Relating Musical Structure and Content to Aesthetic Response: A Model and Analysis of Beethoven's Piano Sonata Op. 110

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I. Preamble

THE origins of this article lie in my efforts some years ago to understand and interpret the passage from Beethoven's Piano Sonata op. 110 cited in Example 1, both as an analyst, to discern its structure, and as a performer, to realize its intended expressive import. Superficially, the two issues appeared readily addressable: formally (as Beethoven himself observes) the theme is an inversion of the fugue subject that occurs earlier in the movement, which in turn derives from the opening 'motto' of the sonata; while in terms of emotional intent, the passage seems to have a certain neutrality in contrast to the tragic reprise of the aria which precedes. These tentative solutions merely raised more questions, however. Why does the fugue subject appear in inversion? It seemed unlikely that Beethoven employed this device merely because it was available to him. Does it, therefore, have particular structural significance? And why the feeling of emotional neutrality? To what can it be attributed, and what is its purpose in the sonata as a whole? Finally: how do the music's structure and meaning interrelate – is the former a source of the latter, does the latter influence the former, or (perhaps) do the two represent parallel strands in the sonata's construction?

For some time these problems appeared insoluble. Subsequently, however, four factors emerged which together held out the prospect of enabling my thinking to move forward. The first was William Kinderman's exegesis of op. 110 in terms of narrative design, in which he shows how musical meaning is generated from the integration of thematic material across the sonata through 'a network of forecasts and reminiscences'.[1] Second, I encountered Robert Hatten's *Musical Meaning in Beethoven*, which demonstrates how structuralist and hermeneutic approaches to analysis can be combined within a semiotic framework.[2] The third factor was the evolution of my own 'zygonic' theory, which proposes that the cognition of musical structure is based on a sense of the derivation of material through

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[1] William Kinderman, 'Integration and Narrative Design in Beethoven's Piano Sonata in A♭ Major, Opus 110', *Beethoven Forum*, 1, ed. Christopher Reynolds, Lewis Lockwood and James Webster (Lincoln, NE, and London, 1992), 111–45 (p. 111).

[2] Robert Hatten, *Musical Meaning in Beethoven: Markedness, Correlation and Interpretation* (Bloomington and Indianapolis, 1994).

Example 1.   Beethoven, Piano Sonata op. 110, third movement: inversion of the fugue subject.
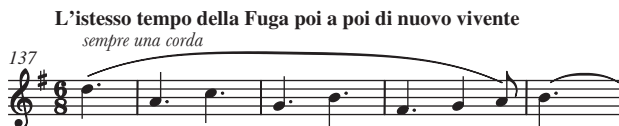
imitation.[3] The fourth and final factor was the growing interest in emotion and meaning in the field of music psychology: as Patrik Juslin and John Sloboda's recent compilation of contemporary theory and research illustrates, there now appears to be sufficient empirical evidence of direct links between musical features and affective response for these usefully to inform certain types of analysis.[4]

So the current project was born: to formulate a model showing how the (typically subconscious) cognition of music and informed listeners' aesthetic response to it (of which they are usually aware) interact, and to use this initially as the basis for an analysis of op. 110, building on the techniques and findings of Kinderman and Hatten. Some may argue that this whole enterprise is an epistemological bridge too far, since music psychology tends to focus on how people typically hear (or play or compose) pieces, tending towards generalities and commonalities; whereas music theory and analysis usually seek to discover what listeners could (or should) hear, and bear largely on specific compositions.[5] However, rather than a conceptual mismatch, the result is intended to present a 'thoughtful confrontation' between empirical and theoretical approaches to understanding music – to paraphrase Robert Gjerdingen – which may foster progress in both.[6]

II. The model

Preliminary definitions
The first step is to define 'structure', 'content' and 'aesthetic response' as they are used in the current context. 'Structure' refers solely to implicative relationships through which one perceived sonic event or feature is deemed to derive through imitation of another. Such relationships are termed 'zygonic',[7] and are

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[3] See, for example, Adam Ockelford, 'The Role of Repetition in Perceived Musical Structures', *Representing Musical Structure*, ed. Peter Howell, Robert West and Ian Cross (London, 1991), 129–60; 'A Theory Concerning the Cognition of Order in Music' (Ph.D. dissertation, University of London, 1993); *The Cognition of Order in Music: A Metacognitive Study* (London, 1999); 'The Magical Number Two, Plus or Minus One: Some Limits on our Capacity for Processing Musical Information', *Musicae scientiae*, 6 (2002), 177–215; 'On Similarity, Derivation, and the Cognition of Musical Structure', *Psychology of Music*, 32 (2004), 23–74.

[4] *Music and Emotion: Theory and Research*, ed. Patrik Juslin and John Sloboda (Oxford, 2001).

[5] David Temperley, personal communication, 2003.

[6] Robert Gjerdingen, 'An Experimental Music Theory?', *Rethinking Music*, ed. Nicholas Cook and Mark Everist (Oxford, 1999), 161–70 (p. 166).

[7] From the Greek 'zygon' for 'yoke', implying the presence or union of two similar things.

context-independent. 'Content' refers to the perceived sonic qualities of musical events, or the context-specific relationships that exist between them: particular pitches, melodic intervals, onsets, inter-onset intervals, durations, harmonies, dynamics, timbres, etc.

For example, in the melody that begins at bar 17 of the second movement of op. 110 (see Figure 4 below), the pitch of the first note (ab') and that of the second are aspects of their 'content'. However, since the second pitch is the same as the first and may be considered to derive from it, the relationship between them is said to be 'structural'. A comparable structural relationship exists between the two c''s that occur two bars later – although their content is different, comprising pitches a major third higher than the opening pair.

'Aesthetic response' embraces a range of evaluative reactions, including the intuitive perception of qualities such as 'beauty', 'balance' and 'coherence'. It encompasses 'affect', which arises from the emotions that may be evoked by or constructed in relation to music.

Context

We start with the assumption that all musical sounds and the relationships between them potentially bear affect, causing or facilitating an emotional response. This view accords with the reasoning of Francis Sparshott, who asserts that the sounds constituting music 'are designed to stand in precisely defined and conceptually elaborated relations to each other, and are engineered with no other purpose than to reward perceptive attention'.[8] And just as our perception of the world at large is saturated with affect,[9] so too our engagement with music is typically affective in nature, with an aesthetic current in our stream of consciousness flowing in response to pieces as they unfold in time.

This phenomenological aspect of music is termed 'evaluative' by Juslin and Sloboda, as opposed to that which they regard as 'representational', which includes the recognition of structural features.[10] This division is echoed across the broad arena of contemporary musicological thought: in music philosophy, for instance, the Hanslick/Wagner debate lives on in the dichotomy between the principally formalist approaches of, say, Malcolm Budd and Peter Kivy, and those primarily centred on musical meaning and expression – in the work of Jerrold Levinson and Kendall Walton, for example.[11] In music theory and analysis, it is hard to escape the conclusion (the efforts of the 'new musicologists'

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[8] Francis Sparshott, 'Music and Feeling', *Journal of Aesthetics and Art Criticism*, 52 (1994), 23–36 (p. 28).

[9] Since, as Philip Johnson-Laird and Keith Oatley observe, survival often requires that, as sentient creatures interacting with highly complex environments that are ultimately irreducible to logical analysis, we gauge sensory input intuitively. Johnson-Laird and Oatley, 'Basic Emotions, Rationality, and Folk Theory', *Cognition and Emotion*, 6 (1992), 201–23 (p. 201).

[10] Patrik Juslin and John Sloboda, 'Music and Emotion: Introduction', *Music and Emotion*, ed. Juslin and Sloboda, 3–20 (p. 3).

[11] See Jenefer Robinson, 'Introduction: New Ways of Thinking about Musical Meaning', *Music and Meaning*, ed. Jenefer Robinson (Ithaca, NY, and London, 1997), 1–20 (pp. 2–3).

such as Susan McClary and Lawrence Kramer notwithstanding) that the weight of twentieth-century achievement – ranging from the work of Arnold Schoenberg to Heinrich Schenker, and from Fred Lerdahl to David Lewin, for instance – is structuralist in nature, since this approach is more readily amenable to scientific scrutiny than a hermeneutic one. Indeed, towards the end of the century, Lerdahl and Jackendoff could reasonably assert that a proper consideration of musical affect required research paradigms yet to be developed,[12] thus deferring (yet again) an examination of what lies at the heart of our engagement with music[13] – a challenge taken up subsequently, however, by writers such as Robert Hatten.[14]

In psychology too the evaluative components of composing, performing and listening, which are framed here by the notion of aesthetic response,[15] have figured only peripherally. Just as analysts and theorists have sought to show how pieces are constructed as quasi-logical patterns in sound, so most effort in the realm of music psychology has been devoted to understanding how musical structure is processed in cognitive terms. Moreover, most of the work on affect has focused on emotion alone: with regard to other issues in musical aesthetics, psychologists have on the whole had 'embarrassingly little to say' according to Sloboda and Juslin,[16] with one or two notable exceptions such as Daniel Berlyne.[17] However, there is currently a new wave of interest in music and emotion, characterized by a multiplicity of approaches in psychology and other fields.[18]

Sloboda and Juslin conceptualize this diversity as a set of bi-polar dimensions.[19] For example, at one extreme emotion is held to be induced in listeners by the intrinsic nature of the musical elements and their interaction,[20] while the opposite view regards pieces as a resource to be exploited in the active process of

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[12] Fred Lerdahl and Ray Jackendoff, *A Generative Theory of Tonal Music* (Cambridge, MA, 1983), 8.

[13] Nicholas Cook and Nicola Dibben, 'Musicological Approaches to Emotion', *Music and Emotion*, ed. Juslin and Sloboda, 45–70 (p. 50).

[14] Hatten, *Musical Meaning in Beethoven*.

[15] See Adrian North and David Hargreaves, 'Experimental Aesthetics and Everyday Music Listening', *The Social Psychology of Music*, ed. David Hargreaves and Adrian North (Oxford, 1997), 84–103 (p. 84); John Sloboda, 'Does Music Mean Anything?', *Musicae scientiae*, 2 (1998), 21–32 (p. 26).

[16] John Sloboda and Patrik Juslin, 'Psychological Perspectives on Music and Emotion', *Music and Emotion*, ed. Juslin and Sloboda, 71–104 (p. 81).

[17] For example, Daniel Berlyne, *Aesthetics and Psychobiology* (New York, 1971); *Studies in the New Experimental Aesthetics*, ed. Daniel Berlyne (Washington, DC, 1974).

[18] See Patrik Juslin and Marcel Zentner, 'Current Trends in the Study of Music and Emotion: Overture', *Musicae scientiae*, special issue 2001/02, 3–21 (p. 3).

[19] John Sloboda and Patrik Juslin, 'Music and Emotion: Commentary', *Music and Emotion*, ed. Juslin and Sloboda, 453–62.

[20] See, for instance, Marco Costa, Pio Bitti and Luisa Bonfiglio, 'Psychological Connotations of Harmonic Musical Intervals', *Psychology of Music*, 28 (2000), 4–22; Glenn Schellenberg, Ania Krysciak and Jane Campbell, 'Perceiving Emotion in Melody: Interactive Effects of Pitch and Rhythm', *Music Perception*, 18 (2000), 155–71; and Alf Gabrielsson and Erik Lindström, 'The Influence of Musical Structure on Musical Expression', *Music and Emotion*, ed. Juslin and Sloboda, 223–48.

emotional construction.[21] Then, one approach acknowledges the biological basis of our emotional response to music, functioning through innate neurological mechanisms,[22] while another treats it primarily as a cultural artefact, whose message may be opaque to listeners who lack the appropriate disposition.[23] A further dichotomy resides in the fact that music is capable both of 'representing' emotions, which are recognized by listeners, and of 'inducing' them, whereby they are directly felt.[24] In addition, a distinction can be drawn between 'intrinsic' and 'extrinsic' sources of emotion in music.[25] The former are non-arbitrarily embedded in structural characteristics, while the latter include meanings derived through extra-musical associations that may function at an individual or cultural level. The model developed here places greater emphasis on emotional induction rather than construction; it assumes a neutral position on the biological/cultural continuum; it is more concerned with emotional feeling than recognition; and it is used principally to investigate intrinsic as opposed to extrinsic sources of musical emotion. Hence, it represents only one piece in a complex conceptual jigsaw. The model is theoretical in nature, building on the findings of psychological, philosophical and musicological research. Because these sources largely refer to music from the Western classical and popular traditions, inevitably this bias permeates the current model too and its purview is comparably constrained. Accepting this limitation, the model may fulfil a number of functions, which include underpinning further empirical and theoretical developments. Here, its use as a framework for analysis provides an opportunity to gauge its effectiveness in this role.

