Journal of Film Music 5.1-2 (2012) 179-198
doi:10.1558/jfm.v5i1-2.179

ISSN (print) 1087-7142
ISSN (online) 1758-860X

ARTICLE

Music Theory through the Lens of Film

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Abstract: The encounter of a musical repertoire with a theoretical system benefits the latter even as it serves the former. A robustly applied theoretic apparatus hones our appreciation of a given corpus, especially one such as film music, for which comparatively little analytical attention has been devoted. Just as true, if less frequently offered as a motivator for analysis, is the way in which the chosen music theoretical system stands to see its underlying assumptions clarified and its practical resources enhanced by such contact. The innate programmaticism and aesthetic immediacy of film music makes it especially suited to enrich a number of theoretical practices. A habit particularly ripe for this exposure is tonal hermeneutics: the process of interpreting music through its harmonic relationships. Interpreting cinema through harmony not only sharpens our understanding of various film music idioms, but considerably refines the critical machinery behind its analysis. The theoretical approach focused on here is transformation theory, a system devised for analysis of art music (particularly from the nineteenth century) but nevertheless eminently suited for film music. By attending to the perceptually salient changes rather than static objects of musical discourse, transformation theory avoids some of the bugbears of conventional tonal hermeneutics for film (such as the tyranny of the "15 second rule") while remaining exceptionally well calibrated towards musical structure and detail. By examining a handful of passages from films with chromatically convoluted scores—*Raiders of the Lost Ark*, *King Kong*, and *A Beautiful Mind*—I reveal some of the conceptual assumptions of transformational theory while simultaneously interpreting the scenes and films that these cues occupy. Ultimately, it is the notion of "transformation" itself—as a theoretical keystone, an analytical stance, and an immanent quality of music—that is most elucidated through this approach.

Keywords: chromaticism; transformation theory; music theory; John Williams; James Horner; James Newton Howard; neo-Riemannian

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It is perhaps unsurprising that music theory has made only tentative and halting contributions to the young field of film musicology. Despite the existence of a number of promising exceptions, the disciplinary landscape of Anglo-American music theory has been largely unmarked by sustained or rigorous work on this repertoire.[1] This is reflected in a paucity of

* I would like to thank William Rosar for spearheading this publication and the symposium at which it first appeared, and for supplying helpful feedback at various stages of its genesis. Some material in this article is based on research done in my dissertation, "Reading Tonality through Film: Transformational Hermeneutics and the Music of Hollywood" (Harvard, 2012).

1 The vitality of "film music theory" can be assessed by noting the number of scholars with academic positions as music theorists who have published or presented on film musical topics. Within the disciplinary boundaries of music theory thus defined, film music theory is practiced by only a handful of theorists. The most significant contributions to this nascent sub-discipline come from David Neumeyer (particularly 1998 and 2001) and Ronald Rodman (1998, 2000, 2010). Important contributions have also been made by Alfred Cochran (1986, 1990), Charles Leinberger (2002), Scott Murphy (2006), and Rebecca Eaton (2008). This number does not include the considerably larger cast of scholars who do not have explicit music theoretical professional affiliation but have nevertheless contributed to the field through work of a broadly theoretical orientation (such as through motivic, formal, and stylistic analysis). It also leaves out those who hail from institutions outside the English-speaking core from which, for better or worse, I judge the overall vigor of Anglo-American film music theory. This disciplinary lacuna on the English-speaking side is, thankfully, quickly being filled in.

film music offerings in the conventional venues of the English-speaking theory world: theory journals, conferences, dissertations, and monographs. Even as music theory makes inroads in traditionally shunned styles like jazz and pop, film music in several crucial ways presents a uniquely confounding corpus. It is defiantly "non-absolute" music, composed as but one part of a superordinate text. It hails from a repertoire with a shaky relationship with more accepted canons for analysis. It appears to eschew or (worse) to be constitutionally incapable of many of the pet-preoccupations of modern theorists, particularly with regard to the ur-theoretical category of long-range tonal structure. And so on.[2]

In this article, I propose a means of redressing this neglect from within the field of music theory. The chances of success for such a project are improved if we reverse the traditionally dependent relationship between repertoire and analysis. That is, we should not attempt "selling" film music to theorists by stating that the repertoire is in desperate need of theory in order for its styles to be understood and its structures to be parsed. While theoretical rigor can only benefit film musicology, the impressive analytic work of many non-theorists shows that the field is doing well without music theorists hollering "you're doing it wrong!" Let us instead consider the more productive position that music theory stands to see itself enriched, expanded, and clarified by contact with this fresh repertoire. Without exposure to new corpuses, music theory has a problematic (if too easily ridiculed) tendency to get hung-up on picayune distinctions relevant only to small amounts of music and even smaller groups of scholars. By exploring analytically ripe film scores with the latest models of musical structure and meaning, music theory will find itself standing on firmer, more relevant ground.

One topic of special importance to contemporary music theory that serves an effective bridge between methodology and repertoire is *transformation*. In the past two decades, a large if somewhat loosely united group of analytic and conceptual tools has coalesced into one of the discipline's newest theoretical systems: transformation theory. I will explain the conceptual underpinnings of the system—and its amenability to film music—shortly, but first it will serve to consider "transformation" more generally. Film musicology is already deeply invested in notions of change and adaptation; as this issue attests, tracking historico-stylistic transformations is a vibrantly active undertaking. The film musicologist traces the ways in which musico-dramatic practices evolve through the history of cinema. But transformation is hardly limited to relevance in this diachronic dimension. John Williams, in an interview in which he defends the composition of original underscore (as opposed to Kubrickian use of preexisting pieces), makes a claim that rings true to anyone who has analyzed or composed for screen:

> [A film composer can] take themes and reshape them and put them in a major key, minor key, fast, slow, up, down, inverted, attenuated and crushed, and all the permutations that you can put a scene and a musical conception through, that you wouldn't be able to tastefully do if you had taken a Beethoven symphony and scored…with that.[3]

By invoking notions of variation, permutation, and taste, Williams alludes to deep principles of film scoring. Where bending musical material at the whim of cinematic need would be tasteless according to misplaced Beethovenian expectations, it is an asset to the composer for celluloid. Film music obeys its own rules, as it were, and is not subject to the same principles that constrain absolute music.[4] This special logic can be vividly felt in the domain of pitch-relations—harmony and tonality—which, in the absence of a priori formal motivation, become expressive resources, vessels for meaning-laden transformations.[5] Williams's own scores attest to the essential practical value of musical "permutation" for

Indeed, several offerings in the present issue of this Journal (Tobias Plebuch and Thomas Schneller) are theoretical in the most meaningful sense of the term—rigorous, concerned with both musical structure and meaning, and mindful of the preexisting literature from other theorists.

2 Some of these challenges echo issues raised in the annals of opera interpretation, as articulated by Carolyn Abbate and Roger Parker in their introduction to *Analyzing Opera* (1989: 1-24). The parallels between film music and opera go deeper than their shared analytical stumbling blocks, of course, and need not be belabored here. But it is worth noting that an important difference, with ramifications for analysis, is that unlike opera, film decouples dialogue (explicit meaning) and music (implicit or non-denotative meaning). This places film much closer to melodrama in its musico-dramatic practice, as is demonstrated by several other articles in the present journal.

3 Quoted from Thomas, "A Conversation with John Williams" (1991).

4 These rules are not dissimilar to those at play in one of the clear stylistic precedents for the symphonic, theme-reliant underscore employed by Williams and others: Wagnerian music drama. Williams's sentiment echoes uncannily Wagner's defense in *Über die Anwendung der Musik auf das Drama* of his own "audacious," "far-fetched," and symphonically "inconceivable" musical transformations—thematic manipulations he argues are totally cogent within the dramatic context of the *Ring* cycle. It is no coincidence that those passages Wagner singles out in his own musical prose (specifically permutations of the Valhalla, Rheingold, and Tarnhelm leitmotifs) are among the materials most discussed by today's transformation theorists (as in Lewin 1992, Hunt 2007).

