmic C/D

Yorgason (2009) defines metric dissonance as a 'noncongruence between a listener's internal meter and the metric patterns present in a work's sounding surface'. This 'may involve the emergence of a potential secondary meter, but should also include the subtler effects of expressive asynchrony (such as asynchronous metric streams) which slightly ruffle the metric surface without suggesting a secondary meter' (p. 403).

The terms 'meter' and 'rhythm' are often used to mean very similar things. Meter is related to the anticipation of re-occurring rhythmic events, and a sense of meter is used to predict future rhythmic events. Rhythm is used to describe any regular re-occurring motion regardless of whether the re-occurrence aligns with a sense of metric predictability.

The auditory disruption that rhythmic dissonance creates has been categorised into five types: diminishing dispersal, metric asynchronicity/disjunct rhythm, metric shift, temporal density, and expressive variation. All other rhythmic events are considered consonant. Syncopation is considered a consonant

because it is schematically expected in jazz and jazz-derived music. It may on occasion be necessary to deem extreme examples of syncopation as containing metric dissonance, however normative use of syncopation is generally expected and therefore does not create any metric dissonance when compared to the rhythmical mean.

1) *Diminishing Dispersal*. Yorgason (2009) describes diminishing dispersal as ‘a temporal process in which successive rhythmic events become more synchronous and constricted; the gradual narrowing of dispersal’ (p. 88). In all cases, the fundamental premise of diminishing dispersal utilises a ‘dissonance-to-consonance’ paradigm; as inter-onset intervals decrease, a positive valence is established as the phrase gradually synchronises with the tactus.

2) *Metric Asynchronicity*. Yorgason (2009) defines metric asynchronicity as ‘the absence or lack of concurrence in time’ (p. 396). Mehldau uses metric asynchronicity either to create a disjunct rhythm which is often a precisely dissonant rhythmical stream or by playing with an ‘absence’ of rhythm.

3) *Metric Shift*. As described by Yorgason (2009), metric shift is ‘a deliberate decision to reinterpret the location of the beat, based on changes in accentual patterns, harmonic rhythm, or other factors; the recasting of a weak beat as a strong one or the experiencing of a change in meter type (p. 404). Metric shift, is any acoustically salient polyrhythmic activity, and is considered dissonant to the referential norm.

4) *Temporal Density*. ‘Change in the temporal density of sound events involves change in the quantity of acoustic energy per unit of time, and thus may be perceived as intensity change’ (Eitan & Granot, 2007, p. 45). Krumhansl (1996, p. 414), Farbood (2012, p. 401) and Lehne et al. (2012, p. 3) all associate decreases in temporal density with decreasing tension. Berry (1976) posits that rhythmic density (among other elements such as harmony, melody, etc.) can be perceived as being dissonant if there is expectation for resolution to a simpler state.

5) *Expressive Variation*. In *Hearing in Time: Psychological Aspects of Musical Meter* (London, 2004), expressive variation is defined as ‘subtle nuances involving compressions and extensions of otherwise deadpan rhythms, what musicians might call pushing and pulling the time’ (p. 27). Rhythmic dissonance via expressive variation is directly related to the tactus and its absolute subdivisions, where dissonance is perceived to increase as inter-onset intervals stray from it. Yorgason (2009) notes that expressive variation is related to ‘structural delay of beat arrivals’ (p. 128), and can be understood to be a juxtaposition of two separate metric streams; the first being the underlying tactus and the second being the expressive variation. To exemplify express variation, common jazz terms such as ‘laid back’ or ‘pushed forward’ are used.

#### D. Organic C/D

Parncutt and Hair (2011) state, ‘A musical event only sounds familiar if it is similar to previously heard events, which are also similar to each other. By analogy with our comments on other dichotomies, we might anticipate a connection between similarity and consonance, and between difference and dissonance’ (p. 138). The aim of organicism is to create ‘works in which everything is an outgrowth of a basic idea’ (p. 138).

For Parncutt and Hair (2011), ‘Organicism gives a musical work unity... which – in the broadest sense – could be considered an aspect of consonance. From a psychological viewpoint, organicism can only be perceived if recent musical events are perceived to be similar to earlier musical events that have been stored in memory’ (p. 138). Organic C/D can be defined as C/D relating to aspects of melodic, harmonic and rhythmic consistencies/discrepancies when comparing improvisation to the composition from which it is derived. Therefore, an organic consonance occurs when references to the melody, for example, are made during an improvisation, and organic dissonances occur when violations of parameters like harmony and hypermeter occur, such as a non-congruent phrase rhythm or harmonic deviation.