'Content' and aesthetic response

Doubts have been expressed as to whether a workable model of aesthetic response to music could be constructed, for unless pattern and affect are linked in a systematic way then the quest must be futile, and the existence of a coherent connection is by no means incontrovertible.[26] Sparshott,[27] for instance, argues that

[21] Tia DeNora, 'Aesthetic Agency and Musical Practice: New Directions in the Sociology of Music and Emotion', *Music and Emotion*, ed. Juslin and Sloboda, 161–80.

[22] Isabelle Peretz, Lise Gagnon and Bernard Bouchard, 'Music and Emotion: Perceptual Determinants, Immediacy, and Isolation after Brain Damage', *Cognition*, 68 (1998), 111–41; Isabelle Peretz, 'Listen to the Brain: A Biological Perspective on Music and Emotion', *Music and Emotion*, ed. Juslin and Sloboda, 105–34.

[23] Judith Becker, 'Anthropological Perspectives on Music and Emotion', *Music and Emotion*, ed. Juslin and Sloboda, 135–60.

[24] Klaus Scherer and Marcel Zentner, 'Emotional Effects of Music: Production Rules', *Music and Emotion*, ed. Juslin and Sloboda, 361–92 (p. 380); Daniel Västfjäll, 'A Review of the Musical Mood Induction Procedure', *Musicae scientiae*, special issue 2001/02, 173–211.

[25] Sloboda and Juslin, 'Music and Emotion: Commentary', 459.

[26] Mitch Waterman, 'Emotional Responses to Music: Implicit and Explicit Effects in Listeners and Performers', *Psychology of Music*, 24 (1996), 53–67 (p. 66).

[27] Sparshott, 'Music and Feeling', 24.

there seems to be no reason a priori to suppose that only one relationship should hold between musically formal structures and the active and affective lives they relate to, or that they should relate distinctively to any specific range of such phenomena, or that such relationships as obtain should be reducible to any system.[28]

Examples to support this view are commonplace: contrast, for instance, the joy that may be triggered upon rehearing one's wedding march following the event with the grief that listening to the same piece may elicit following the death of one's partner.[29] Hence a composition (even the same recorded performance) may induce different emotional states in a listener according to context. The aesthetic responses of different listeners may be varied too, since they will bring unique mindsets to bear in attending to music.[30] It is therefore hard to see how a model of structure/content ↔ aesthetic response could function with any consistency, given the profound influence of extramusical factors that lie beyond the boundaries of contemporary research techniques. This difficulty is compounded, moreover, by other, intrinsically musical, issues. For example, Deryck Cooke's pioneering hypothesis that particular melodic patterns within a tonal context are linked to precise emotional meanings[31] has failed to find empirical support.[32]

Other investigations, however, have indicated that general features of music, such as register, tempo and dynamic level, do relate with some consistency to particular emotional states.[33] For example, passages in a high register can feel exciting[34] or exhibit potency,[35] whereas series of low notes are more likely to promote solemnity or to be perceived as serious.[36] A fast tempo will tend to induce feelings of excitement,[37] in contrast to slow tempos that may

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[28] Malcolm Budd, *Music and the Emotions: The Philosophical Theories* (London, 1985).

[29] Justin London, 'Some Theories of Emotion in Music and their Implications for Research in Music Psychology', *Musicae scientiae*, special issue 2001/02, 23–36 (p. 25).

[30] David Hargreaves, Dorothy Miell and Raymond MacDonald, 'What are Musical Identities, and Why are They Important?', *Musical Identities*, ed. Raymond MacDonald, David Hargreaves and Dorothy Miell (Oxford, 2002), 1–20 (p. 11).

[31] Deryck Cooke, *The Language of Music* (Oxford, 1959).

[32] See, for example, Clive Gabriel, 'An Experimental Study of Deryck Cooke's Theory of Music and Meaning', *Psychology of Music*, 6 (1978), 13–20; and Peter Hampson, 'A Naturalistic Empirical Investigation of Deryck Cooke's Theory of Music and Meaning', *Sixth International Conference on Music Perception and Cognition*, ed. Chris Woods, Geoff Luck, Renaud Brochard, Fred Seddon and John Sloboda (CD, Keele, 2000).

[33] Summarized in Alf Gabrielsson and Erik Lindström, 'The Influence of Musical Structure on Musical Expression', *Music and Emotion*, ed. Juslin and Sloboda, 223–48.

[34] Karl Watson, 'The Nature and Measurement of Musical Meanings', *Psychological Monographs*, 54 (1942), 1–43.

[35] Klaus Scherer and James Oshinsky, 'Cue Utilization in Emotion Attribution from Auditory Stimuli', *Motivation and Emotion*, 1 (1977), 331–46.

[36] Watson, 'The Nature and Measurement of Musical Meanings'; Lage Wedin, 'Multidimensional Study of Perceptual-Emotional Qualities in Music', *Scandinavian Journal of Psychology*, 13 (1972), 241–57.

[37] William Thompson and Brent Robitaille, 'Can Composers Express Emotions through Music?', *Empirical Studies of the Arts*, 10 (1992), 79–89.

connote tranquillity[38] or even peace.[39] Loud dynamic levels are held to be exciting[40] or triumphant,[41] or to represent gaiety,[42] while quiet sounds have been found to express fear, tenderness or grief.[43] Conversely, as Leonard Meyer asserts, 'one cannot imagine sadness being portrayed by a fast forte tune played in a high register, or a playful child being depicted by a solemnity of trombones'.[44]

However, while such properties appear to be necessary in determining musical expression,[45] they are not sufficient to evoke an aesthetic response that is truly musical. Indeed, according to Patrik Juslin, Anders Friberg and Roberto Bresin, these features derive ultimately from the cues used to express emotions vocally in non-verbal communication and speech.[46] These are present cross-culturally,[47] suggesting a common phylogenetic derivation from 'nonverbal affect vocalisations'[48] and that they are embedded ontogenetically in early maternal/infant vocal interaction.[49] Hence, any succession of sounds may invoke a primitive emotional reaction according to the values of what Meyer terms their 'statistical parameters' (which he takes to include register, dynamic

[38] Ralph Gundlach, 'Factors Determining the Characterization of Musical Phrases', *American Journal of Psychology*, 47 (1935), 624–44.

[39] Laura-Lee Balkwill and William Thompson, 'A Cross-Cultural Investigation of the Perception of Emotion in Music: Psychology and Cultural Cues', *Music Perception*, 17 (1999), 43–64.

[40] Watson, 'The Nature and Measurement of Musical Meanings'.

[41] Gundlach, 'Factors Determining the Characterization of Musical Phrases'.

[42] Sören Nielzén and Zvonimir Cesarec, 'Emotional Experience of Music as a Function of Musical Structure', *Psychology of Music*, 10 (1982), 7–17.

[43] Patrik Juslin, 'Perceived Emotional Expression in Synthesized Performances of a Short Melody: Capturing the Listener's Judgement Policy', *Musicae scientiae*, 1 (1997), 225–56.

[44] Leonard Meyer, 'Music and Emotion: Distinctions and Uncertainties', *Music and Emotion*, ed. Juslin and Sloboda, 341–60 (p. 342).

[45] Justin London, 'Musical Expression and Musical Meaning in Context', *Sixth International Conference on Music Perception and Cognition*, ed. Woods, Luck, Brochard, Seddon and Sloboda.

[46] Patrik Juslin, Anders Friberg and Roberto Bresin, 'Toward a Computational Model of Expression in Music Performance: The GERM Model', *Musicae scientiae*, special issue 2001/02, 63–122.

[47] Klaus Scherer, Rainer Banse and Harad Wallbott, 'Emotion Inferences from Vocal Expression Correlate Across Languages and Cultures', *Journal of Cross-Cultural Psychology*, 32 (2001), 76–92.

[48] Klaus Scherer, 'Emotion Expression in Speech and Music', *Music, Language, Speech and Brain*, ed. Johan Sundberg, Lennart Nord and Rolf Carlson (London, 1991), 146–56; 'Affect Bursts', *Emotions: Essays on Emotion Theory*, ed. Stephanie van Goozen, Nanne van de Poll and Joseph Sergeant (Hillsdale, NJ, 1994), 161–96; 'Expression of Emotion in Voice and Music', *Journal of Voice*, 9 (1995), 235–48.

[49] Stephen Malloch, 'Mothers and Infants and Communicative Musicality', *Musicae scientiae*, special issue 1999/2000, 29–54; Sandra Trehub and Takayuki Nakata, 'Emotion and Music in Infancy', *Musicae scientiae*, special issue 2001/02, 37–61; Colwyn Trevarthen, 'Origins of Musical Identity: Evidence from Infancy for Musical Social Awareness', *Musical Identities*, ed. MacDonald, Hargreaves and Miell, 21–38.

level, speed and continuity).[50] So what are the additional ingredients needed to induce a specifically musical response?[51]

One factor is the very nature of the sounds that are used in most styles and genres: they have intrinsically musical characteristics which, like those identified above in relation to vocalization, have the capacity to induce consistent emotional responses, within and sometimes between cultures. For example, in the West and elsewhere, music typically utilizes a framework of relative pitches with close connections to the harmonic series. These are used idiosyncratically, with context-dependent frequency of occurrence and transition patterns, together yielding the sensation of tonality.[52] Such frameworks can accommodate different modalities, each potentially bearing distinct emotional connotations. In Indian music, for instance, the concept of the raga is based on the idea that particular patterns of notes are able to evoke heightened states of emotion,[53] while in the Western tradition of the last four centuries or so, the major mode is typically associated with happiness, for example, and the minor with sadness.[54]

While qualities of perceived sound such as these are important because they set the auditory scene, they cannot alone account for the unique and powerful aesthetic reaction that music can engender. To understand why this is so, we need to consider a further factor: the temporal nature of the musical experience.

The temporal nature of the musical experience

To model the mental processes that enable us to appreciate music as a temporal art form, we will begin by considering the simplest of events – a short note or chord – which a listener knows is going to occur. Edmund Husserl contends that there are three phases in one's reaction to such a stimulus.[55] Before it is heard, but as it is anticipated, the note or chord will exist cognitively as a 'protention' – an expectation of the future, enauralized in the conscious present. Then, as it is perceived, the stimulus will form a 'primal impression' – an

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[50] Meyer, 'Music and Emotion', 342.

[51] See London, 'Some Theories of Emotion in Music and their Implications for Research in Music Psychology', 24.

[52] Carol Krumhansl, 'An Exploratory Study of Musical Emotions and Psychophysiology', *Canadian Journal of Experimental Psychology*, 51 (1997), 336–52; Peretz, Gagnon and Bouchard, 'Music and Emotion'.

[53] Nazir Jairazbhoy, *The Rāgs of North Indian Music: Their Structure and Evolution* (London, 1971), 28.

[54] Kate Hevner, 'Experimental Studies of the Elements of Expression in Music', *American Journal of Psychology*, 48 (1936), 246–68; Robert Crowder, 'Perception of the Major/Minor Distinction: III. Hedonic, Musical and Affective Discriminations', *Bulletin of the Psychonomic Society*, 23 (1985), 314–16; Krumhansl, 'An Exploratory Study of Musical Emotions and Psychophysiology'; Peretz, Gagnon and Bouchard, 'Music and Emotion'.

[55] Edmund Husserl, *The Phenomenology of Internal Time-Consciousness* (The Hague, 1905–10; repr. 1964); summarized in Izchak Miller, *Husserl, Perception, and Temporal Awareness* (Cambridge, MA, 1984), 120ff.; revisited in David Lewin, 'Music Theory, Phenomenology, and Modes of Perception', *Music Perception*, 3 (1986), 327–92 (pp. 329ff.).

Example 2.   Beethoven, Piano Sonata op. 110, third movement: second appearance of 'aria'.

immediate response to the sound heard. Beyond this, the note will continue to resonate mentally as a 'retention' – a projection of memory into present consciousness.

While it seems reasonable to assume that one's aesthetic response to a musical event will tie in with the temporal existence of its ideation, perception and memory, the position is not straightforward, since the feelings that may arise as part of an aesthetic experience have a life of their own, which can endure well beyond the initiating stimulus or even its 'retention' (to use Husserl's term) as a perceived musical event. Conversely, emotions may be aroused very quickly in response to music: listeners have reliably distinguished the emotional tone of excerpts as 'happy' or 'sad' within a quarter of a second, for example,[56] although, clearly, the judgment of other ingredients in the aesthetic mix such as beauty and coherence may take rather longer than this.