5 David Neumeyer's (1998) critique of film tonal structure remains an indispensible contemplation of style of analysis of questionable suitability to motion picture music, and of the interaction of traditional theoretical categories with the unique poietic and esthesic qualities of cinema.

generating spans of film musical time and infusing those spans with appropriate semantic content; I will shortly demonstrate this sort of tonal/thematic manipulation in his *Raiders of the Lost Ark* score. In programmatic repertoires generally, change is a more basic compositional parameter (and analytical focal point) than predefined structure (like the Schenkerian *Ursatz*) and autonomously motivated musical discourse. Thus, if film musical *change* is a practical imperative, then transformation ought to be a principal interpretive category.

Transformation: Thematic, Expressive, Algebraic

Theorists use "transformation" as a blanket term for a variety of different concepts, sometimes without clearly distinguishing which is meant at the time, or why. It will serve us here to delineate the three most important senses of the word: thematic, expressive, and algebraic. The thematic connotation is most familiar, and is most widely discussed by film musicologists (and composers—John Williams appears to have this sense in mind in his discussion of musical permutation). The art of *thematic transformation* is the practice of modifying discrete units of musical discourse like motifs and melodies, as well as more abstract structures like harmonic progressions or rhythmic patterns, over the course of a piece.[6] This may occur incrementally, with gradual changes constructing apparently new themes piece-by-piece out of old ones. But it may just as easily take place in summary fashion, with an accustomed theme miraculously transmuted into a fresh variant when dramatic context insists on swift metamorphosis. Thematic transformation is chief among the procedures by which a signifying device like leitmotif is able to contribute to film something more consequential than mere "calling-card"-style announcement. The prevalence and occasional subtlety of the technique in film forces us to address some important theoretical questions. First, under what circumstances should we relate musical materials with clear harmonic affinity but without melodic or motivic similarity? Thematic transformation is easy to reconstruct and interpret when the rhythmic/intervallic structure of a theme is retained and harmony or orchestration shifts. But what of the reverse, when an underlying harmonic paradigm is retained but melodic information is heavily disguised or discarded wholesale—should this even count as transformation? Furthermore, in what way might such harmonic-thematic transformation correlate with shifted semantic content? This amounts to asking how musical hermeneutics ought to respond to harmonic transformation. An analysis of a cue from James Newton Howard's score to *King Kong* (2005) will address these questions directly.

The second theoretical sense of transformation is of music's ability to project *change as such* as its dominant organizational and expressive impulse. Where some pieces may put forth as their primary coherence-granting structure a single musical object (such as a prolonged tonic, a retained rhythmic pattern, etc.), works that rely heavily on constant but traceable change can be said to be transformationally motivated. Many soundtrack cues possess this dynamic, processual character, together forming an example of what Robert Hatten has termed an "expressive genre." The concept of expressive genre refers to any consistently signifying collection of related musical topics (association-laden units of musical discourse) that are combined together to suggest "broad expressive states," independently of a specific type of formal design.[7] Familiar Classical expressive genres include "the Pastoral" and "*Sturm und Drang*."[8] These signifying categories are just as prevalent in film music. For example, the expressive genre "hurry" depends on the accumulation of energy through consistent motion without a sense of arrival. Conceived in this abstractly expressive way, the musical topics of activity and urgent impatience almost suggest themselves—the minor scalar runs and chugging accompaniments at fast tempi virtually *de rigueur* for hurry-type cues. Indispensible clusters of film music topoi like this and many others are as much in play in J. S. Zamecnik's prototypes in silent-film music anthologies from 1913 as they are in the action thrillers of present day.[9]

6 Thematic transformation-as-formal strategy is strongly associated with Franz Liszt, and many of the prototypical devices for dramatic theme manipulation found in film music can be traced to his programmatic symphonic works. Wagner's "transformation" of the technique of reminiscence motif of Grand Opera to the leitmotif of his own mature dramas—and thence to Strauss, Huppertz, Korngold, Steiner, Williams, Newton Howard, and so on—owes much to the powerful influence of Liszt.

7 See Hatten 2004: 67.

8 The notion of expressive genre as it pertains to film musical genres and style topoi is taken up by Ronald Rodman in *Tuning In* (2010).

9 This is not to say that the precise sound of 1913 and 2013 hurries sound similar. Expressive genres are subject to stylistic evolution like anything else. Because they are generated from clusters of topics, rather than hard-and-fast instructions of "include this gesture, exclude that one," their development across decades of film history can actually be quite varied—so long as the broadest elements of musical meaning are included. In the case of the hurry genre, contemporary scoring is likely to involve topical additions like electronic percussion loops and subtractions such as decreased emphasis on functional harmony.

In the case of the transformational expressive genre in film music, the constitutive associative-laden topics include:

1. Fast but steady harmonic rhythm, often with sequential or oscillating progressions;
2. Ample chromaticism without retention of a single tonic;
3. Motor rhythms and ostinato accompaniment figures to suggest an ongoing process;
4. Pliable melody and instrumentation to fit (or imply) quickly changing dramatic situations.

Again, the delineation of a model for transformation invites several opportunities to clarify deeper theoretical issues. Even when the elements of the generic list are realized, can music embody this dynamic aesthetic when its components are blended with those of a more static character? For example, what do we make of film music written in the static style of the American minimalists that nevertheless seems to pulsate with harmonic change?

Establishing the dramatic ends served by this transformational aesthetic helps to address such issues. While I do not plan on laying out the full gamut of cinematic needs a change-as-such expressive genre can fill, two types of scenes jump out as potential beneficiaries: sequences of creative thought, and time-lapse montages. In the former, this element could be likened to an "idea" within the film character's own mental state; music can depict intellection while other cinematographic techniques risk crudely literalizing the unknowable workings of the mind. In the latter, metamorphic music is of general editorial utility, injecting a form of sustained eventfulness—continuity through transformation—to counter the dispersive effects of rapid cuts and shifts in temporal point of view. A second short case-study of James Horner's music for *A Beautiful Mind* (2002) will demonstrate how this expressive genre can vividly and decisively benefit both montage and thought-process narratival purposes.

There is a third definition of transformation that has been of interest to a certain stripe of mathematically oriented music theorists: transformation as well-defined actions within an abstract algebraic setting. This article has neither the scope nor the need for any extended exegesis of the mathematical conception of "transformation," but a limited introduction can clarify some aspects of the thematic and expressive varieties discussed above.[10] The methodology that underlies applications of abstract algebra to music analysis (appropriately dubbed "transformation theory") is of tremendous utility to film music scholarship. Though it has not yet penetrated the broader musicological sphere in the same fashion that Schenkerian or set-analysis have, transformation theory is close to becoming enshrined as the dominant North American theoretical approach for analyzing chromaticism. The theory is the brainchild of theorist David Lewin, whose influential writings in the 1980s and 1990s strove to usher in a paradigm shift in how we hear and think about music. Lewin urged moving away from treating of musical phenomena as though they were reified events and objects, and instead suggested conceptualizing them as dynamic processes and gestures. To paraphrase Lewin in the foundational text *Generalized Musical Intervals and Transformations*, we should ask "if I am at musical event *s* and wish to get to *t*, what sort of musical change [a transformation] should I enact in order to get there?"[11] The system Lewin arrayed to answer that self-posed question recruits the tools of abstract algebra and graph theory to convey aspects of musical perception both sophisticated and intuitive.[12] The transformational ethos consists of a devoted and rigorous interest in *characterizing* the stuff of change.[13] This applies not only to single events, but to interactions of large networks of musical relationships. When its sights are trained onto pitch relations, transformation theory grants us a means of *reading* harmony. Importantly, it enables this reading without necessarily referring to a fixed key. This agnostic attitude towards tonic-assignment is liberating in a repertoire like film music, where maintenance of pitch-centers is often deemphasized in favor of continuous expressive modulation.

The formal machinery of transformation theory involves the distillation of characteristic changes such as harmonic motions into algebraic transformations.