Organic C/D can be categorised into three types: melodic quotes, hypermetric dissonance, and harmonic destabilisation.

1) *Melodic Quotes*. In jazz performances, references to the melody during improvisation are fairly commonplace, depending on the musician. Berliner states (1994), ‘References to the melody provide a useful connective tissue between a solo and its respective vehicle, reaffirming the identity of the latter and imbuing the former with special characteristics’ (p. 172). A melodic quote can be considered an organic consonance.

2) *Hypermetric Dissonance*. In *On Phrase Rhythm in Jazz*, Love (2011) explains ‘every solo necessarily involves the superimposition of a grouping structure on a metrical structure... grouping structure can support or contradict meter, creating a state of phrase rhythm consonance or dissonance’ (p. 9). Hypermeter is defined by Yorgason (2009) as ‘a metrical pattern that occurs at levels higher than that of the notated bar line meter’ (p. 401). Unless otherwise specified the term hypermeter will be used to describe the inherent sectional tendencies found in jazz standards and compositions; e.g. a 32-bar AABA jazz composition will arguably contain four hypermetric sections of eight bars each. Hypermetric dissonance occurs when elements of improvisational phrasing violate the strophe.

3) *Harmonic Destabilisation*. ‘The chord progressions, harmonic rhythm, and formal structures of the popular songs used in tonal jazz are not only simple, predictable, and periodic, but also constantly repeated with little harmonic development in choruses... harmonic interest, in “magical” performances, is directed to sonorities, improvisational strategies of chordal substitution and interpolation, and the ebb and flow of intensity (McGowan, 2005). Harmonic destabilisation occurs when elements of superimposed harmony violate the strophe.

#### E. Cultural C/D

Parncutt and Hair (2011) note that ‘from a psychological perspective, cultural context is essentially a matter of familiarity (p. 146). Terms such as conditioned (Cazden) and familiarity (Parncutt and Hair) assist in defining cultural C/D for this study, but it is important to emphasise that cultural C/D here refers to normative idiomatic jazz practices and is not related to ethnological studies on culture. Perhaps the clearest way to define cultural C/D is ‘acoustically stylistic familiarity’ pertaining to 1940s bop and 1950s post-bop jazz. It is not within the scope of this paper to debate what defines jazz style (nor the substyles found within it) per se; it is tacitly assumed

that the reader is somewhat familiar with such devices including (but not limited to) bebop vocabulary, harmonic upper-structure, modes derived from blues, melodic minor, harmonic minor, pentatonic, hexatonic, and octatonic sonorities. Cultural dissonance, as the inverse of cultural consonance, can be defined as any marked sonority (Hatten, 1994) that isn't associated with the jazz tradition.

Over time, certain devices that were once culturally dissonant, through repetition would naturally become culturally consonant, if adopted by the 'mainstream' improvising collective. An example of this is the use of odd time signatures. Before the groundbreaking album *Time Out* (Brubeck, 1959) this was an anomaly but it is now commonly adopted by arrangers and composers.

## VI. HOLISTIC MUSICAL EXAMPLES

We have examined individual sonorities and assessed these using terms relating to consonance and dissonance. These categories form the foundations of the analytical model to examine perceived motivation in Mehldau's performances. It is important to demonstrate how Mehldau fuses elements of C/D together to create a holistic musical performance. Parncutt and Hair (2011) note that 'in many traditions of compositional practice, C/D refers not only to a single sonority or interval, but also to a whole passage or piece. Consonance tends to prevail over dissonance, which provides a foil to consonance and is catalytic in creating a (metaphorical) sense of motion' (p. 126).

Huron (2006) defines this metaphorical sense of motion as 'contrastive valence', as 'a conjecture that the hedonic value of an experience is amplified when preceded by a contrasting hedonic state' (p. 412). Huron argues that pleasure can be experienced from music containing contrast: 'I have suggested that the pleasure associated with these responses arises from limbic contrast – a phenomenon I've called contrastive valence. Pleasure is increased when a positive response follows a negative response. While surprise is biologically bad, surprise nevertheless plays a pivotal role in human emotional experience. Surprise acts as an emotional amplifier' (p. 39).

By analysing Mehldau's improvisation it is possible to observe dissonances that, when combined, align with Huron's (2006) model of contrastive valence. Mehldau creates (1) phrases, and (2) musical climaxes, by combining different types of consonance and dissonance.