Extending Husserl's phenomenological framework to model listeners' aesthetic reaction to a series of events, each following the first may comprise an amalgam of reactions to the

perception of the current event,
memory of past events,
cognition of the relationships between them,
anticipation of forthcoming events, and
anticipation of the relationships between these and the current event.[57]

To observe this scheme in practice, consider the fragmented melody of the aria's second appearance in the third movement of op. 110 (see Example 2), in particular the effect of the second appoggiatura (from a' to $b\flat'$ in the first bar).[58] The a', sounding on the fourth beat against a G minor triad, is astringently

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[56] Peretz, Gagnon and Bouchard, 'Music and Emotion', 124.

[57] See Dan Sperber and Deirdre Wilson, *Relevance: Cognition and Communication* (Oxford, 1995), 118; Emery Schubert, 'Correlation Analysis of Continuous Emotional Response to Music: Correcting for the Effects of Serial Correlation', *Musicae scientiae*, special issue 2001/02, 213–36.

[58] On the basis of listeners' retrospective accounts, John Sloboda confirmed musicians' intuitive notion that melodic appoggiaturas are one of the features of Western classical music capable of triggering a marked emotional response. See Sloboda, 'Music Structure and Emotional Response: Some Empirical Findings', *Psychology of Music*, 19 (1991), 110–20.

discordant, with the capacity to engender an aesthetic reaction with a marked emotional charge. The appoggiatura is not an isolated phenomenon, though, and what makes it telling in aesthetic terms is the context in which it is heard. This a' (the second of two) occurs with a feeling of inevitability, since it is foreshadowed both by the previous repetition of the c'' above (whose second appearance also functions as an appoggiatura) and, more directly, by the preceding demisemiquaver a'. Together with the underlying harmonic consistency (and the previous appearance of the melody in unadorned form), this means that the stylistically attuned ear cannot help projecting the discord on the final beat of the bar. That is, the aesthetic impact of the appoggiatura derives not only from its immediate perceptual qualities, but also from those of the preceding notes and their relationships to events past and present. As the model suggests, however, a further factor influencing the aesthetic *mélange* at this point is the anticipation of the resolution to come, foreshadowed (through inversion) as it is by the preceding movement from c'' to $b\flat'$. This 'protention' enables listeners to savour the discord since they know that it will be resolved, and how.[59]

Aesthetic coherence and unity; the function of structure

This example from op. 110 contains the seeds of a question that is fundamental to our understanding of musical content, structure and aesthetic response: how is it that the passage cited – indeed, the whole work – offers a coherent and unified experience over time? This is not achieved through perceptual uniformity, for the sonata describes rich and diverse patterns in sound, eliciting a stream of emotions that ebb and flow, reaching climaxes amid periods of lesser intensity – as Suzanne Langer hypothesizes, apparently emulating the dynamic disposition of our inner feelings.[60] Yet, despite this diversity, the impression we have is not of a series of discrete reactions, but of one evolving aesthetic response. How does this come about? What is it that gives a piece of music its inherent unity as a work of art? A detailed answer to this question in relation to op. 110 follows. At this stage, we consider the matter in general terms.

One approach to understanding how aesthetic unity in music is achieved, which draws upon Langer's contention that 'musical structures logically resemble

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[59] Hence this view is opposed to that famously (though not uncontroversially) espoused by Leonard Meyer, who most recently concludes that states of feeling become emotional experiences 'when they are at least tinged by uncertainty' ('Music and Emotion', 353), something which music achieves through the physical-somatic conditions created by the statistical parameters being qualified through the action of syntactic and native processes which uniquely characterize the art form (p. 346). These generate arousal, so directing attention to what is still to come, thereby giving rise to implication. Since what is implied can never be more than probable, meaningful attention to music is necessarily characterized by uncertainty as to how past and present patterns will be continued and, ultimately, resolved (p. 354). Yet here – on the contrary – we are saying that informed anticipation is a key element in one's aesthetic response to music. See Ockelford, 'Implication and Expectation in Music: A Zygonic Model' (forthcoming, *Psychology of Music*, 2005).

[60] Suzanne Langer, *Philosophy in a New Key: A Study in the Symbolism of Reason, Rite and Art* (Cambridge, MA, 1942; repr. 1957), 226ff.

certain dynamic patterns of human experience',[61] is to consider how aesthetic coherence is achieved in literary forms, since, according to T. S. Eliot, these present feeling 'by a statement of events in human action or objects in the external world'.[62] Language-based art forms offer three principal sources of aesthetic response: that which Eliot terms the 'objective correlative' – 'a set of objects, a situation, a chain of events which shall be the formula of that *particular* emotion';[63] the manner of representation (including, for example, the use of metaphor); and the structure and sounding qualities of the language itself.[64] Hence, the aesthetic unity of a literary work requires semantic, syntactic and sonic elements each to exhibit expressive coherence in its own right, as well as working together in an evocative fusion of content, structure and sound.[65] With regard to music, however, the position is rather different, for although it is often programmatic, linked to words, or used to support film or drama,[66] it is an art form that, in some cultures at least, can lead an independent existence, free of effable meaning.[67] Yet without external referents – Eliot's 'objective correlatives' – upon which the expressiveness of verbal language depends, how can musical aesthetics ever get off the ground?

The answer lies, I believe, in music's self-referencing architecture,[68] whose disposition zygonic theory seeks to explain. In summary, this holds that a sense of structure in music will be established when one feature of its content is deemed to derive from another or others through imitation – a proposition

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[61] *Ibid.*

[62] Thomas Stearns Eliot, *The Sacred Wood: Essays on Poetry and Criticism* (London, 1920; repr. 1997), 54.

[63] *Ibid.*, 85.

[64] See Thomas Stearns Eliot, *The Use of Poetry and the Use of Criticism* (London, 1933), 118–19.

[65] Reflecting further on the comparison with language, while it is the meanings of words that tend to elicit an emotional response, it is their syntactical structure and sonic qualities that induce the aesthetic component of our reaction to a text (beauty, felicity of expression and so forth). Repetition (the foundation of structure in music) sometimes plays a part: through rhyme, assonance, alliteration, anaphora and metre, for example. See Carlos Chavéz, *Musical Thought* (Cambridge, MA, 1961), 39, 40; Leonard Bernstein, *The Unanswered Question* (Cambridge, MA, 1976), 147–8; Ockelford, 'A Theory Concerning the Cognition of Order in Music', 168.

[66] See London, 'Some Theories of Emotion in Music', 25.

[67] See Douglas Dempster, 'Is There Even a Grammar of Music?', *Musicae scientiae*, 2 (1998), 55–65 (p. 58).

[68] See John Rothgeb, 'Thematic Content: A Schenkerian View', *Aspects of Schenkerian Theory*, ed. David Beach (New Haven and London, 1983), 39–60 (p. 39): 'Music, lacking access to the kinds of direct association with the phenomenal world central to most other art forms, was able to satisfy the universal requirement of association only through the "likeness of itself" – through self-repetition.' Also Basil de Selincourt, 'Music and Duration', *Reflections on Art*, ed. Suzanne Langer (London, 1958), 152–60 (p. 156): 'The value of repetition in music belongs of course to the peculiar inwardness of the art. A musical composition must be content to be itself. The reference and relations into which analysis resolves its life-current need point to no object, no event; they take the form of the creative impulse which is their unity and they repeat one another because iteration is the only outward sign of identity which is available to them.'

Figure 1.   Beethoven, Piano Sonata op. 110, first movement: examples of zygonic and interperspective relationships.

similar to that summarized by Edward Cone thus: 'y is derived from x (y ← x), or, to use the active voice, x generates y (x → y), if y resembles x and y follows x. By "resembles", I mean "sounds like" …'.[69] I further hypothesize that the cognitive acknowledgement of structure may occur consciously (as is usually the case in music analysis) or subconsciously (as in the experience of the 'typical' listener). The cognitive constructs through which derivation is thought to occur may be modelled conceptually and captured terminologically as 'zygonic relationships', which are represented as an arrow overlaid with a large 'Z'.[70] The notion that structure is founded on perceived derivation applies not just to motives and themes but potentially to all aspects of the musical fabric.[71] Therefore, it is sometimes necessary to identify which aspect of perceived sound a given relationship refers to. In Figure 1, the superscript 'P', 'O' and 'D' indicate relationships of 'pitch', 'onset' and 'duration', for example. Figure 1 also depicts

[69] Edward Cone, 'On Derivation: Syntax and Rhetoric', *Music Analysis*, 6 (1987), 237–55 (p. 237).

[70] Ockelford, 'The Role of Repetition in Perceived Musical Structures', 141.

[71] See Ockelford, *The Cognition of Order in Music*.

relationships that are not zygonic, which merely conceptualize as a difference, ratio or other value that which is typically experienced as a qualitative connection between aspects of musical events.[72] They are symbolized with large 'I', which stands for 'interperspective' (that is, 'between perceived aspects' of sound).

All such relationships can exist at different levels, according to their adjacency to the perceptual surface. Primary relationships (subscript '1') are mental connections between the qualities of sounds themselves (for example, the interval between two pitches). Secondary relationships (subscript '2') link primaries (acknowledging, for example, the difference between two melodic intervals). Tertiary relationships (subscript '3') represent a considerable degree of abstraction from direct perceptual input, and exist only in zygonic form.[73] In Figure 1, a tertiary zygon reflects the fact that the inter-onset intervals between the opening notes of the first three bars decrease by a quaver in each case, and accords this regularity a structural status – at least in conceptual terms.[74] Empirical work would be required to determine the extent to which this connection is typically processed by listeners. The imitation through which derivation is thought to occur may be exact (as in the case of the primary zygonic relationship of duration in Figure 1) or approximate (see, for instance, the secondary zygonic relationship of pitch between the descending intervals in bars 1 and 2).[75]

In ontological terms, zygonic relationships have the status of hypothetical constructs, which were developed as conceptual shorthand – intended to facilitate psycho-musicological modelling and analysis – for a range of logically equivalent cognitive processes that we may reasonably suppose occur during meaningful interaction with music. These potentially involve any perceived aspect of sound, exist over different periods of time, and operate within the same and between different pieces, performances and hearings. Zygons may function reactively in assessing the relationship between extant values, or proactively, in ideating a value as an orderly continuation from one remembered, heard or imagined.[76]

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[72] See Lawrence Zbikowski, 'Metaphor and Music Theory', *Music Theory Online*, 4 (1998), vol. 1; and *Conceptualizing Music: Cognitive Structure, Theory, and Analysis* (New York, 2002). Building on the work of George Lakoff, Zbikowski shows how such notions are underpinned by culture-specific conceptual metaphors, mapped onto the domain of music-space from our perception of the physical world.

[73] Ockelford, 'The Magical Number Two, Plus or Minus One'.

[74] See Eugene Narmour, 'Music Expectations by Cognitive Rule-Mapping', *Music Perception*, 17 (2000), 329–98 (p. 364).

[75] Observe that relationships (whether or not they are zygonic) which link different values use half-arrowheads (in contradistinction to full arrowheads, which are indicative of identity). Note also that some arrowheads are open and some are filled – the former showing a link between single values, and the latter indicating a compound connection within or between 'constants' (typically, values extended in time) – implying a network of relationships the same. For fuller explanations, see Ockelford, *The Cognition of Order in Music*.

[76] A fuller discussion of key issues in zygonic theory, including what counts as sameness and similarity, and how these interact with the notions of salience, categorization and derivation, is to be found elsewhere. See Ockelford, 'On Similarity, Derivation, and the Cognition of Musical Structure'.

What can this, a model of music-structural cognition, tell us about the coherence and unity of listeners' aesthetic response to music? Let us assume that, just as a work of literature will hang together aesthetically only if what it evokes makes sense,[77] so for (absolute) music to add up in aesthetic terms, its structure and content must exhibit a coherence comparable to that displayed by the events and scenarios of everyday life.[78] But how is this possible, when the fabric of music and that of the wider world differ substantially? The answer, I suggest, lies in the way we believe things happen. Through everyday experience, we develop an intuitive understanding of contingent and causal relationships, and we generally reckon that there is a logic in what occurs. Is there a comparable logic to music? It may appear not, since we do not consider that one sound physically causes another to occur (it is performers who generally cause sounds to happen). But whereas the world is 'real', music is only 'notional', and to engage in the abstract drama of a piece as it unfolds requires listeners in some subconscious sense to suspend their disbelief. Hence, although causation may be an inappropriate concept to use in describing the influence that one musical event is perceived to have on another, the notion of implication (as zygonic theory suggests) is intuitively apposite.[79] So the zygonic hypothesis, extended to take account of aesthetic response, may be expressed as follows. Just as a feeling of derivation underpins the cognition of structure, so coherence and unity of aesthetic response similarly rely on a sense of derivation. However, as we shall

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[77] See Alan Garnham, Jane Oakhill and Philip Johnson-Laird, 'Referential Continuity and the Coherence of Discourse', *Cognition*, 11 (1982), 29–46.