10 Those who wish for more explanation can turn to Steven Rings (2011), who provides a user-friendly introduction to transformation in this sense (and transformation theory at large), accessible for those with little background in abstract algebra.

11 Lewin 1987. The much quoted passage paraphrased above comes from pp. 158-59.

12 When the Lewinian approach restricts its purview to music based around the consonant triad, it is customary to refer it to neo-Riemannian theory. This designation points to conceptual basis in theories of nineteenth-century German theorists like Hugo Riemann, for whom issues of musical space, chromatic function, and enharmonic identity were persistent subjects of theorization. The reader curious in the intellectual background of neo-Riemannian theory can consult Cohn 1998 and Gollin and Rehding 2011.

13 Rings gives this account of the transformational ethos: "Transformation theory is a branch of systematic music theory that seeks to model relational and dynamic aspects of musical experience. The theory explores the manifold ways in which we as musical actants—listeners, performers, composers, interpreters—can experience and construe relationships among a wide range of musical entities (not only pitches). The formal apparatus of the theory allows the analyst to develop, pursue, and extend diverse relational hearings of musical phenomena" (Rings 2011: 10).

It can encode chromatic progressions in a variety of ways. The simplest method is to make note of the interval spanned between two sonorities. The notation $\mathbf{T}_n$ indicates transposition pitch by n semitones (with octave equivalence). This sort of description suits passages related by incremental transposition as well as harmonic motions constructed from clear parallel voice-leading (sometimes called "planing"). However, transposition fails to account for changes in triadic mode, and neglects another component of triadic chromaticism pertinent to film: common-tone relatedness. Chromaticism enables the connection of harmonic progressions very distant by diatonic metrics through measuring the presence of shared triadic tones. This principle of "triadic parsimony" can describe complex chromatic progressions in terms of small (and again incremental) displacements of single tones with a triad. For example, the characteristically filmic third progression C major ⇨ E major would be treated as a simple $\mathbf{T}_4$ progression by transposition, but this fails to account for the importance of the shared E of both chords. A preferable analysis describes it through two common-tone retaining transformations. First, the pitch C in C major is displaced to B, forming an E minor triad. Second, the pitch G is shifted to G♯, producing the E major triad as a result. In the algebraic notation of transformation theory, this would be described as an **LP** progression. **L** indicates the "Leittonwechsel" operation (which shifts the single member of a triad that does not make up its minor third by one semitone). **P** indicates the "parallel" operation, which reverses the triad's mode.

A small inventory of these transformational operations can fully describe any conceivable triadic relation; it is up to the analyst to pick which combination of transposition, common-tone, and functional operations best capture the unique quality of any given progression. Example 1 lists five transformations to be used in this article, with simple definitions of what changes they effect on a triad. Transformational analysis typically involves the chaining of numerous such operations together to form compound transformations (such as **LP**). These multiple transformations are then typically interpreted as visual networks to highlight salient relationships and assemble metaphorically suggestive spaces.

The advantages of applying transformational techniques to the film musical corpus are numerous. By attending to the perceptually salient *changes*, rather than static objects, of musical discourse, the theory avoids some of the bugbears of conventional tonal hermeneutics for film. These stumbling blocks include the restrictions of the "15 second rule" and the sometimes wrongheaded impulse to read tonality over whole movies. At the same time, it is exceptionally well calibrated towards musical detail and the listener's dynamic apprehension thereof. In film music, where the spectator's attention tends to be limited to fairly local harmonic phenomena, a theoretical apparatus that targets expressive change is a decidedly more appropriate tool than one that seeks out long-range coherence. The aptness of methodology is complemented by an aptness of target repertoire. Transformation theory, though it grew out of analysis of atonal music (and persists investigating it in some circles), has seen most of its growth in research on Romantic-era chromaticism. In the tonal practice of Liszt, Wagner, and other Romantic composers, traditional coherence-based models have historically faltered—if not outright failed—in music analyses. Because this chromatically oriented tonal idiom has enjoyed a continually revitalized presence in Hollywood, the Lewinian methodology, devised *expressly* to handle such non-normative musical syntax, is irresistibly appropriate.

Romantic-era chromaticism comes in several dialects, but the variety that transformation theory is particularly concerned with is *triadic chromaticism*. I define this as the use of consonant sonorities (namely the everyday [037] triad) in progressions that are not

Example 1: Transformation Inventory

Symbol	Transformation	Example
$\mathbf{T}_n$	Transpose by n semitones	$\mathbf{T}_2$ (C maj) = D maj
DOM(inant)	Become dominant of / $\mathbf{T}_5$	**DOM**(C maj) = G maj
P(arallel)	Invert about fifth / displace non-ic5 pitch	**P**(C maj) = C min
L(eittonwechsel)	Invert about fifth / displace non-ic3 pitch	**L**(C maj) = E min
R(elative)	Invert about fifth / displace non-ic4 pitch	**R**(C maj) = A min
S(lide)	Invert fifth about third / displace non-ic5 pitch	**S**(C maj) = C♯ min

directed by diatonic intervals or functional routines. Triadic chromaticism in film tends to correspond with four closely related aesthetic needs that are essentially holdovers from nineteenth-century musico-dramatic rhetoric. The first of these is **intensification**, in which chromatic motions suggest a ramping up of energy beyond the confines provided by diatonic space; incremental transposition of passages by semi- or wholetone is a well-exploited version of this broader harmonic strategy.[14] The second affective use of triadic chromaticism involves aspects of **magic and the occult**. Music in this vein plays upon the still-potent strangeness of many chromatic progressions insofar as they are set against normative diatonic progressions.[15] Such capacity to signify uncanniness and alterity also associates the idiom with **unusual psychology**, particularly of madness and dream-like states, evoked through traditionally disorienting sonorities like the whole-tone collection and the diminished seventh chord. Finally, the category of the **sublime**—the commingling of awe and fear—is easily evoked by triadic chromaticism, particularly when realized through the association of chromatic motions and large tonal distances.[16] All four chromatic aesthetics involve heightened states relative to everyday reality, whether perceptual or metaphysical. Because film, and Hollywood genre film in particular, is invested in conveying a sense of heightened reality, the well-mined progressions of triadic chromaticism as a class are themselves associated with "the movies." The remark that something "sounds like film music" is often attributable to the presence of these harmonic transformations, irrespective of any actual cinematic provenance of the music they are heard in.

Williams: *Raiders of the Lost Ark*

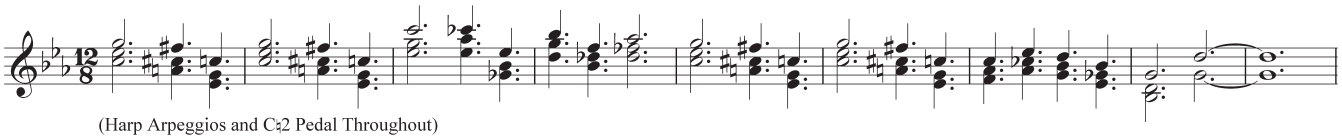
To see this methodology at work let us examine a passage from a score by John Williams: the iconic "Map Room: Dawn" scene from Steven Spielberg's *Raiders of the Lost Ark* (1981). In this sequence, the protagonist Indiana Jones consults a mysterious chamber that, with the right artifacts and at the correct time of day, reveals the location of the film's MacGuffin, the Ark of the Covenant. Williams's cue for this scene is structured around several progressively more urgent statement of the "Ark Theme," shown in Example 2 in a reduced transcription by the author (as will be all musical examples in this article). The theme that provides the basis for "Map Room" is highly chromatic, constructed almost entirely from non-diatonic transformations acting on purely minor triads. Particularly salient is the theme's *leitharmonie*, a tritonal oscillation between tonic and the triad $\mathbf{T}_6$ away. The theme thus draws on centuries' worth of associations with dark magic, and implies to the audience that this is a dangerous MacGuffin, best left untouched by humanity's grasping hands.[17] The menace of the c⇔g♭/f♯ oscillation stems from both the malevolent associations of $\mathbf{T}_6$ and the bumpiness of the underlying transformation, as reckoned from a common-tone preserving perspective. No parsimonious path exists to get from c to g♭/f♯ (the most plausible path involves the quaternary transformation **RPRP**). Example 3a demonstrates the tortuous route to accomplish the diabolic oscillation through incremental pitch displacements. This rough quality contrasts interestingly with the considerably smoother second phrase, analyzed in Example 3b. That portion follows a stepwise descending pattern that methodically ushers C5 back down to the theme's starting melodic tone G4. Williams actually artificially "roughens" the passage's voice-leading to insure motivic continuity with the opening phrase, but this partial masking of ideal smoothness does not diminish the progression's coiled, dangerously fascinating character.[18]