### A. 'Tres Palabras' – 2m17s

At 2m17s of 'Tres Palabras' (Anything Goes, 2004), Mehldau plays a line over a V-I in D minor. He combines the use of several dissonances over the A7, which are resolved at the onset of a D minor chord (bar 2). Mehldau employs two successive vertical dissonances: an unprepared b9 (Bb) accompanied by a dissonant dyad (F and G), then a major seventh (G#), followed by a chromatic passage (horizontal dissonance). He utilises diminishing dispersal (rhythmic dissonance) and perceptual dissonance as the line descends to well within tessitura range. At the onset of resolution (Dm7), perceptual, rhythmic, and vertical (diagonal) consonances provide positive valence (see Figure 1).

In addition, cultural dissonance is also achieved through the use of a major seventh played on a downbeat of a dominant

chord, A7. In bar 1 of Figure 54, Mehldau plays a G# at beat 3, a structural beat. This is considered both a vertical sensory dissonance and a cultural one as it does not follow chord/scale norms. In this case contrastive valence is used as an emotional amplifier, where dissonances draw our attention to the consonances.

Figure 1: 'Tres Palabras' – 2m17s

### B. 'Sky Turning Grey (For Elliott Smith)' – 2m20s

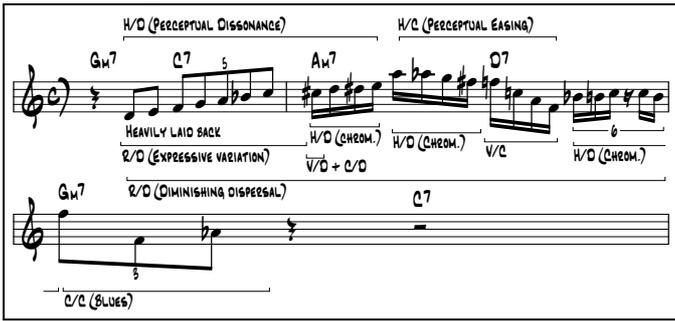
In 'Sky Turning Grey (For Elliott Smith)' (Highway Rider, 2010), at 2m20s, Mehldau combines horizontal dissonances by employing linear tonality (an implied C#m7b5 over a Cm7b5), disjunct melodicism, and a rising passage that culminates, and then eases, with chromaticism at bar 3. At bar 4, further consonance ensues with the use of temporal easing and consonant melodicism. To further the sense of resolution, Mehldau quotes the melody at bars 5 and 6 (see Figure 2), providing organic consonance.

Figure 2: 'Sky Turning Grey (For Elliott Smith)' – 2m20s

### C. 'The Nearness Of You' – 3m07s

In 'The Nearness Of You' (Anything Goes, 2004), Mehldau employs a myriad of dissonances and consonances for contrastive valence. At 3m08s he starts a phrase that uses perceptual dissonance resolving to perceptual consonance throughout Figure 3. Concurrently Mehldau also employs expressive variation (rhythmic dissonance) and diminishing dispersal (rhythmic dissonance) throughout the 3-bar phrase. He increases the temporal density at bar 2, utilising chromaticism (horizontal dissonance) for added instability. In addition, at bar 2 beat 1 Mehldau plays a C# over Am7 (vertical dissonance) (unsupported by his left hand) creating a chromatic appoggiatura to the eleventh (D) of Am7. The phrase concludes with a cultural consonance, a blues cell in F. Playing a major third over a minor chord at bar 2 (albeit implied in this case) is considered to be culturally dissonant, and is a feature found often in Mehldau's composition and improvisation.