[78] See John Sloboda, 'Does Music Mean Anything?'

[79] Cf. Meyer's reason for preferring the notion of implication to that of causation in music theory and analysis: that the former makes more sense in the context of uncertainty, which he holds to be the catalyst of emotional response to music (see, for example, Meyer, *Style and Music: Theory, History, and Ideology*, Philadelphia, 1989, 84ff.; 'Music and Emotion, Distinctions and Uncertainties', 346–7). However, as I argue above, since informed anticipation appears to play a central role in musical affect, uncertainty cannot, and it is because relationships between objects in music are only metaphorical that the concept of implication is preferable to that of causation. See also Sperber and Wilson, *Relevance*, 72, who contend that 'for a representation to be amenable to logical processing, all that is necessary is for it to be well-formed' (rather than semantically complete – that is, representative of a state of affairs in a possible or actual world). In Sperber and Wilson's terms, logic in language (that is semantically complete, and therefore capable of being true or false) can be described as propositional, whereas logic in music would be considered non-propositional (see also Dempster, 'Is There Even a Grammar of Music?', 61). In language, Sperber and Wilson contend (p. 84), 'logical implication' is a syntactic relation which holds purely by virtue of the formal properties of assumptions, involving no reference to their semantic properties. This supports the notion that logical implication – the keystone of zygonic theory – is applicable to music too. A comparable line of argument is advanced by Bob Snyder, *Music and Memory* (Cambridge, MA, 2000), 230: 'By causing musical events to "point to" other musical events, it connects those events in a relation of implication. . . . Musical linearity is like a metaphor of physical causation, and indeed linearity is an attempt to make musical events seem to cause each other. (Note that much of the linearity in verbal narrative structures is based on causation – events are connected to other events through earlier events causing the later events.)' See also Fred Maus, 'Narrative, Drama and Emotion in Instrumental Music', *Journal of Aesthetics and Art Criticism*, 55 (1997), 293–303.

see, while zygonic relationships are necessary, they are not sufficient to ensure
that these qualities are present.

The relationship between structure, content and aesthetic response

We now examine how structure, content and aesthetic response interrelate.
Understanding musical organization and responding aesthetically involve pro-
cessing content and structure together; like syntax and semantics in language,
they are inextricably linked.[80] Just as content is inconceivable without structure
(for that would be tantamount to chaos), so structure cannot physically exist
without content, although in an abstract sense it can, since the same implicative
relationships may pertain to different qualities of perceived sound. However, as
soon as structure becomes reified in a particular context it fuses with content
and the two become one, functioning rather like the threads in a tapestry,
which serve to hold things together as well as creating aesthetically pleasing
effects.

   While a common structure can support diverse contents, a given content
cannot be framed by different structures. This equates with a necessary condi-
tion of what Tim Horton terms 'compositionality', whereby when 'constituents
are combined to produce a specific type of complex construction, the syntactic
relation itself is independent of the particular constituents involved'.[81] In sum-
mary, the structure/content relationship between two musical events, expressed
in terms of sameness, similarity and difference, can take six forms as follows:

the content of two identical structures may be the same, similar or different;
the content of similar structures may be similar or different; and
the content of different structures must necessarily be different too.

These scenarios do not relate to aesthetic response in a straightforward way:
even exact repetition (in which both structure and content are identical) may
produce a changed evaluative reaction since one event has the unique func-
tional quality of preceding or succeeding the other; as Meyer puts it, 'repetition,
though it may exist physically, never exists psychologically'.[82] Despite this, the
precise replication of content and structure can be expressively constraining. To
paraphrase Arnold Schoenberg: while logic and coherence are necessary for
comprehensibility, repetition alone can give rise to monotony;[83] hence there
is an aesthetic need for variation, which preserves some features while chang-
ing others.[84] So it is that the capacity of structures that are identical or alike
to support similar or different content is a critical feature of much musical

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[80] See Diana Raffman, *Language, Music, and Mind* (Cambridge, MA, 1993).

[81] Tim Horton, 'The Compositionality of Tonal Structures: A Generative Approach to the
   Notion of Musical Meaning', *Musicae scientiae*, 5 (2001), 131–56 (p. 143).

[82] Leonard Meyer, *Emotion and Meaning in Music* (Chicago, 1956), 49.

[83] Arnold Schoenberg, *Fundamentals of Musical Composition* (London, 1967), 1.

[84] *Ibid.*, 8.

development, for it offers the possibility of expressive diversity within a frame-work of structural coherence.

For instance, at the thematic level, a commonly used device within the West-ern classical tradition is a change of mode (from major to minor or vice versa), through which a modest alteration of content allied to structural identity or similarity can induce a marked change in affect. This occurs, for example, in what would conventionally be termed the 'development section' of the first movement of op. 110, when a variant of the opening A♭ major theme appears in F minor. At the level of motives, the position is typically rather different. Even substantial modifications to content or structure may give the general effect of aesthetic consistency or incremental change. This can be particularly evident where a single motivic form is used pervasively, leading different appearances to vary in actual or implied harmonic content, a technique that is used extensively in the fugal sections of op. 110. Hence, a musical discourse in a major key may well embrace elements that reflect related minor modes, yet without threaten-ing the hegemony of the prevailing tonality. It may be that this approach accounts for the potential aesthetic richness of pieces utilizing the major/minor tonal system.[85]

Since a given structure can support many different contents, the fact that successive appearances of a theme or motive share the same or a similar under-lying organization is no guarantee of an aesthetically coherent relationship between them: typically the contents of the configurations in question also need to be linked directly, through the repetition of expressive features or orderly change in them. An example occurs at the end of the last movement of op. 110 (bars 204ff.), where a motive derived from the opening of the sonata forms an ascending sequence that leads to the climax of the work. Here, not only are the internal relationships of the motive replicated on each appearance, thereby sup-plying the necessary structural cohesion, but the overall pitch content of each is transformed consistently too (through successive transposition), ensuring that the passage as a whole is aesthetically coherent.

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[85] Thus creating an effect in some ways comparable to that produced by the technique of photo-montage when it is used to form the image of a human face from many smaller pictures of faces. The expressions (happy, sad, etc.) on these individual physiognomies need not corre-spond to those evinced by the single, larger face. Hence there could be a number of smaller, sad images coming together to make a happy whole. So it is with minor chords in a major context and vice versa: by focusing one's attention on the detail, a particular aesthetic response may come to the fore; by attending more globally, a different reaction may be engendered. In fact, it is likely there will be an interaction between the two: the effect of a major tonality will be coloured by the minor elements within it (and vice versa). In his *Auditory Scene Analysis* (Cambridge, MA, 1990), Albert Bregman makes a similar observation in relation to the percep-tion of Webern's arrangement of the Ricercar from Bach's *The Musical Offering* (p. 471). John Sloboda observes in 'Music Structure and Emotional Response' (p. 115) that sequences based on the cycle of fifths often underlie passages that listeners describe as being particularly laden with emotion. The current theory suggests that this may occur through the predictable trans-formation of motives from major to minor (and back) that repeated transposition within the framework of the diatonic major scale necessarily engenders.

It is the capacity of content to function structurally, both within and between groups, that enables two events whose structure is different to be coherently linked – a device common to much music and central to the construction of op. 110. Primary zygons can ensure both structural logic and unity of content (and, therefore, coherence of expressive purpose), as, for instance, in the connection between the first movement of the sonata and the second, a link that is forged through the use of identical pitches and dynamics (see Figure 3 below). Secondary relationships in the domains of pitch or perceived time can fulfil a comparable or complementary function, and Beethoven utilizes these too in binding movements I and II of op. 110 together (again, see Figure 3).

Finally, observe that, since the demands of comprehensibility yield structures that are typically replete with repetition,[86] musical textures are inevitably saturated with content that is uniform, consistent or, at most, subject to only small degrees of variation. The aesthetic consequence is that many styles and genres of music tend towards affective evenness or gradual change, in which sudden contrasts are the exception. This bears on a general characteristic of the structure/content ↔ aesthetic response relationship: that there are many more events in a piece than distinct affective states associated with it. By implication, most events reinforce or colour the state that currently pertains rather than replacing it with one that is markedly different.[87] Just as in real life, unremitting vacillation between contrasting emotions would appear to be unsustainable. Nonetheless, in much the same way as literary art forms typically compress in time the events they represent and, therefore, the responses that correspond to them, so music can evoke a series of divergent emotional states within a highly constricted timeframe – a capacity which, as we shall see, op. 110 exploits powerfully.

Other factors in the cognitive environment

Music's perceived content and structure constitute only two of many elements that reside within and contribute to the 'cognitive environment' of the listener.[88] While we will briefly acknowledge these other factors here, their significance should not be underestimated. For example, the listener's cognitive environment may be influenced by extramusical forces, pertaining both to the person's inner world and to his or her reaction to the circumstances in which the performance is being heard. An important extramusical factor is the power of association, which can overwhelm a listener's reaction to intramusical attributes that would otherwise occur, while leaving intact her or his ability to recognize the sentiments which the piece would typically engender, and without compromising the internal 'sense' of the music. To reflect on the example cited earlier, the wedding march played following the death of one's partner

[86] Ockelford, *Repetition in Music: Theoretical and Metatheoretical Perspectives*, RMA Monographs, 13 (London, 2005).

[87] See Schubert, 'Correlation Analysis of Continuous Emotional Response to Music', 216.

[88] Sperber and Wilson, *Relevance*, 38ff.

may still be recognized as essentially joyful even though it may elicit intense grief, and it may be perceived as musically coherent, despite the fact that aesthetically it has the opposite effect to that which was intended.

Other factors pertaining to the cognitive environment of listeners include the aesthetic range of experiences they bring to bear; their knowledge of music, gained through previous hearings of the current piece and others; 'extramusical associations' (connotations of non-musical entities or events established through previous experience); their music-processing abilities; attitudinal issues, such as values, beliefs, preferences and propensities; and their prevailing mood, which will provide the affective backdrop against which any emotions aroused by the music will be superimposed as phasic perturbations.[89] The external environment can influence aesthetic response in a number of ways too. A listener may well be affected by the demeanour of the performer and by the reactions of others who are present, through empathy and 'emotional contagion',[90] for example, and by the social context in which the music is being heard and the nature of its location.[91]

Summary
Taking into account all the factors mentioned in the preceding sections, I propose the following general model of musical structure, content and aesthetic response (see Figure 2). The relative significance of the many elements that potentially play a part in the structure/content ↔ aesthetic response dynamic will differ from one occasion to another, and the elements are liable to interact in complex ways. Clearly, to understand how the whole system operates will require a good deal of further theoretical and empirical work. In the analysis of op. 110 that follows, just five aspects of the model are utilized, for reasons that are explained below; other analyses may well adopt a different approach.

III. The model in action: an analysis of Beethoven's Piano Sonata op. 110

Introduction
We return to Beethoven's Piano Sonata op. 110, and, through analysis framed by elements of the structure/content ↔ aesthetic response model, seek to answer the questions with which we began. In so doing, we will have regard to the problem highlighted by Nicholas Cook and Nicola Dibben of how to reflect on the expressive properties of music alongside its structural ones in a way which treats both aspects equally, while neither confusing nor conflating

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[89] Richard Davidson, 'On Emotion, Mood, and Related Affective Constructs', *The Nature of Emotion: Fundamental Questions*, ed. Paul Ekman and Richard Davidson (Oxford, 1994), 51–5 (p. 52).

[90] Klaus Scherer and Marcel Zentner, 'Emotional Effects of Music: Production Rules', *Music and Emotion*, ed. Juslin and Sloboda, 361–92 (p. 370).