Example 4 produces an analyzed transcription of the climactic passage from the "Map Room" sequence. Here, the Ark Theme's tonally centrifugal tendencies finally spring it free of the imposed confines of C minor. In an elegant symmetry, the

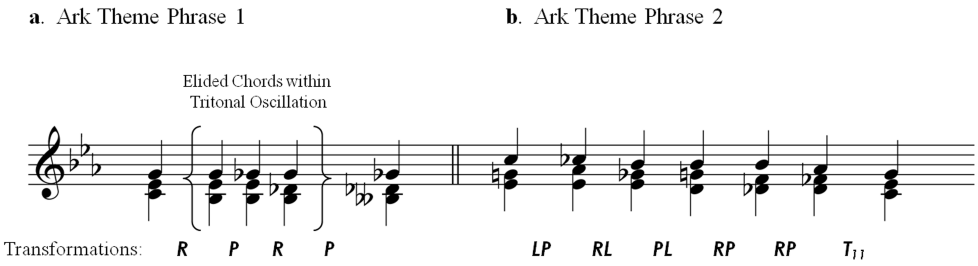
14 The use of stepwise modulation to communicate musical intensification was coined "expressive tonality" by Robert Bailey (1977) in his foundational study of Wagner's mature tonal designs. While numerous scholars have picked up the phrase after Bailey, it is a somewhat inapt label, as tonal expressivity is hardly limited to motions by m/M2. The artificial intervallic limitations of Bailey's terminology are lifted in a few recent cases, such as Christopher Doll's (2011) treatment of meaningful modulations in pop songs.
15 The association of chromaticism and the otherworldly, particularly in nineteenth-century music, is well established in musicology. Taruskin 1985 on octatonicism, Cohn 2004 on hexatonic poles, and Bribitzer-Stull 2012 on Tarnhelm progressions are examples of genealogical studies of certain progression-classes tied to Romantic era harmonic weirdness. While these harmonic effects occur with associations firmly intact in film music, only Bribitzer-Stull traces development to contemporary scoring practice.
16 See, for example Edmund Burke's (1757) *Enquiry into the Origins of our Ideas of the Sublime and Beautiful* and Immanuel Kant's (1790) *Third Critique* for canonical treatments of this aesthetic state.

17 The associative pregnancy of $\mathbf{T}_6$ is well-exploited by film composers and well-observed by commentators. Janet Halfyard (2010) notes its use in supernatural horror comedies, William Rosar (2006) in the music of Leith Stevens, and Scott Murphy (2006), from a transformational perspective, in science fiction cinema.
18 Murphy (forthcoming) observes a parallelism in this phrase of the Ark theme, in which an initial downwards major third progression (**LP**) is counterbalanced by an upwards M3 progression (**PL**) one chord-pair later. Based on his research, he finds that downwards minor **LP**s generally tend to venture away from tonics, while the converse is true for upwards **PL**s. Thus the move from E♭ to G minor offsets the tonal digression initiated by C to A♭ and begins the homeward-bound m3 sequence that closes in on the tonic (or rather, its $\mathbf{T}_{11}$ related substitute, D♭ minor).

Example 2: Williams: *Raiders of the Lost Ark*, Ark Theme



Example 3: Ark Theme Linear Analyses



same straining minor-third progressions that arrive at the theme's C-minor apotheosis (mm. 1-6) are recruited to dismantle that key's primacy after m. 19. What follows is a passage of consummate triadic chromaticism, hinting at but never firmly establishing the keys of E♭, F♯, B, and G minor. Smooth voice-leading arises at many instances, impelled by a semitonally craning melody. Functionally ambiguous oscillations are rife, as are multiply embedded minor- and major-third progressions. The latter is instanced by an incipient major third (**LP**) cycle at mm. 19, 23, and 26, indicated by dotted arrows.[19] The exaggeratedly definitive "functional" cadence to C♯ minor that finishes the section (and establishes the concluding tonic of the cue) stands out amidst this chromaticism. The cadence, which begins at m. 27, is itself a reinterpretation of the cadence of the more neutral version of the theme presented in Example 1. The thunderous underlining of G♯2⇨C♯3 and E5⇨D♯5⇨C♯ is so rhetorically overstated that one suspects Williams is intentionally overcompensating for the radical *underdetermination* of tonal trajectory during the passage's bulk. Indeed, the whole end of the cue settles in C♯ rather than C♮ minor, a slippery $\mathbf{T}_1$ transformation of the whole tonal edifice of the theme and a dramatic repudiation of the power of prolongational syntax in this tonal idiom.

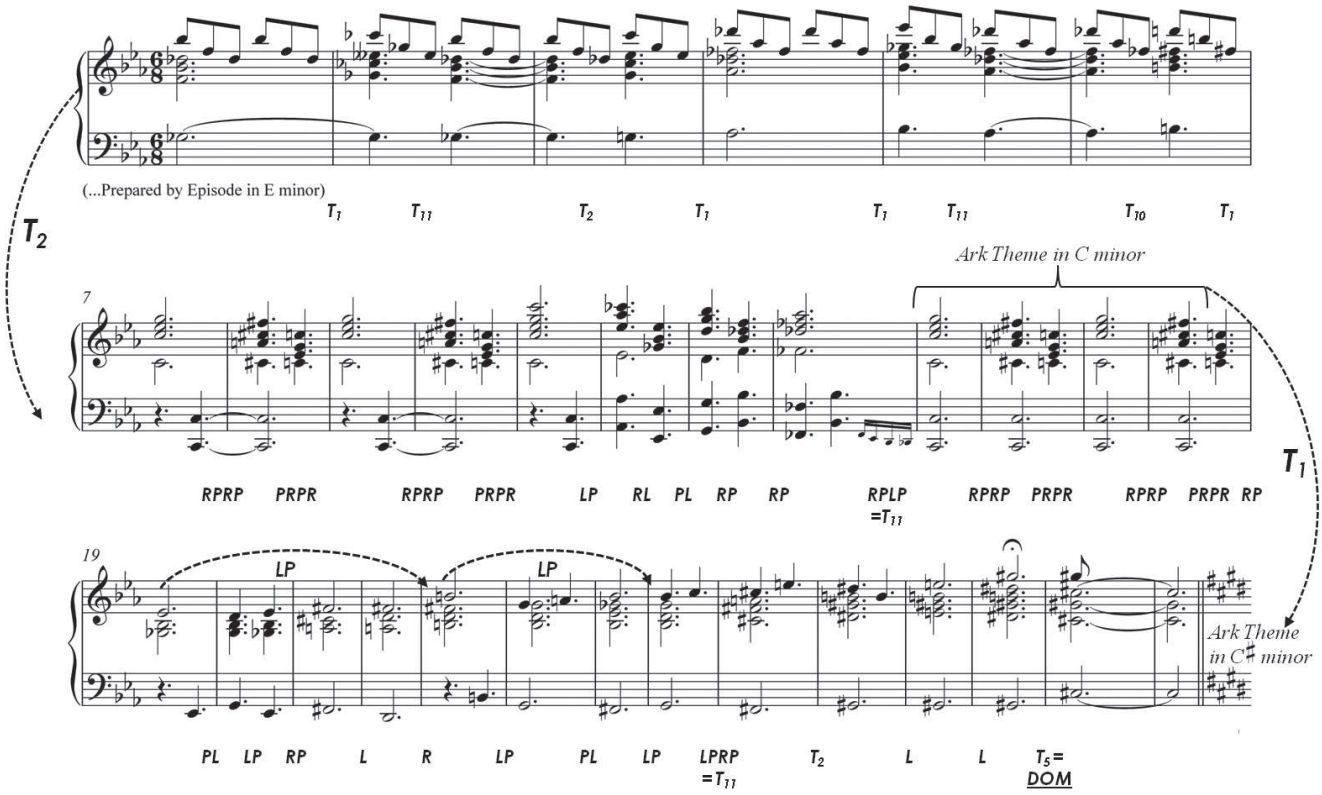
Three out of four of the chromatic expressive aesthetics are captured by Williams's "Ark Theme" and the "Map Room" cue that showcases it. Tonal intensification telegraphs the approaching revelation of the Ark's location, and is conveyed in two ways: (1) intrinsically in the theme, through the progressive expansion of register and harmonic distance from the tonic; and (2) extrinsically in the cue's gradual crescendo and increasingly disruptive modulatory forays. The occult is wedded into the harmonic and thematic associations already erected around the theme as it attaches to an ancient and mysteriously powerful artifact. And finally, a healthy dose of sublimity, by virtue of the sheer audacity of Williams's chromaticism, is transferred from soundtrack to the screen. We see the feeling of fascination coupled with terror communicated by score expressed on Indy's face. If successful, the aforementioned musical forces will provoke a similar response in the filmgoer as the protagonist.