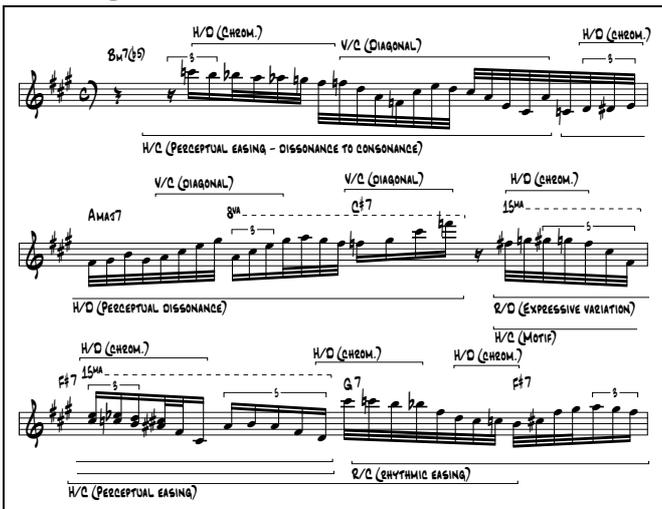
Figure 3: 'The Nearness Of You' – 3m07s



**D. 'Someone To Watch Over Me' – 6m02s**

In 'Someone To Watch Over Me' (Live in Tokyo, 2004), Mehldau employs a four-stage improvisational concept beginning with perceptual easing (horizontal consonance) via chromaticism (horizontal dissonance) and vertical consonances before moving to a build using perceptual dissonance (horizontal dissonance) and vertical consonance (bar 2, Figure 4). Mehldau then combines chromaticism (horizontal dissonance) with expressive variation (rhythmic dissonance) and a one beat motif (horizontal consonance) repeated three times from the end of bar 2, easing perceptual and rhythmic dissonances towards the end of bar 3.

Figure 4: 'Someone To Watch Over Me' – 6m02s



**E. Problems concerning Classification of C/D**

It is unsound to propose a new analytical framework in jazz without demonstrating practical issues pertaining to potential ambiguity. Huron (2006) argues that some musical expectation exists in the listener that cannot be found in the music (p. 360), and acknowledges Schoenberg's proposal that events exist in music that aren't necessarily perceived by the listener. Table 2 provides some clarity in cases of categorical ambiguity.

Table 2: Problems and Concerning Classification of C/D

Problem	Example/Answer
Is a diagonal vertical dissonance not simply a harmonic destabilisation?	No. A harmonic destabilisation is an alternative chord sequence usually realised by both hands on the piano, a diagonal vertical C/D spells out the notes of only one chord at a time. Harmonic destabilisation has a greater effect to the listener; disruption to the schematic norm causes greater

	arousal/attention than relatively brief vertical dissonance. It has an effect on the organicism of the work, therefore it is an organic dissonance.
Is the chromatic scale simply a cultural consonance instead of a horizontal dissonance?	As it is a scale and often played as such, chromaticism is a horizontal dissonance; on occasion the chromatic scale may form part of a motif in which case the motif-ness may be more salient than the chromatic-ness. In addition, a chromatic enclosure (F-Eb-E) is considered a cultural consonance more than a chromatic dissonance, as its primary function is to decorate guide tones instead of creating instability via chromaticism. Sometimes a chord sequence is composed containing an ascending/descending chromatic bassline (e.g. Am – Am/G# – A7/G – D/F#); in this case the chromaticism forms part of the harmonic framework and is not a dissonant sonority.
Isn't perceptual dissonance and temporal density just a matter of context? Surely what may be a dissonant event in one piece may be a consonant one in another.	Yes, this is indeed the case. Factors such as tempo and style have to be accounted for when considering temporal density. Factors such as the normative range of the solo in general have to be taken into account when deciding whether a phrase should be marked for perceptual dissonance; context plays a big part.

**VII. CONCLUSION**

There is a dearth of detailed analysis on the music of Brad Mehldau, so this paper serves as a unique contribution to a narrow subject, but also as an entrée to understanding the evolution of jazz. It defines and exemplifies a new approach to jazz analysis derived from a study of holistic consonance and dissonance, and cognitive research into perceived motivation.

This paper has defined a collection of musical terms relating to consonance and dissonance largely derived from authors and texts in the fields of musicology and cognitive sciences. Although the terms are largely borrowed from the Western classical tradition, their assembly into a holistic analytical model is an original contribution to the field of jazz musicology. Arguably, this contribution is required due to a paucity of analytical methods available when attempting to understand a performer like Brad Mehldau.

Using this model it is now possible to compare divergent musicians by using a common set of tools; for example, it may be observed that Wynton Kelly plays with a higher degree of cultural consonance than Paul Bley. It could also be argued that Keith Jarrett plays using less harmonic destabilisation than Ethan Iverson. A player such as Thelonious Monk is known for his high degree of organic consonance via melody, vertical dissonances via dissonant dyads, and rhythmic dissonance via metric shifts. The possibilities of this model are not simply limited to the music of Mehldau; due to the autodidactic nature of jazz performance there is huge diversity within the field. This is of course what makes the individualism of each player so valuable to the jazz tradition. This model, if applied thoroughly, can situate a performer within cultural and organic contexts as well as detail specific devices that they have in their

employ. Please contact the author for annotated analyses of full solos.

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