[91] *Ibid.*, 364–5.
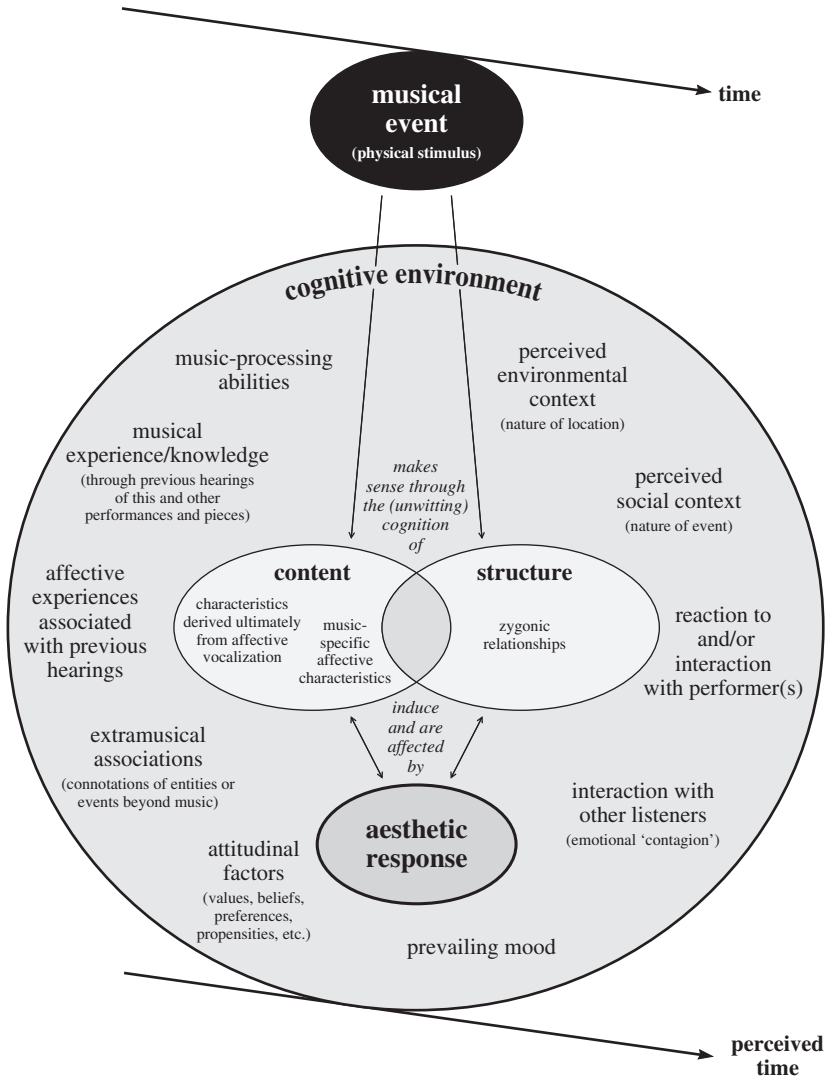
Figure 2. Model of the relationship between musical events and aesthetic response.

the two.[92] We will assume that the observations pertain to a listener who is familiar with the work and has at least an intuitive sense of its place in the broad stylistic domain of the Western Classical and Romantic periods; who does not have an exceptional emotional association with the piece; whose reaction to the

[92] Cook and Dibben, 'Musicological Approaches to Emotion', 67.

performer and interaction with other listeners have no marked impact; and whose location and context can be considered to be neutral factors. This leaves five areas for consideration:

content (musical attributes and the context-specific relationships between them) – 'c'
structure (the pattern of zygonic relationships that provides a framework for the content) – 's'
extraoperative relationships (significant connections with other pieces; invariably zygonic) – 'er'[93]
extramusical associations (connotations of entities or events beyond music that are utilized by the composer) – 'ea'
aesthetic response (including perceived emotional properties, balance, beauty, sense of movement and so on) – 'ar'

In differing combinations and permutations, these can form the framework for scrutinizing musical events or features of any type. The focus of the analysis may range from the micro-elements of a piece, such as a note or chord, to macro-considerations such as the teleological impact of large-scale formal relationships. A succession of observations may be made, tracing one's experience of a piece over time, or the outcome may be an analytical snapshot isolated from the temporal domain. The analyst may begin by examining all or any of the first four areas (content, structure, extraoperative relationships and extramusical associations) and subsequently consider how these affect aesthetic response and the nature of the reaction that is induced. Alternatively, it is possible to start with a known aesthetic response and seek to explain this through analysing content, structure, etc. Here we undertake three analytical forays in relation to op. 110: (1) the opening gesture: a detailed phenomenology; (2) the use of quotation and the 'chameleon' effect; and (3) teleology in music: the narrative metaphor.

The opening gesture: a detailed phenomenology
In terms of aesthetic response (**ar**), Beethoven gives clear indications to performers as to his expressive intentions for the first movement of op. 110 (see Figure 1): the music is to be played 'moderato cantabile molto espressivo' and the opening 'con amabilità (sanft)'.[94] The first chord sets the listener's aesthetic sensibilities on the appropriate course. At this early stage, structure (**s**) is of little aesthetic consequence, and affect derives from the content (**c**) of the opening sonority: its harmony (A♭ major), the register of the melody note (c''), its timbre (pianoforte in mid-range), its dynamic (p) and its duration (dotted crotchet at

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[93] Note that these form a subset of the domain of 'musical experience/knowledge' identified in Figure 2.

[94] See Heinrich Schenker, *Beethoven: Die letzten Sonaten: Sonate in As Dur Op. 110* (Vienna, 1972), 17.

moderato). These elements form an integrated percept which, synthesizing the results of a wide range of psychological research,[95] we would expect to convey calmness and contentment, a prediction that accords with the accounts of musicologists.[96] However, to the stylistically attuned listener, there is aesthetically much more to the first chord than this. Although extramusical associations (**ea**) are yet to emerge, extraoperative relationships (**er**) reveal spacing that is highly unusual – if not unique – in the context in which it appears.[97] With a relatively small interval between the 'bass' and 'tenor' parts (a perfect fifth), and a large interval between 'tenor' and 'alto' (a perfect eleventh), the height of the melody note is emphasized, and Beethoven presents listeners with an arresting initial sonority unprecedented as an opening gesture in his other sonatas and, perhaps, in the Classical/Romantic pianoforte repertory as a whole.[98] Together, these factors mean that the affective qualities of calmness and contentment which would characterize the chord irrespective of the position of the inner parts are enhanced, moving the listener's initial aesthetic response towards the serene and the transcendental.[99]

From this simple though experientially rich starting point, a short melody unfolds, whose upper contour initially ascends two scale degrees from mediant to dominant (**c**), affording a sense of movement characterized by a small-scale rise in affective intensity (**ar**). The ascent is underpinned through a secondary zygon of scale degree, through which the second step imitates the first (**s**). It is elaborated by repeated descents of a third (**c**, **s** – the appurtenant relationships are illustrated in Figure 1), each representing a momentary lowering of intensity that is immediately countered by the assertiveness of the ascending fourth that follows (**ar**). These descents cause a lower, parallel line to be formed (**s**), which, extending to the mediant in bar 5, initially comprises the tonic and supertonic (**c**), an ascent that unobtrusively reinforces the modest rise in intensity of the upper contour (**ar**). In bar 3, the dominant is prolonged through a synthesis of the three-note rising figure of the upper melodic contour and the rhythm from the opening bar (**c**, **s** – the derivation of the initial duration is illustrated in Figure 1), giving the sense of balance and coherence (**ar**) one would expect from a Classical melody (**er**). The subdominant is reached on the second beat of bar 4 through a chromatic descent by step from the dominant (**c**) – a melodic figuration widely used in the Classical style (**er**)[100] and here potentially derived from

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[95] Summarized in Gabrielsson and Lindström, 'The Influence of Musical Structure on Musical Expression'.

[96] For example, Eric Blom, *Beethoven's Piano Sonatas Discussed* (London, 1938), 230.

[97] Other Beethoven sonatas that open with chords with the mediant at the top have spacing that conforms more immediately to that of the harmonic series. For example: op. 2 no. 3; op. 7; op. 10 no. 2; op. 90; op. 101.

[98] However, this is a typical feature of Beethoven's late style – see Martin Cooper, *Beethoven: The Last Decade 1817–1827* (Oxford, 1985), 425 – and the opening sonority foreshadows greater extremes of register later in the movement; see, for example, bars 25–8.

[99] See Hatten, *Musical Meaning in Beethoven*.

[100] Including the great majority of Beethoven's other piano sonatas.

the preceding material through both primary and secondary zygonic relation-ships (**s**) – imbuing the diatonic serenity of the opening bars with a transient hint of melancholy (**ar**).[101] The fleeting expressiveness of the chromatic figure introduced at this juncture (and then set aside for a time) is strengthened in subsequent appearances that are more substantial in duration and reinforced harmonically (for example, in bars 32 and 91) (**s**, **c**, **ar**).

    The dominant → subdominant descent is reiterated in a trill (**c**, **s**) which introduces a brief, unaccompanied elaboration of the imperfect cadence, lead-ing the ear to the second phrase of the opening melody. While the demisemi-quavers and grace notes offer a strong rhythmic contrast with what has gone before (and what is immediately to come) (**c**), coherence is assured since the pitches are derived through retracing the tightly structured melodic contour that has appeared up to this point (**s**). Thus the pattern that characterizes the first movement is established (**s**), whereby relatively short ideas are merely presented – largely, as it were, without comment – and juxtaposed with others that bear significant contrasts (**c**) (eschewing the periods of sustained develop-ment so typical of Beethoven earlier in his compositional career (**er**)).[102] In fact, an early indication of this fragmentary approach – a hint of Beethoven's use of aposiopesis that is to come[103] – is to be found within the first phrase, when the increasing sense of movement towards the imperfect cadence (**ar**), generated by shortening inter-onset intervals (the relevant relationships are illustrated in Figure 1) and a crescendo (**c**, **s**), is thwarted (**ar**) by a sudden reduction in dynamic and – typically, in performance – a delay in the onset of chord V at the beginning of bar 4 (**c**). Hence the movement has a tentative quality, which engenders an increasing expectation of structural and aesthetic resolution in the movements to come (**s**, **ar**).[104] So in seeking to understand the significance of the soloistic link in bar 4 that is currently under discussion (in simple terms: why is it there?), the listener familiar with op. 110 may regard this as the first, faint foreshadowing of the 'recitative' that lies at the heart of the sonata (**s**), with its emotion-laden extramusical associations of expressive vocalization (**ea**).

    So much for the opening phrase of melody. Integral to this in terms of con-tent, structure and aesthetic response is its accompaniment, which is note-worthy in a number of respects. Major harmonies (including the dominant seventh) are used exclusively;[105] indeed, to all intents and purposes they monopolize proceedings for the first 40 bars (**c**, **s**). This homogeneity of relative harmonic value ensures a certain consistency of positive emotional tone and,

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[101] See Timothy Maher and Daniel Berlyne, 'Verbal and Exploratory Responses to Melodic Musical Intervals', *Psychology of Music*, 10 (1982), 11–27.

[102] See Ockelford, 'On Similarity, Derivation, and the Cognition of Musical Structure'.

[103] See Cooper, *Beethoven*, 190.

[104] Kinderman, 'Integration and Narrative Design in Beethoven's Piano Sonata in A♭ Major, Opus 110', 117.

[105] With the possible exception of the harmony constituting the fourth quaver of bar 3, which can be interpreted as B♭ minor⁷ or D♭ major⁶.

by virtue of contrast, lends a greater intensity to the sadness of the F minor transformation of the first theme that opens the 'development section' from bar 40 (**ar**). The opening of the sonata is at once chordal[106] and polyphonic[107] (**c**, **s**) – hymn-like, and so bearing connotations of spirituality (**ea**). The bass line is an imperfect inversion of the melody, whereby each ascent (with its concomitant rise in emotional intensity) is simultaneously counterbalanced by a descent (and associated lowering of affective impact) and vice versa (**c**, **s**, **ar**), engendering – quite literally – a feeling of reflectiveness and of tranquillity (**ar**), the latter enhanced through the discreet though pervasive repetition of the dominant then the tonic in the inner parts (**c**, **s**).

In summary, this phenomenological account of the manner in which the content and structure of the opening bars of op. 110 may relate to a listener's aesthetic response, despite its detail, is nonetheless far from comprehensive and is constrained by our limited capacity to conceptualize the feelings that music engenders. Still, the analysis yields a number of insights as to how the cognitive and evaluative processes pertaining to this initial musical gesture are likely to unfold together over time, and demonstrates that these are sufficiently characteristic to enable the opening melody and its accompaniment to serve as a 'motto' for the whole sonata.[108] How this is achieved – particularly given the introduction of pre-existing (and strongly contrasting) material in the second and third movements – is an issue taken up in the sections concerning quotation and musical narrative that follow.

The use of quotation and the 'chameleon' effect

The second movement, which serves as a scherzo,[109] differs substantially from the first in relation to the five main dimensions that have been identified: internally, in terms of content and structure, and externally, through the use of extraoperative relationships at the thematic level (entailing the quotation of two humorous folksongs)[110] which, to the informed listener, confer particular extramusical associations. These four factors, acting together, are likely to induce an aesthetic response that contrasts strongly with that elicited by the quietly yearning lyricism of the first movement. How, then, is aesthetic coherence achieved? Following 116 bars of meticulously crafted musical discourse in the sophisticated, abstract style that is a facet of Beethoven's 'late' period, how can the sudden introduction of material based on comical folksongs make any musical sense?