Newton Howard: *King Kong*

Two case studies will serve to further address the theoretical questions raised earlier about thematic and expressive transformation. These short analyses come from movies both falling in a roughly contemporary

19 Another incipient third cycle emerges from the 2-bar units in C minor, E♭ minor, and F♯ minor across mm. 17, 19, and 21. The pattern stops short of circling the full m3 division of the octave however, arriving at B minor at m. 23 instead of A minor.

Example 4: "Map Room: Dawn" Climax

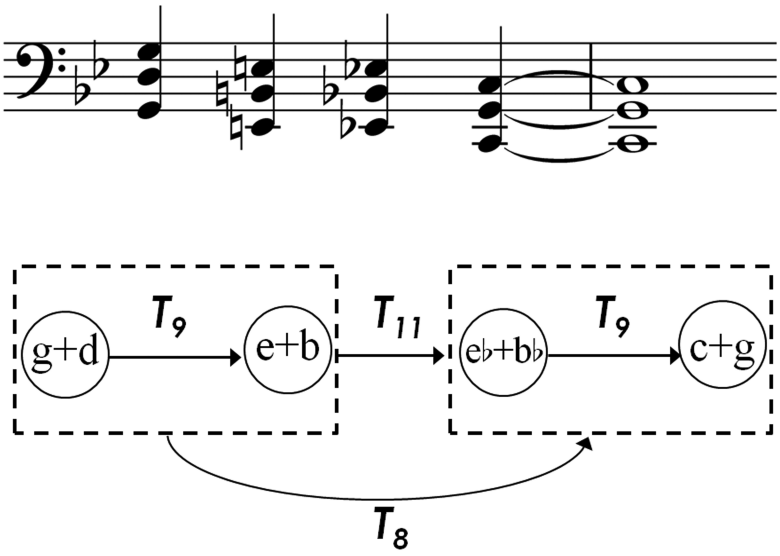


scoring practice, and thus represent ways to apply this methodology to an idiom very much alive for today's listeners. I first inspect an action sequence from Peter Jackson's *King Kong*, with the intent of showing how the transformational apparatus can reveal subtle but important thematic details that bear on the overall interpretation of a film. I then turn to a cue from *A Beautiful Mind* that demonstrates how attention to transformational dynamics can reveal things like symmetry and teleology only rarely incorporated into film music analyses.

James Newton Howard's score to *King Kong* (2005, directed by Peter Jackson) is effective largely by virtue of its tight thematic integration and a well-measured serving of musical development to help the extremely long film (187 minutes) retain a sense of momentum towards its tragic conclusion.[20] One instance of

20 In a lamentable but familiar occurrence in Hollywood, composer Howard

Example 5: James Newton Howard: *King Kong*, Threat Motif and Analysis



thematic transformation is in service of a larger narrative shift that Jackson's film makes in relation to its 1933 predecessor. In the original *Kong*, the titular beast, despite the attribution of many human-like qualities—most crucially a fascination and desire to possess Fay Raye's wilting heroine Anne Darrow—never quite transcends the category of "monster." In the remake, the filmmakers take care to turn Kong into a relatable protagonist, and his relation to Darrow (Naomi Watts) is more poignant for being treated as loving and mutually consensual.

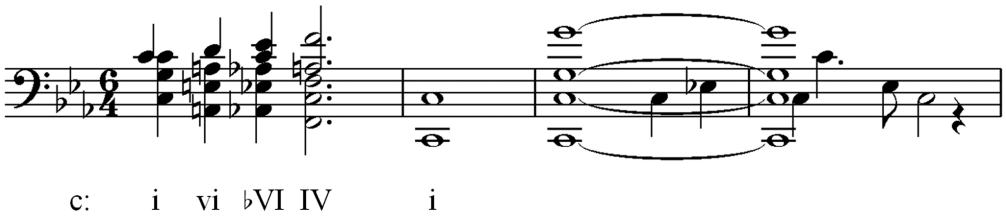
Newton Howard's score is critical in rendering Kong sympathetic, and in reflecting the human characters' own evolving perception of the beast. Newton Howard sets up a leitmotif for Kong immediately with the opening credits. A growling, four-sonority-long trombone theme (reproduced and analyzed in Example 5) sounds as soon as the movie's title appears on screen, its intended referent unmistakable. The motif's open fifths are shorn of modal information, but its aggressive guise and placement within an overall G-minor cue lend it the negative valence of the minor mode without its literal components. (Indeed, the combination of dyads E-B and E♭-B♭ contain whiffs of both modes.) Without explicit mode, I treat it as a "primitive" succession of direct transpositions $\mathbf{T_9 \cdot T_{11} \cdot T_9}$ that pits two m3-related dyads against each other by a downward major third ($\mathbf{T_8}$). Harkening back to Steiner's original motif, this is a musical representation of Kong as a monster, a primitive and mysterious threat born of Western civilization's deepest fears. Because it accompanies his terrifying first screen appearance and other moments of atavistic terror, I call it his "Threat" motif.

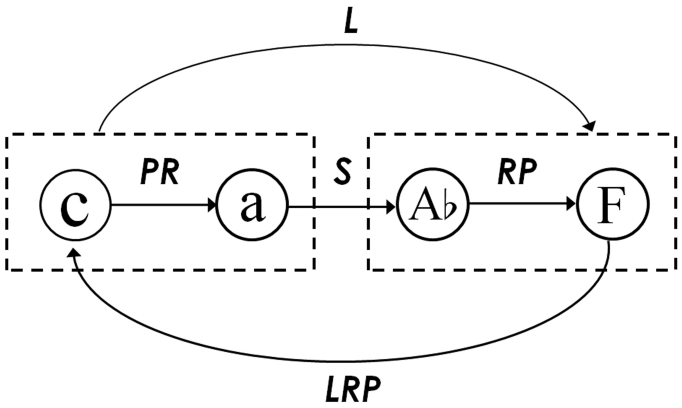
Kong's motif undergoes two significant transformations in the cue "Tooth and Claw." This music accompanies an action set piece in which Kong does death-defying battle against three carnivorous dinosaurs. At the same time as he resists their attacks, he attempts to protect Darrow, who inadvertently walks into the dinosaurs' clutches. Kong's arrival is heralded by the first of these thematic transformations, a fleshing out of his "Threat motif" with an ascending melody as well as long-awaited modal information and explicit chromatic mediant relations (Example 6). This time, the chords 1+2 and 3+4 pivot around a third-sharing semitonal axis (**S**) located about the submediant, while leading to a retrospective plagal "cadence" for C minor. This yields a triadic transformational trajectory of the fleshed-out theme **PR·S·RP·LRP**. We can now more fully assert an underlying roman numeral progression in C minor of i⇨vi⇨♭VI⇨IV.[21]

Shore's score to Jackson's remake of *King Kong* was rejected after Shore had composed its bulk. James Newton Howard was brought on to craft a replacement score, and given a mere five weeks to complete the task for a film that called for a huge amount of prominent and thickly orchestrated music. Despite these pressures, Newton Howard's score was critically acclaimed, sufficient to garner an Oscar nomination at the sventy-eighth Academy Awards.