We will address this issue first in terms of content and structure. Such juxtapositions are possible since musical objects have many properties, and may

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[106] Cooper, *Beethoven*, 188.

[107] Kinderman, 'Integration and Narrative Design in Beethoven's Piano Sonata in A♭ Major, Opus 110', 117.

[108] *Ibid.*

[109] *Ibid.*, 121.

[110] See Cooper, *Beethoven*, 190–1.

therefore potentially be connected through numerous parallel relationships, some of which may be zygonic. In the coda that ends the first movement, Beethoven prepares the ear for the opening of the Allegro molto in a number of ways – principally in the domain of pitch (which is reinforced through similarity of dynamic level). The final, repeated A♭ major chord is configured so that the mediant (c'') and the tonic ($a♭'$) are at the top, a dyad that is echoed in the initial sonority of the second movement, although the tonal functions of the pitches concerned change to become the dominant and mediant of F minor. Similarly, the $f♭'$ (which functions in the final cadence as a dominant minor ninth over a tonic pedal) can be construed as foreshadowing the $e♮'$ of the second chord of the Allegro (where it operates as the leading note of F minor). As well as these primary relationships, zygons between the movements also operate at secondary level: the descending melodic contour from bar 113 continues through the first four bars of the Allegro, while the concluding octaves in the left hand are taken up again in the bass line that follows (see Figure 3).

These are not the only significant connections of content and structure. Since, in addition to anticipating the new material that follows, the end of the first movement consciously recalls the opening of the sonata (through reiterating fragments of melody and contour within the original textural and registral dimensions),[111] other, longer-range links are also brought to prominence. For example, the first three notes of the Allegro can be heard as an elaboration of the descending major third with which the sonata begins, a relationship that is reinforced by the similar spacing of the chords that initiate the two movements. It is also possible to consider the contour of the opening four bars of the Allegro, which descends six scale degrees, as an inversion of the contour of the 'motto' theme. (This relationship is indicated through an 'inverse zygonic invariant' of pitch degree, whose nature and function are fully explained in Ockelford, *The Cognition of Order in Music*.) As we shall see, the inversion becomes highly significant later in the piece.

Yet the opening phrase of the movement also derives from the folksong 'Unsa Kätz häd Kaz'ln g'habt'. Hence material that was originally conceived quite separately from op. 110 is made integral to the fabric of the sonata: while offering a contrast to ideas that were presented in the first movement, it nevertheless appears to grow naturally from them. Moreover, Beethoven pulls off the same feat again, introducing a further folksong – 'Ich bin lüderlich, du bist lüderlich' – in bar 17 of the second movement. This is adapted to fit in with the development of the first Allegro theme through what I term the 'chameleon' effect, whereby the relative values of pitch and rhythm that characterize the melody are maintained,[112] while absolute values in these domains and those pertaining

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[111] Kinderman, 'Integration and Narrative Design in Beethoven's Piano Sonata in A♭ Major, Opus 110', 120.

[112] Through a zygonic relationship that combines imitation in the domains of relative pitch and perceived time – a so-called 'syzygy' (see Ockelford, *The Cognition of Order in Music*).

Figure 3. Beethoven, Piano Sonata op. 110, first and second movements: folksong material integrated into the fabric through primary and secondary zygonic connections.

to timbre and loudness are transformed. Furthermore, an accompaniment is added which enhances the integration of the tune into its adoptive surroundings. And the process of assimilation does not stop there. Following the first two phrases of the folksong, a new, third segment appears which not only extends the melody through an irresistible internal logic, but, through its simplified rhythm, wide chordal spacing and accompanying octaves (which rise in contrary motion to the tune), also clarifies the relationship to the first theme. This connection becomes even more explicit when the second folksong and its development are subsequently transposed to F minor (the key of the opening; see Figure 4).

It may seem reasonable to assume that Beethoven had to search long and hard to find two tunes whose elements knitted together so naturally with the material he had devised for the first movement of op. 110. But is this the case? My meta-analysis of the work of Rudolph Réti suggests not.[113] Réti held the view that masterpieces of the Western classical tradition constitute coherent entities since, in each case, all significant thematic material derives from a single motivic source. However, since similarity and sameness are ubiquitous in music (owing to the cognitive constraints necessitated by the creation and processing of abstract patterns in sound), even a short passage will prospectively be linked to any other in similar style by countless numbers of potential zygonic relationships – any of which may but need not be realized.[114] Hence, by highlighting the appropriate features in any two given swatches of musical material, it will often be possible for a composer (such as Beethoven) to coax the ear, or an analyst (such as Réti) to lead the eye, into forging 'logical' connections between them, irrespective of whether either passage was originally derived from the other. Hence if compatibility of structure and content between extant and newly composed music was his only criterion for the selection of extraneous material to include in op. 110, Beethoven could have pressed into service any of a huge number of folk-tunes. Therefore we can assume that the songs were selected partly on account of their musical characteristics and associated aesthetic qualities, but also – perhaps predominantly – because he wanted to introduce the specific connotations of buffoonery that 'Unsa Kätz häd Kaz'ln g'habt' ('Our cat has had kittens') and 'Ich bin lüderlich, du bist lüderlich' ('I'm a slob, and you're a slob') convey.[115]

What affective response is this process likely to induce? What impact does the chameleon effect have in the aesthetic domain? In considering these issues, Christopher Ballantine's analysis of the mechanism and impact of quotation provides a helpful starting point:

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[113] Ockelford, *Repetition in Music*; Rudolph Réti, *The Thematic Process in Music* (Westport, 1951).

[114] Ockelford, *Repetition in Music*, 121.

[115] English translations taken from Kinderman, 'Integration and Narrative Design in Beethoven's Piano Sonata in A♭ Major, Opus 110', 121.

Figure 4.   The 'chameleon' effect.

(1) An extraneous fragment is 'chosen'.
(2) A dialectic – which may include a distortion of the fragment – exists between the fragment, with its semantic associations, and the new musical context.
(3) The new context has primacy over the fragment, by providing the structure through which the fragment, its associations and its interrelations are to be understood.[116]

With regard to the dialectic in op. 110, the new context does indeed have primacy over the old: only the opening phrases of the folksongs are used (and, in the case of 'Unsa Kätz', modified to end on the leading note); pitch and tempo are brought into line with the overarching tonal and temporal requirements of the sonata; and the words are, of course, lost in the transition to the timbre of the pianoforte. Yet without their associated texts, the gentrified song fragments actually convey nothing of the earthy humour that was their *raison d'être*: none of their residual musical attributes evokes the mundane or the comic. Indeed, in the first case, the swift descent from dominant to leading note in the minor mode suggests energetic sadness, while in the second, the descent from tonic to dominant in the relative major, immediately repeated a third higher, exudes a positive vigour – musicological intuitions that are supported in general terms by music-psychological research (see above, notes 33–43). Both excerpts are accompanied using a bass line that moves in contrary motion, the first entailing successive diminished-seventh harmonies and the second utilizing simple canonic imitation, techniques that are indicative of a certain artistic refinement. Each of the fragments moves harmonically from tonic to dominant, signalling a motivic function within a broader teleological context. Certainly Beethoven injects excitement into the proceedings, starting with the C major 'shout' that releases the energy implicit in the quiet opening phrase,[117] followed by series of syncopations, changes of tempo, periods of pent-up silence and further sudden changes in dynamic. But none of these things is inherently humorous, particularly given the prevailing minor mode; the general effect is one of agitation.

The chameleon effect is so persuasive that not only would listeners never know that quotations were present were the fact not disclosed to them, but little or nothing of the sentiments of the cited material would be conveyed either.[118] And while the second movement offers a convincing aesthetic experience in its own right (purely on the basis of the abstract musical qualities of the folksong fragments and the context in which they are embedded), a more complete understanding of the 'meaning' of op. 110 as Beethoven constructed it necessarily entails an awareness of the quotations used and their extramusical connotations, engendered by the meanings of their words and a knowledge of

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[116] Christopher Ballantine, *Music and its Social Meanings* (Johannesburg, 1984), 74.

[117] Cooper, *Beethoven*, 190.

[118] Compare Bach's use of two folksongs in Variation 30 of the *Goldberg Variations*.

the social contexts in which the songs would typically have been heard. Given such an awareness, Ballantine's dialectic could be remodelled along the lines set out in Section II above, whereby a listener's aesthetic response is held to be an amalgam of his or her immediate reaction to the modified versions of the folk-tunes, to the way they are derived from the originals, and to the manner in which they relate to the surrounding material of the sonata. This is likely to mean (following Ballantine's principle of contextual primacy) that the predominant state that is aroused will be one of agitation – a feeling which, shot through with the banal humour of the folksongs, will be contorted with irony. Given that this complex, unsettling message follows the serene though unfulfilled first movement, the effect of the Allegro molto is to emphasize the earlier uncertainty, though without entirely displacing the serenity, because of the way in which the new material is made to grow out of the old. Rather, through the zygonic relationships between them, it is as though the themes of the 'scherzo' bring to the fore latent meanings of certain material from the first movement. Hence, an aesthetic conflict is set up that demands resolution. Will the quasi-spiritual aspects of the Moderato dominate as the 'true' aesthetic of the sonata, or will the mundanity disclosed by the folksong fragments ultimately prevail? This will be determined in the last movement, and to understand how this functions in a teleological sense, we need to consider the larger-scale narrative of the whole sonata – the subject of our final analytical foray.

Teleology in music: the narrative metaphor
Earlier, I argued that the cognition of zygonic relationships in music is necessary for aesthetic coherence, an assertion that will be tested and developed as we reflect further on op. 110. However, the operation of zygonic connections cannot be sufficient in this regard, otherwise the order in which ideas were presented could (for instance) be reversed without detriment to aesthetic coherence. For example, if the fugue theme can logically be derived from the 'motto' then the converse must also be true – yet such a contortion would not make musical sense. What other factors, then, play a part? To answer this question we need to appreciate how music functions teleologically: how its components operate in relation to one another in achieving aesthetic goals (as opposed to constituting a series of discrete events that happen to share certain features). One approach to this issue is to consider music as 'narrative'.[119] The concept of narrative, an orderly account of connected events, is typically reliant on semantics and is principally used in relation to verbal formulations such as literature or drama. However, since music can generate sequences of feelings and expectations through successions of auditory events which, despite being abstract, are felt to be contingent upon one another, it is reasonable to assert that a piece of music, asemantic as it is, has a narrative thread too, albeit a metaphorical one.

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[119] See, for example, Kinderman, 'Integration and Narrative Design in Beethoven's Piano Sonata in A♭ Major, Opus 110'; Maus, 'Narrative, Drama and Emotion in Instrumental Music'.

The narrative metaphor that captures the perceived aesthetic action of a composition necessarily entails changes in affective response as events unfold over time – developments that the model presented in this article predicts are underpinned by transformations of content and structure. I have identified six ways in which such transformations may be configured:[120]

(a) where one event is derived as a whole from another;
(b) where one event is derived in part from another;
(c) where one event engenders a number of others (as a whole or in part or both);
(d) where an event is both derived from another and serves to engender a further one – forming an implicative chain of three events or more;
(e) where one event is derived from a number of others; and
(f) where the manner in which one event is derived from another is itself imitated.

This classification of the ways in which logical relationships between musical events may be disposed also maps the potential routes through which musical narrative can flow. Here the classification will be used to show how the content, structure and aesthetic response pertaining to individual events and the relationships between them work together to form the narrative of op. 110.

Type (a), through which one event is derived as a whole from another, is encountered almost immediately, when the ascent of the initial phrase, which breaks off in only the fourth bar, resumes through a substantially developed and expanded version of the opening material. The initial harmonic framework, with some modifications, is doubled in length to extend over seven bars. The homophonic/polyphonic texture is replaced with one in which a solo line and accompaniment are clearly differentiated, and the melody, consisting of a series of motivic cells derived from the 'motto'[121] with the notable addition of appoggiaturas, has a wider range than the first phrase, soaring up to f'''. Following the restraint of the opening and the uncertainty generated by the aposiopesis in bar 4, this development serves to pick up the narrative thread of the music with renewed conviction (through the extension of the harmonic framework and melodic expansion growing from reiterations of the opening motive), heightened intensity (through the unusually high tessitura of what is now a solo line) and increased expressivity (through the inclusion of appoggiaturas). However, the fresh sense of assurance is short-lived when, in turn, after only seven bars, the melody and its accompaniment break off once more and are replaced by a series of arpeggio figures (which present a further perspective on the opening material; see Figure 5).