21 Even though mode is not provided for the first two sonorities, and the second contains a "dissonance" of D♮, the exterior C minor context and the functional progression is strong enough to guarantee the previous chords will be heard as minor *Stufe* in that key.

Example 6: Kong Threat Motif: Heroic Appearance in "Tooth and Claw" and Analysis

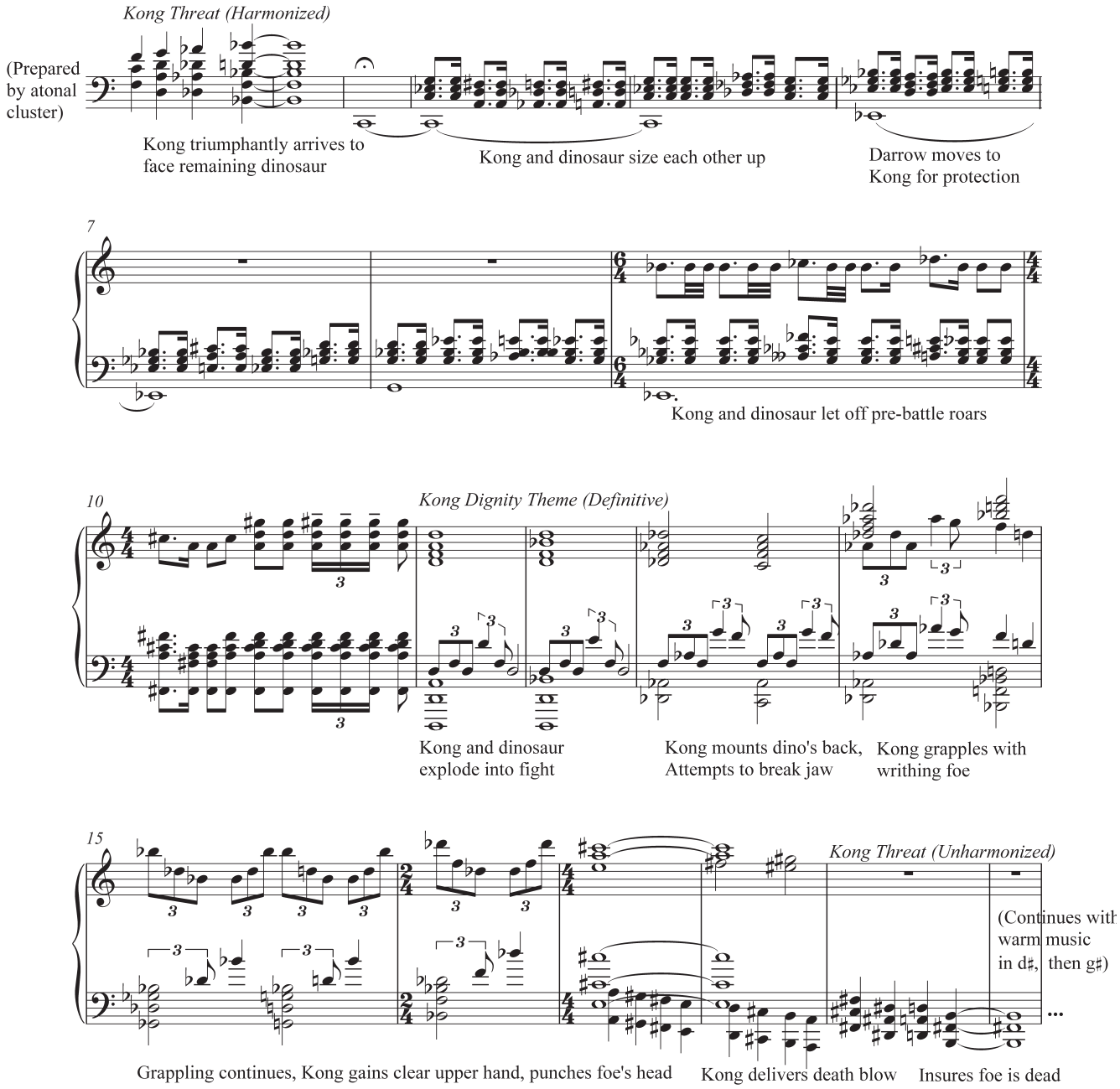




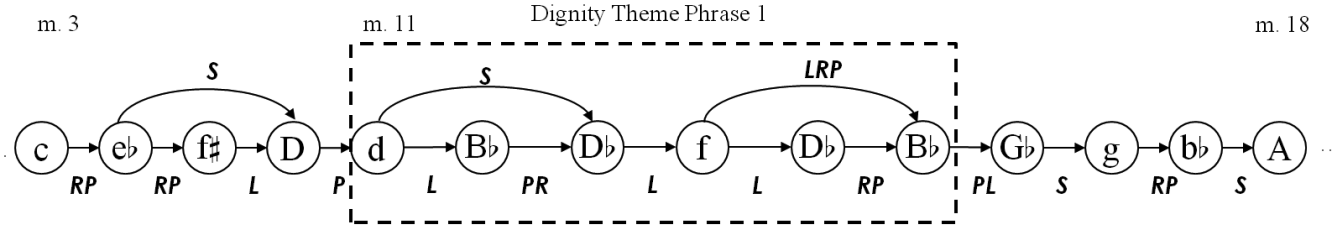
The last two measures of the theme in Example 6 display the beginnings of an ostensibly new motif, which comes to be associated with Kong's ferocious but sad and unvoiced dignity. "Tooth and Claw" culminates in a definitive pronouncement of this theme. The "Dignity" motif accompanies Kong's gruesome defeat of the last of the carnivores, witnessed by Darrow with a combination of awe, fear, and gratitude. Kong beats his chest to the sounds of his revived "Threat" motif, which is followed by gentler and considerably softer music in E♭ minor. Example 7 reproduces the majority of this climactic passage, along with screen actions and leitmotifs indicated between staves. A diachronic transformation network is provided below to track its transformational trajectory.

Following a vault from F♯ to D minor, the "Dignity" melody crystallizes at mm. 11-15. It is

Example 7a: "Tooth and Claw" Climax



Example 7b: Dignity Theme Analysis



a true example of triadic chromaticism, subject to continuous and rapid chromatic modulations *within* its phrasal boundaries. These convolutions effectively discourage tonic-assignment except for the asserted, but prolongationally unearned, reference points of D minor (m.11), and a brief A major (m. 17). The emblematic transformation here is again **S**, which at once prepares the theme (mm. 9-10, from E♭ min to an inverted D major), steers its first phrase (mm. 11-13, from D minor to D♭ major), and guides chord-to-chord motion in its second phrase (mm. 15-17, G minor to G♭ major, and B♭ minor to A major). Each transformation lends a distinctive affective quality to the overall theme. The overall preponderance of third-sharing semitone progressions, constantly readjusting the stable ground against which the arpeggiation-based theme struggles to remain balanced on, mimics Kong's violent attempt to grapple with his thrashing final adversary. The **L**s applied to D and D♭ tap that progression's association with sentiment as well as "the epic," lending a pathos-laden quality to the scene that contrasts with its general ferocity.[22] The like-mode spanning third progressions appear to serve more relaxational/intensificatory purposes. The **RP** that draws the music to B♭ major suggests heroism and a definitive turning of the tide for Kong. Meanwhile, the same transformation applied to G minor reverts to the role it played in m. 8: ramping up tension, in this case before the ultimate **S** discharges B♭'s pent-up negative energy onto a "triumphal" A minor.

Whence does this "Dignity" motif derive? The fearsome final statement of his "Threat" motif at m. 20 (once again shorn of thirds) draws our attention to latent similarities with the broad theme that immediately precedes it. Example 8 demonstrates the connection via transformational analyses of both themes. A single atemporal prototype composed of four triads and six transformations is the shared source of both their harmonic materials: in Lewinian parlance, this amounts to the much sought-after property of *network isography*. In essence, each theme relies on the pairing of minor-third-related triads (**PR**/**RP**). These in turn are linked together via specific fifth (**LRP**) and semitone (**S**) relations. The major-third relation (**L**) that is enabled by this coupling is explicit in the "Dignity" motif (as befits its more pathetic tenor) while only implicit in the "threat." In "Threat", these progressions are anchored to specific diatonic functions, while in "Dignity," they are essentially loosed from any tonal mooring, and only occur between strictly non-adjacent chords. Nevertheless, the underlying prototype that produces these chords, while not determining their chronological order or functional implications, fully models their interrelationships.

The thematic work done in "Tooth and Claw" shows that thematic transformation can occur solely across the harmonic domain (without motivic, rhythmic, or even functional outlines retained).[23] Subsequent iterations of the "Dignity" theme, heard in scenes where Kong is cruelly attacked (and eventually killed), bear an affective profile of grandeur and remorse. Casting the "Dignity" theme as a more mature transformational sibling of "Threat" fits with a broader reading of the score, in which James Newton Howard helps construct a sympathetic portrayal of King Kong. By gradually metamorphosing Kong's short and rudimentary "Threat" motif into a more dignified and pathos-capable melody, the composer subverts expectations he himself sets up about Kong's nature as a pure monster. The "Threat" motif transforms along with the audience's relation to Kong, from viewing him unfairly as an antagonist to seeing him as a potential protagonist and eventually the most sympathetic character on screen.

Horner: *A Beautiful Mind*

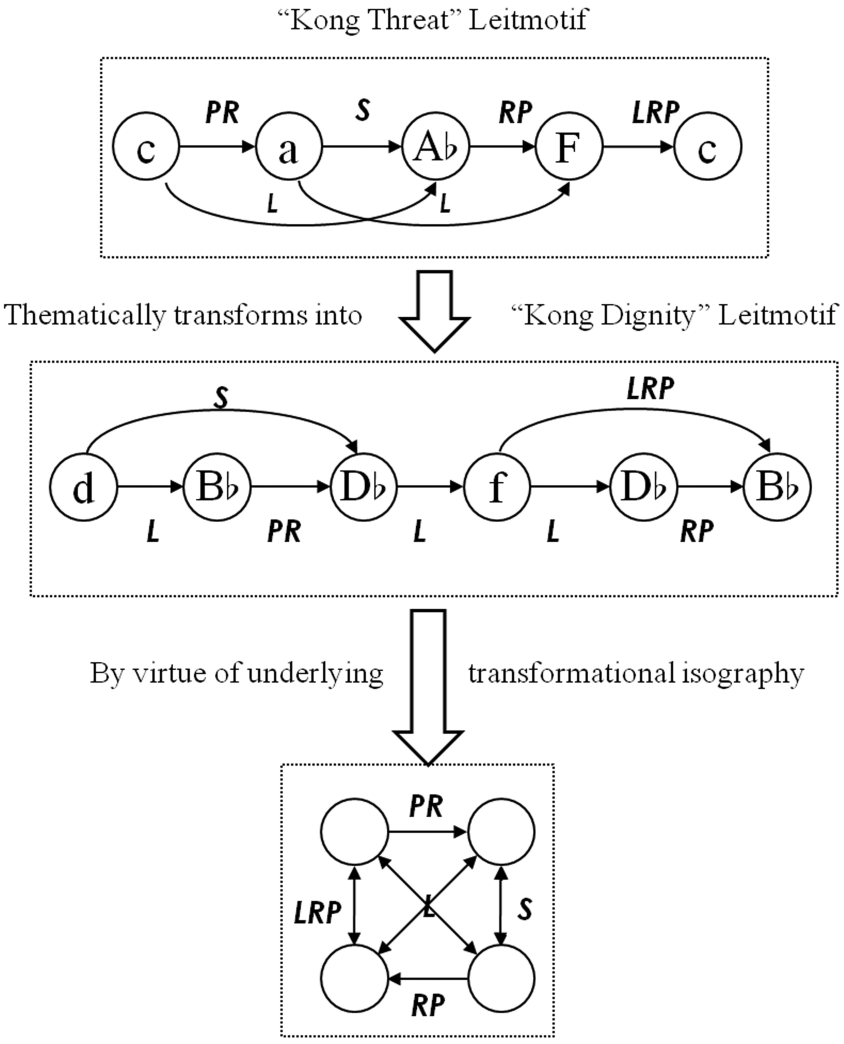
Unlike written media (like the novel), film does not naturally have the ability to directly convey the inner thoughts of its characters. When exposure of a mental process is desirable, filmmakers may avail themselves of a handful of *indirect* methods of indicating such content, like voice-over, staged fantasies or dreams, and, importantly, music. As discussed earlier, the transformational expressive genre in film scoring is apt for scenes of creative and intense intellection. It is this capacity for music to represent the unrepresentable (and for theory to represent that in turn) that leads me to turn to Ron Howard's 2001 biopic, *A Beautiful Mind*.[24]

22 Murphy (2011) has noted an association of mode-switching major third progressions (e.g. C major⇔E minor) with sentimentality and bereavement in modern cinema, and has labeled it the "Loss Gesture" accordingly. Murphy's designation of this progression depends on tonal context: such associations are most clearly at play when a I⇔iii functional paradigm is at play. However, in a case such as "Tooth and Claw" where tonal center is ambiguous, the "Loss Gesture" connotations can combine with connotations from the inverse ♭VI⇔I progression (which has an epic, portentous quality). In this affective calculus, loss + portent = pathos.

23 Drawing these subtle connections is justifiable when there is a clear dramatic-formal rationale for such transformation; otherwise, the analyst is caught searching for harmonic resemblances where none pertinent to film could exist. This is, thankfully, not the case in *King Kong*, but the issue of transformation theory's problematic capacity to draw *too* many connections remains a site for critique for some theorists. See, for example, Buchler's (2007) discussion of relational "promiscuity."

24 Portions of this section are adapted from the author's article "Transformational Analysis and the Representation of Genius in Film

Example 8: Threat and Dignity Thematic Transformational Analysis



The Nobel laureate economist John Forbes Nash, one of the fathers of game theory, is the subject of *A Beautiful Mind*'s loosely accurate biographical narrative. Played by Russell Crowe, the film's Nash is a mathematical genius afflicted by hallucinatory schizophrenia, and much of the film revolves around his pathological need to locate patterns everywhere, real or imagined. The score hails from Howard's frequent collaborator, James Horner. Horner's musical contribution is tasked with, among other things, externalizing the unfilmable workings of the film's titular mind, in scenes of both invigorating intellectual discovery and deepening madness. In scoring Nash's unstable genius, Horner claimed to have received inspiration from the metaphorical image of the kaleidoscope.

> I had this vision of how numbers work, and to me, that was always something I wanted to bring across musically… [Director Ron Howard and I] had this running abstract idea [that] music and the whole art of mathematics, when you get above a certain stage, is not literally just numbers and solutions; it's more like looking through a kaleidoscope…you have one thing and you slowly change it.[25]

The influence of this refractive conceit is readily apparent in Horner's main title for the film (fittingly named "Kaleidoscope of Mathematics"), but is at work

Music" in *Music Theory Spectrum* (Spring 2013). That piece offers more contextualization and analysis of *A Beautiful Mind*, as well as further explanation of the underlying mechanisms of neo-Riemannian theory.