[120] Ockelford, *Repetition in Music*, 111ff.
[121] That is, transformational configurations can (and often do) sustain zygonic links in addition to their principal structural connection (see Figure 5).

Figure 5.   Op. 110, first movement: one event derived as a whole from another (content, structure and aesthetic response).

Transformations of type (b), where one event derives in part from another, are used extensively in op. 110, and particularly at the beginnings and ends of sections and movements, which are engineered to provide coherent connections between otherwise contrasting material. For example, the conclusion of the first movement is tailored in the domains of pitch and loudness to lead seamlessly into the second (see above), while the coda of the second movement has to work even harder to bridge the gap between what is functionally a scherzo and an adagio (comprising a 'recitative' and 'aria'). Here, loudness and tempo gradually decrease, and the tonic major (F) comes to serve as the dominant of B♭ minor, the boundary between movements dissolved into an extended perfect cadence which spans their functional and aesthetic divide. As is the case at the end of the first movement, the coda here serves a dual function, with motivic links extending both backwards and forwards in time, simultaneously recalling and transforming material from the 'scherzo', while also hinting at the opening melody of the adagio (through the profile v–↑vi–↓♮vii–↑i,[122] which in turn foreshadows key expressive elements in the recitative and subsequently the aria). In narrative terms, these bars offer a transition from a period of agitated sadness shot through with irony, through what appears to be a peaceful resolution, but which proves in retrospect merely to be a stepping stone to the true pathos that follows (see Figure 6).

Transformations of type (c), in which one event serves as a source for a number of others, are characteristic of the 'motto' and its immediate derivations.[123] For example, the first phrase begets both the second main idea (as noted above) and the third: the effervescent arpeggio figure that commences in bar 12, whose initial harmonic structure can be attributed to the opening. Whereas these segments individually would express a sense of contentment, even serenity, the narrative effect of the three in sequence is rather more complex. While their brevity, contrasting characteristics and fragmentation suggest uncertainty and incompleteness, the feeling of coherence stemming from their zygonic interrelationships points to future synthesis, resolution – although it is as yet unclear how this will be achieved or what the outcome will be. Which direction will the music take next? Which feeling will ultimately predominate: the serenity or the uncertainty? Given the highly original nature of the exposition up to this point, perhaps the one thing that the first-time (though stylistically aware) listener could reasonably predict after 19 bars is that the music will chart its own course – both structurally and in terms of narrative design (see Figure 7).

Type (d) transformations, through which an event is both derived from another and serves to engender a further one, are fundamental to the construction of the sonata. For instance, the 'motto' gives rise to the inner voice in bars

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[122] 'Profile' is a term I coin in *The Cognition of Order in Music* to mean a series of relative values of pitch (thus being equivalent to 'rhythm' in the domain of perceived time) – see Figure 4.

[123] Although, as is the case throughout op. 110, this classification identifies only the principal connections among a multiplicity of links; see above, note 108.

2nd movement

[Allegro molto]

a tempo

Coda

content (*key features include*)

domain of pitch

mode: F minor ————————————————— major

profile: mixed harmonic and melodic forms of the minor scale; largely diatonic minor harmonies; intervals ≤ perfect 5th

domain of perceived time

tempo: (Allegro molto . . . discontinuous) ————————————————————

rhythm: discontinuous; coda uses syncopation at the two-bar level ———————— poco ritardando

domains of loudness and timbre:

initially very loud then loud; use of sforzandi; diminuendo to 'p'

extraoperative relationships / extramusical associations

material grows from earlier quotation of banal folk-melody fragments

structure

coherence between events is achieved through zygonic relationships in the domain of pitch as follows:

3rd movement

Adagio ma non troppo

Bb minor ————
chromatic modulation; use of larger intervals emphasizing minor qualities

Adagio ma non troppo ————
generally flowing and even

'una corda' indicates further dynamic reduction and timbral rarefication

expressive connotations of recitative and aria

F minor: V ——————— I

Bb minor: ——————— V ——— I

reinforced through regular change in tempo and dynamics in the coda

aesthetic response

agitated sadness, shot through with irony ——— *leads to* ——— *apparently peaceful resolution which proves only to be stepping stone to true pathos that follows*

narrative metaphor

Figure 6.   Op. 110, second and third movements: one event derived in part from another (content, structure and aesthetic response).

Derivation from the opening material of successive events that are relatively short-lived and with significant contrasts (**content/structure**) gives a feeling of hesitancy to material that is intrinsically calm and content (**aesthetic response**); however, the underlying coherence of the relationships between events (**structure**) suggests that these initial ideas will be reconciled in due course (**aesthetic response**) – an impression that may be reinforced by the stylistic awareness of listeners familiar with the works of late Beethoven (**extraoperative relationships**).

Moderato cantabile molto espressivo

con amabilità
(sanft)

Harmony

(see Figure 5)

cresc.

sf

p leggiermente

Figure 7. Op. 110, first movement: one event serving as a source for two others (content, structure and aesthetic response).

114 and 115, which in narrative terms fulfils two functions, encapsulating the aesthetic duality that lies at the heart of the first movement. First, it serves as a final reminiscence in this movement of the opening of the sonata, reinforcing the atmosphere of serene beauty and reflective eloquence that was established then. Second, since it constitutes the initial appearance of the theme in this transformed version, to the listener familiar with the work it is suggestive of events that are yet to come, and affirms the sense of a discourse requiring fulfilment beyond that which the first movement can encompass.

The next occurrence of this transformation is as the subject of the fugue that follows the 'recitative and aria' section in the last movement. Although the use of fugue does not entail the interjection of extraneous material in the same way that the incorporation of folksong fragments does (which bring specific musical content and structure to the sonata as well as extramusical connotations), it does represent the quotation of musical process at the highest level. Bearing the stamp of the vocal polyphony of J. S. Bach, the fugue confers a sense of timelessness and spirituality to those familiar with the Baroque composer's work and beliefs. This familiarity is essential to understanding the narrative intent of the music at this point, for it enhances the capacity of the fugue, in which expressive freedom is consciously subjugated to intellectual control, to resolve the aesthetic uncertainties and ambiguities raised earlier in the piece. Indeed, the impending sense of resolution is embedded in the very nature of the theme, which distils the essence of the motto. Here its iterative pattern of rising fourths and falling thirds, balanced by a linear descent, is captured in a new, flowing rhythm. In aesthetic terms the earlier serenity is now imbued with a new-found assurance, the original break in proceedings between the motto and its continuation being wholly eliminated in this transformed version, which supplies the contour for the end of the first subject and the entry of the second (see Figure 8).

A further link in this transformational chain is found in the inverted subject with which the fugue recommences following a second appearance of the 'aria'. Here the domination of content by structure is complete, and the listener's aesthetic response is likely to be a complex one, combining a memory of the affective qualities of the original subject with a version whose melodic content is precisely the opposite. The result could be described as close to expressive neutrality – the denial of emotion – and to understand its significance in the narrative design of the sonata it is necessary to recognize that the inversion has a further source, thereby constituting a transformational configuration of type (e), in which one event is derived from two or more others. In this formulation, ideas may fuse more or less as equals, or one may absorb the other, implying, in terms of narrative metaphor, the aesthetic domination of one event by another. This notion is central to op. 110 (see Figure 9).

The further source of the inverted fugue subject can be traced back through another chain of events, whose first link is an external one – the folksong 'Unsa Kätz häd Kaz'ln g'habt' – and whose initial line is transformed to open the 'scherzo' in the manner described above. However, an additional transformation of tempo, rhythm and key occurs which enables the same descending contour

context / structural function	transformation of content	extraoperative factors	aesthetic response / narrative effect
opening melody of the first movement of the sonata	—	hymn-like qualities	initial serenity tempered by hesitancy; establishes axes of subsequent aesthetic dialectic
largely an inner part, which occurs in the coda of the first movement of the sonata	fragment utilizing the rising fourths and falling thirds of the 'motto'; greater rhythmic regularity; sense of line attenuated through distribution among a number of parts	—	serves as final reminiscence in the first movement of the opening theme of the sonata, yet modified in a new way which suggests further resolution to come
fugue subject which appears in the final movement following first 'Adagio' section	further manifestation of rising fourths and falling thirds followed by descent by step associated with new, flowing rhythm	connotation of vocal fugues by J. S. Bach (Masses, cantatas, etc.)	transformed opening theme has serenity now imbued with new-found assurance and spirituality
inverted fugue subject which appears in the final movement following second 'Adagio' section	melodic inversion (falling fourths and rising thirds, followed by ascent by step); rhythmic repetition	further connotation of fugues by J. S. Bach	domination of structure over content has the effect of expressive neutrality
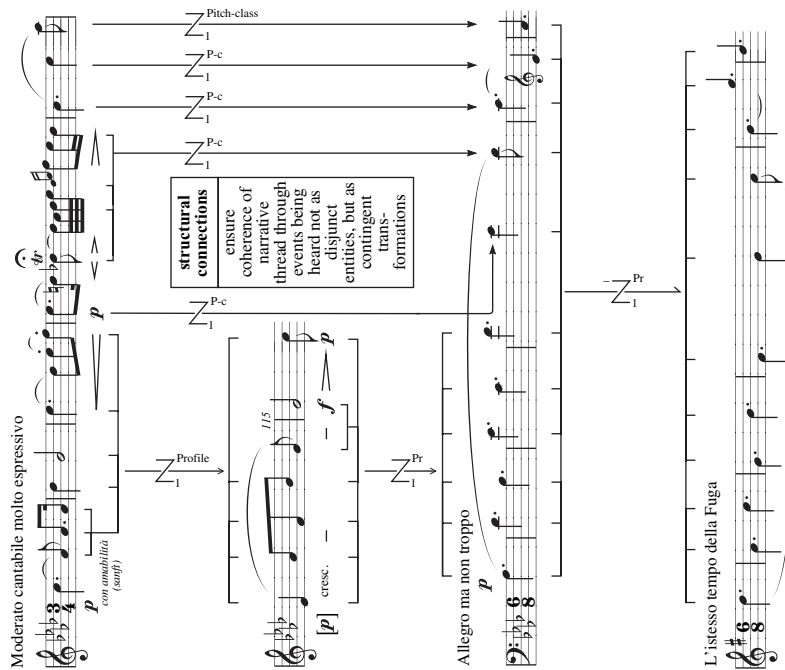
Figure 8.   Op. 110: chain of events (content, structure and aesthetic response).
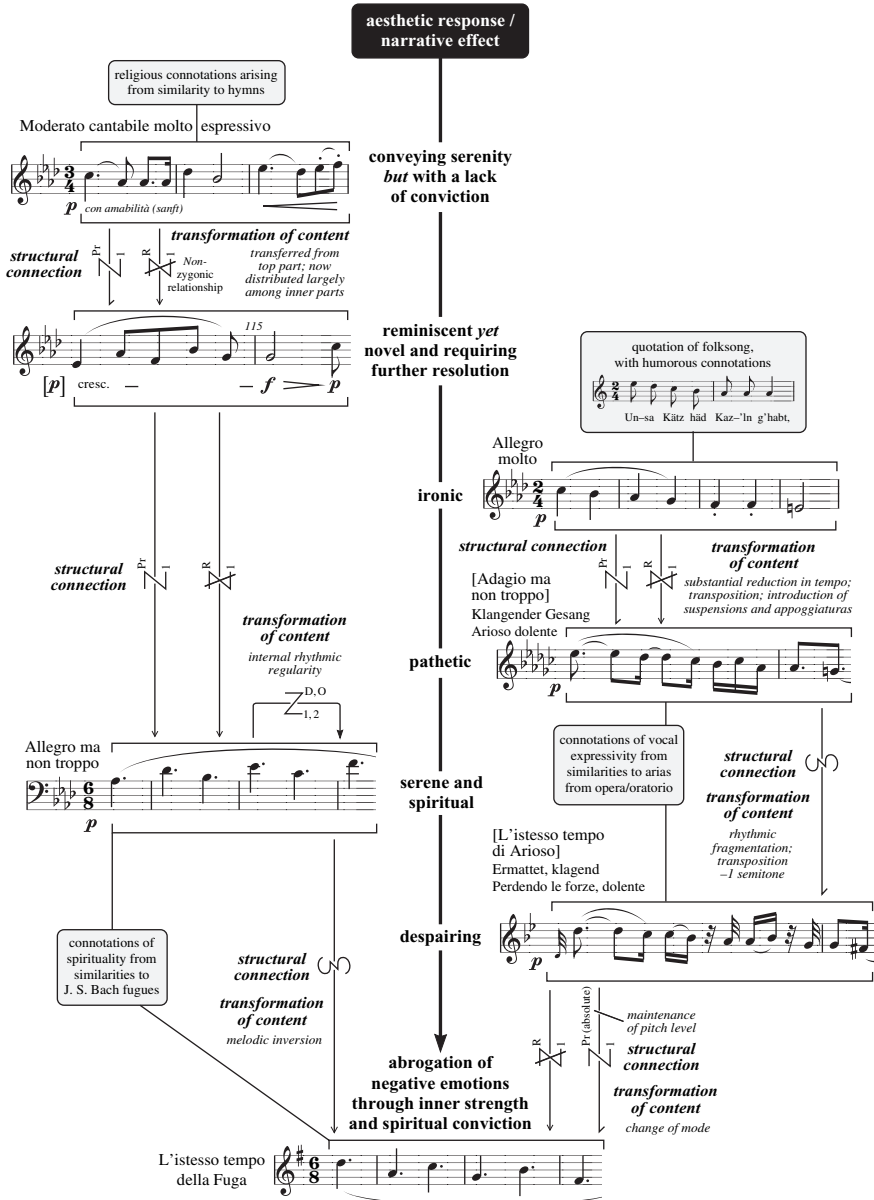
Figure 9.   Op. 110: one event derived from multiple sources.

to form the beginning of the 'aria'. In narrative terms too the material undergoes a second metamorphosis, evolving from being a source of irony to constituting the vehicle of genuine tragedy. Moreover, the grief becomes almost unbearable when the aria appears for a second time, a semitone lower, its previously flowing line broken up into a series of sobs punctuated with rests. However, while these transformations are convincingly woven into the fabric of the sonata through zygonic strands working back and forth between them and their immediate contexts, they present the listener with a narrative dilemma: how will the serenity hesitatingly exhibited in the first movement, the forceful sadness of the second with its ironic overtones of the mundane, the sense of tragedy evoked by the recitative and aria, the spirituality and seeming assurance of the fugue (which seemed at least to dissolve the doubts of the first movement, though left the irony of the second hanging), and the utter despondency of the arias be resolved? While, at this juncture, there is more than one potential aesthetic solution – the sonata could, after all, have ended in despair – Beethoven, typically, chose the transcendent. But how did he achieve this? How could the irony and the tragedy finally be vanquished?

According to the model presented above, the most powerful solution would be for representative material from the 'scherzo' and the aria (which carries with it the aesthetic import of the recitative from which it partially derives) to be absorbed into the fugue – in narrative terms, for tragedy to be conquered by the indomitable force of the intellect, and for the ironic and mundane to be vanquished by spiritual purity.[124] This is precisely what happens. As the fugue sets off again, it is evident that the new descending contour, primarily derived through inversion of the original subject (and ultimately stemming, therefore, from the motto) is also a transformation of the opening of the aria melodies (and so constitutes a development of the beginning of the scherzo and, ultimately, its folksong source). At this point, then, two of the major narrative streams of the sonata coalesce, and the extraneous material of the first folksong, which introduced irony and then tragedy into the intrinsic serenity of the sonata, is finally subsumed by it, in a single, simple, unaccompanied melodic line which, bearing so many connotations and necessarily subject to tight structural constraint, is almost devoid of immediate feeling.

This emotional stillness does not last, though, as the subject in its original shape quickly reasserts itself, but now simultaneously in augmentation and diminution (and so utilizing a transformational configuration of type (f), whereby the manner in which one event is derived from another is itself imitated; see Figure 10).

At this point, the entire three-part texture is made up of variants of the fugue subject – an intensification of the action that gives a sense of impending climax.

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[124] See Kinderman, 'Integration and Narrative Design in Beethoven's Piano Sonata in A♭ Major, Opus 110', 117.

Figure 10. Op. 110, third movement: imitation of the manner in which one event is derived from another.

However, the use of the minor mode indicates that there is still some way to travel, and in terms of the large-scale narrative of the piece one further resolution is indeed still required, for the ironic connotations of the second folksong cited in the second movement have not yet been expunged. Sure enough, the necessary act of sublimation comes as the music moves to the dominant key in a final approach to landing, as it were, and a series of foreshortened versions of the subject, now in double diminution, capture the opening motive of 'Ich bin lüderlich', repeatedly annulling it in a sequence of terminal descents. Through 14 appearances in six bars, the successive entries come to support a final appearance of the subject in inversion, before dissolving into a stream of regular semiquavers that accompany concluding entries of the subject in its original form, beginning in the bass and ending with an extended version in the treble. Here, the texture recollects that used in the recapitulation in the first movement, generating a sense of return that adds to the feeling of fulfilment. At the very last, the cadential A♭ major chord with c''' at the top in the highest register represents the apotheosis of the opening sonority,[125] and initiates a final echo of the descending third, which reaches over an octave into the terminal chord (see Figure 11).

In summary, the relationship between content, structure and aesthetic response in op. 110 at the highest level can be captured in a narrative metaphor as follows. The first movement, while in sonata form, serves as an exposition for the entire work, presenting a series of ideas that derive directly or indirectly from the initial four bars, offering a range of perspectives on the opening material that are at once serene and contemplative yet tentative and unfulfilled. This duality remains unresolved at the end of the movement, indicative of further developments to come, though what form these will take is not clear at this stage. Beethoven's solution is to introduce extraneous material, which tests but is ultimately transformed by the innate strength of the sonata's own resources. In the second movement, formally a scherzo, intrinsically sad and agitated, two banal folksongs are incorporated so that they grow organically from the resources of the Moderato. Hence, rather than adding a mundane comment on proceedings, this injection has the effect of effacing the calm spirituality of the first movement in a stream of forceful irony. In the first section of the third movement, the material is transformed again by a further external influence – the general structure and content of the eighteenth-century 'recitative' and 'aria' – forming a slow movement that is unremittingly tragic in tone. A final extraneous factor is introduced in the first attempt at resolution that follows: the fugal process, particularly alluding to the work of J. S. Bach. The 'motto' from the first movement is recast as the subject, which flows with a new-found assurance, and the aesthetic ambiguity of the first movement appears to have been eliminated by the structural discipline of the fugue. However, this initial effort to

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[125] See Kinderman, 'Integration and Narrative Design in Beethoven's Piano Sonata in A♭ Major, Opus 110', 140.

1st movement

3rd movement

apotheosis

Figure 11.   Op. 110, first and third movements: construction and effect of climax.

resolve matters fails, the 'aria' returns in intensified form, and the music sinks back into even greater despair than before. From this nadir, though, with a huge effort, the fugue re-emerges with a new focus and sense of purpose that almost precludes emotion. Material from the folksongs and the 'aria' is synthesized with versions of the subject; in narrative terms, the earlier irony and despair are assimilated and then expunged by the intellectual conviction and timeless spirituality of the fugue. This process complete, the 'motto' (as fugue subject) returns, transcendent, and the journey ends (see Figure 12).

IV. Conclusion

This article opens with a series of questions concerning the structural significance and expressive import of the inverted fugue subject that begins in bar 137 of the third movement of Beethoven's Piano Sonata op. 110. In seeking answers to these questions, a model is developed which aims to show how listeners' aesthetic response to music – at least in Western 'mainstream' traditions – may be related to its content and structure (as defined through zygonic theory). The model is conceptual in nature, and draws upon contemporary thinking and empirical findings from a number of musicological disciplines, particularly psychology, philosophy, theory and analysis. It offers a framework for further research in each of these areas. Here, the interaction between five aspects of the model (content, structure, extraoperative relationships, extramusical associations and aesthetic response) is considered through an analysis of op. 110. Clearly, other work could be undertaken to test the usefulness and efficacy of the model in a range of cultural and stylistic contexts and set alongside different analytical methodologies. Nonetheless, the preliminary efforts set out here suggest that the model may have some value in addressing the persistent problem in musicology identified by Cook and Dibben of 'how to speak about music and emotional meaning at the same time, without changing the subject'.[126] In the analysis presented here, the division is clear and consistent. Unfortunately, however, the problem is more deep-seated than this, since both our conceptual and linguistic vocabularies are currently inadequate to the task. We are unable to talk about the aesthetic qualities of music with any precision or, ultimately, without engaging in a certain circularity; we cannot capture the essence of how music makes us feel any more than we can adequately represent any other emotional state in words. Paradoxically, though, models such as the one presented here do enable us to engage purposefully with the key questions of how music makes sense, of how it works: of how it is that abstract patterns in sound are able to convey meaning, and what the characteristics of that meaning are.

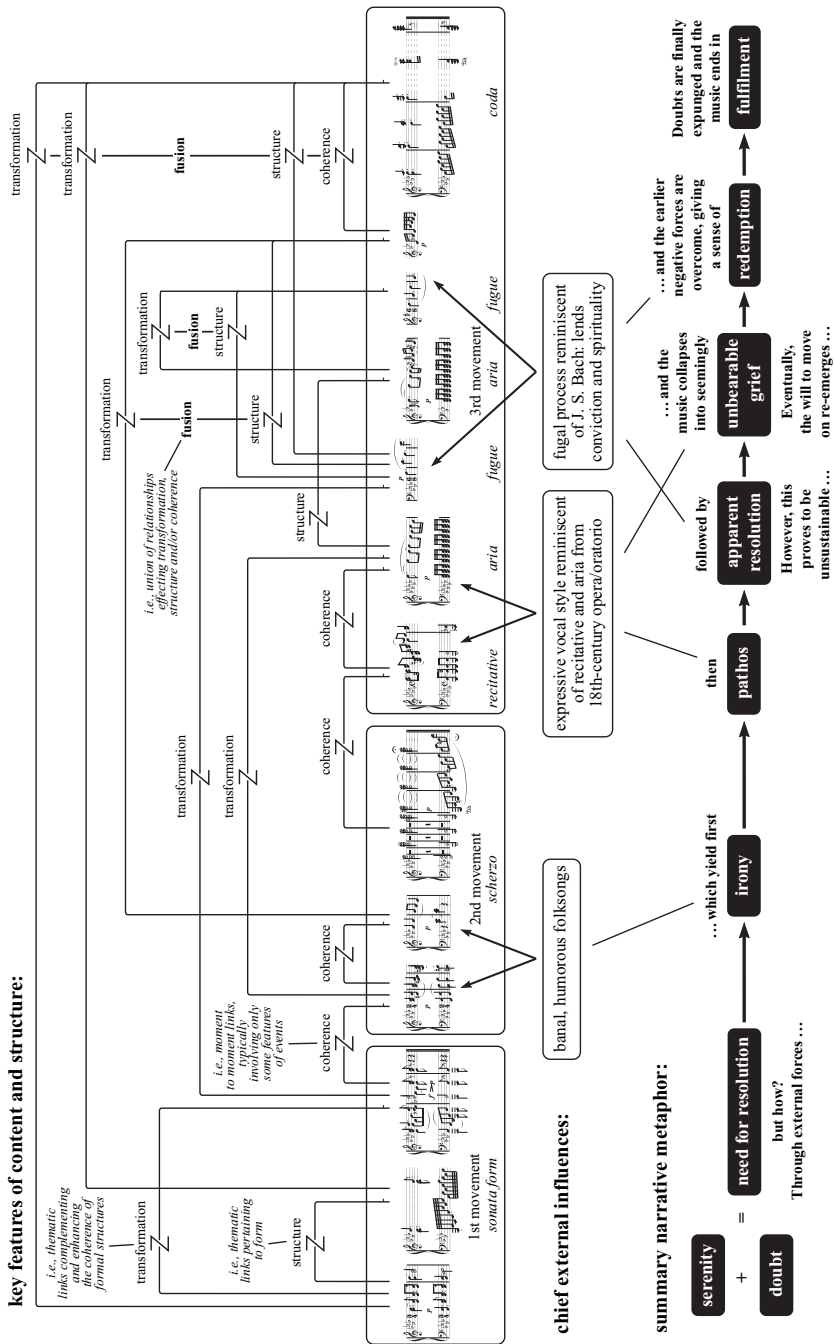[126] Cook and Dibben, 'Musicological Approaches to Emotion', 67.

Figure 12.   Op. 110: summary of content, structure and aesthetic response. For clarification of musical detail, see p. 117.

Figure 12. continued.   Clarification of musical detail.

ABSTRACT

A model is presented which aims to show how, for listeners familiar with a given style, aesthetic response to music may be related to its 'structure' (as defined in relation to 'zygonic' theory) and 'content' (the particular perceived qualities of sound that pertain to a given musical event). The model combines recent empirical findings from music psychology with other approaches adapted from music theory and philosophy. Intra-musical considerations, which form the core of the model, are positioned within a broader socio-cultural, cognitive and physical context. The new framework is used to inform an analysis of Beethoven's Piano Sonata op. 110, which examines in particular the notions of teleology in music and narrative metaphor.