25 Horner (2002), speaking on *A Beautiful Mind* DVD supplemental materials.

Figure 1: Russell Crowe as John Forbes Nash in *A Beautiful Mind*

across the score, particularly in music drawn from the harmonic and motivic wellspring of that cue. Horner employs a triadically chromatic idiom for scenes depicting Nash's mathematical genius.[26] The ten cues that fall into this category abound with chromatic transformations and remarkable permutations of the formal materials of the main title. Yet though the expressive genre is clearly transformational, Horner clothes his colorfully roving chord progressions in the stylistic garb of American minimalism.[27] Far from being at odds with the change-as-such aesthetic, these minimalist accents *enhance* the music's transformational verve. With a musical surface that is consistently triadic and texturally uniform, Horner focuses the listener's interest not on the participating triads themselves, but on their dynamic interactions. Stasis in one musical domain (texture) heightens the impression of change in another (harmony).

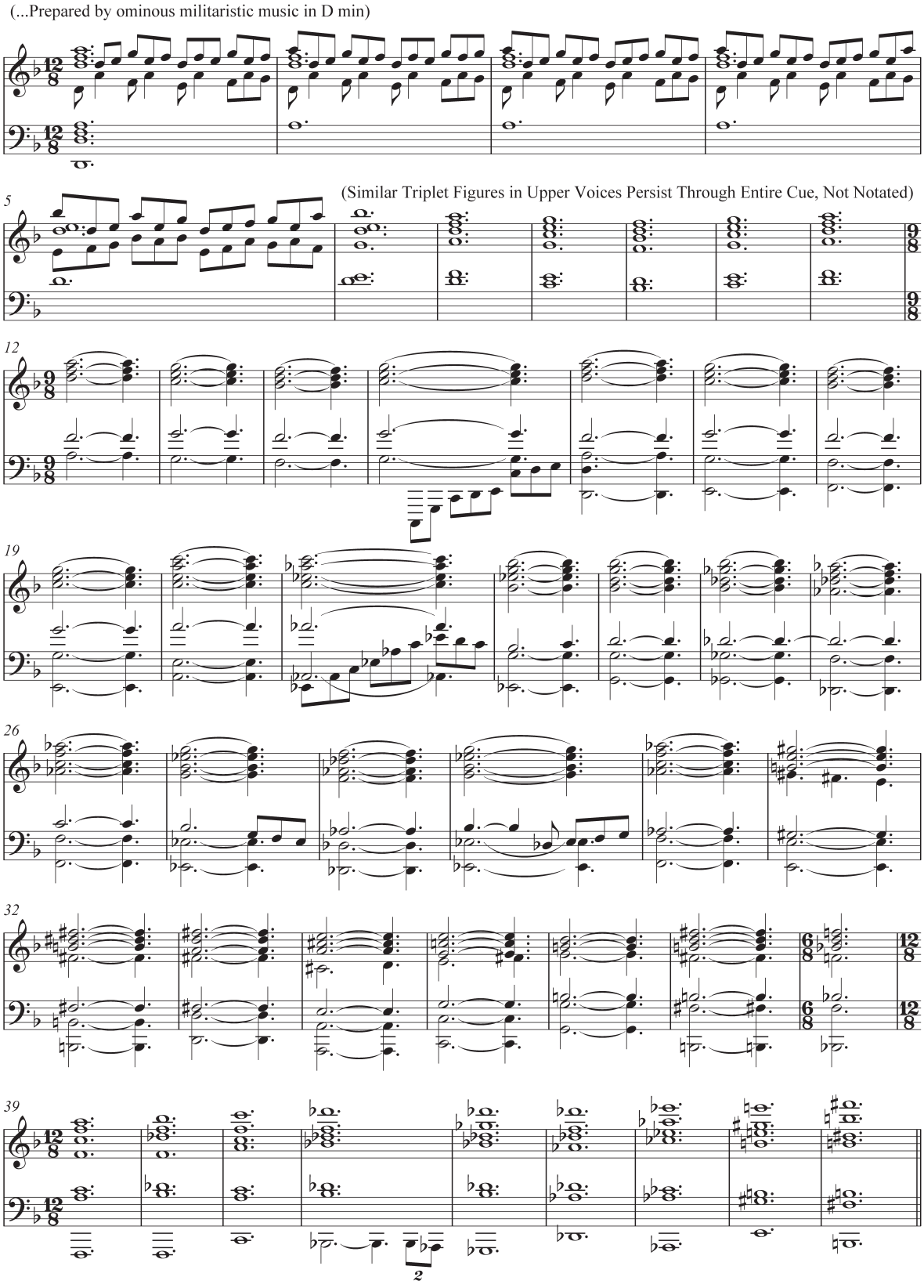
The most sustained development of Horner's Kaleidoscopic music occurs in the cue "Cracking the Russian Codes" (DVD time 23:45). The sequence is *A Beautiful Mind*'s most impressive set piece for demonstrating Nash's intellect. He is brought to a military intelligence base to discern patterns within a massive set of panels spattered with numbers. Amid a dazzling show of numerical special effects, Nash puts his pattern-spotting powers to use; eventually he solves the cryptogram—a set of integers that unlocks the underlying pattern. A reduced transcription is given in Example 10 for the bulk of this cue, up through its conclusion. Example 11 reproduces the portion of Akiva Goldsman's screenplay that this busy music occupies.

One detail is notably omitted in the actual filmed version of this scene: Nash's announcement "There." With that one piece of dialogue cut, the scene goes

26 The origins of Horner's genius music in *Beautiful Mind* are an interesting "transformational" matter in their own right. Clear precedents can be traced from his own scores to *Bicentennial Man* (1999), *Searching for Bobby Fisher* (1993), and *Sneakers* (1992). These, and other connections, are explored in Lehman 2013. It should be noted that, however conspicuous, Horner's derivative tendencies generally do not diminish the effectiveness of his music in context.

27 The textures recall in particular the coruscating arpeggios of Phillip Glass and densely layered orchestration of Steve Reich. Rebecca Eaton's (2008) dissertation "Unheard Minimalisms: The Functions of the Minimalist Technique in Film Scores" deals more devotedly with the stylistic implications of Horner's score, as well as a handful of other soundtracks that hew to the transformational expressive genre.

Example 10: James Horner: *A Beautiful Mind*, "Cracking the Russian Codes" Transcription



Example 11: Screenplay for Codes Sequence

Analyst: We have been intercepting radio transmissions from Moscow.

General: The computer can't detect a pattern. But I'm sure it's a code.

Nash: Why is that, General?

General: Ever just know something, Dr. Nash?

Nash smiles.

Nash: Constantly.

Nash moves to the wall papered with codes.

General: We have developed several ciphers…

But Nash just walks away from the officer. He stands facing the wall, staring at the numbers.

PUSH IN ON Nash's eyes. In the black ocean of his pupils, the reflected rows of code begin to move, forming shifting patterns.

PULL BACK ON Nash, still staring at the wall. Hours have passed, folks sitting, jackets handing on chair backs, coffee cups empty.

NASH-POV. Series of numbers darken as others rise, a cascade of rapidly changing patterns, endless permutations until…

Nash: There.

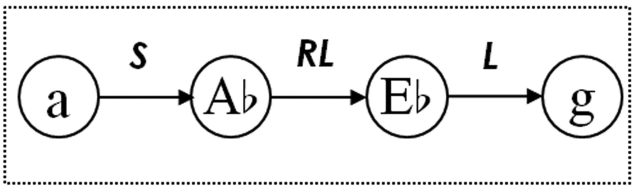
Nash pulls a pencil from his pocket, begins writing numbers on his clipboard. All stare.

Nash (CONT'D): I need a map.

from having an explicit "aha" moment to requiring other, non-literalizing techniques to underline the instant of Nash's discovery. While there are some cues that Nash has solved the problem through visual- and sound-effects, the moment of revelation is still somewhat underdetermined until the score drives home the discovery.

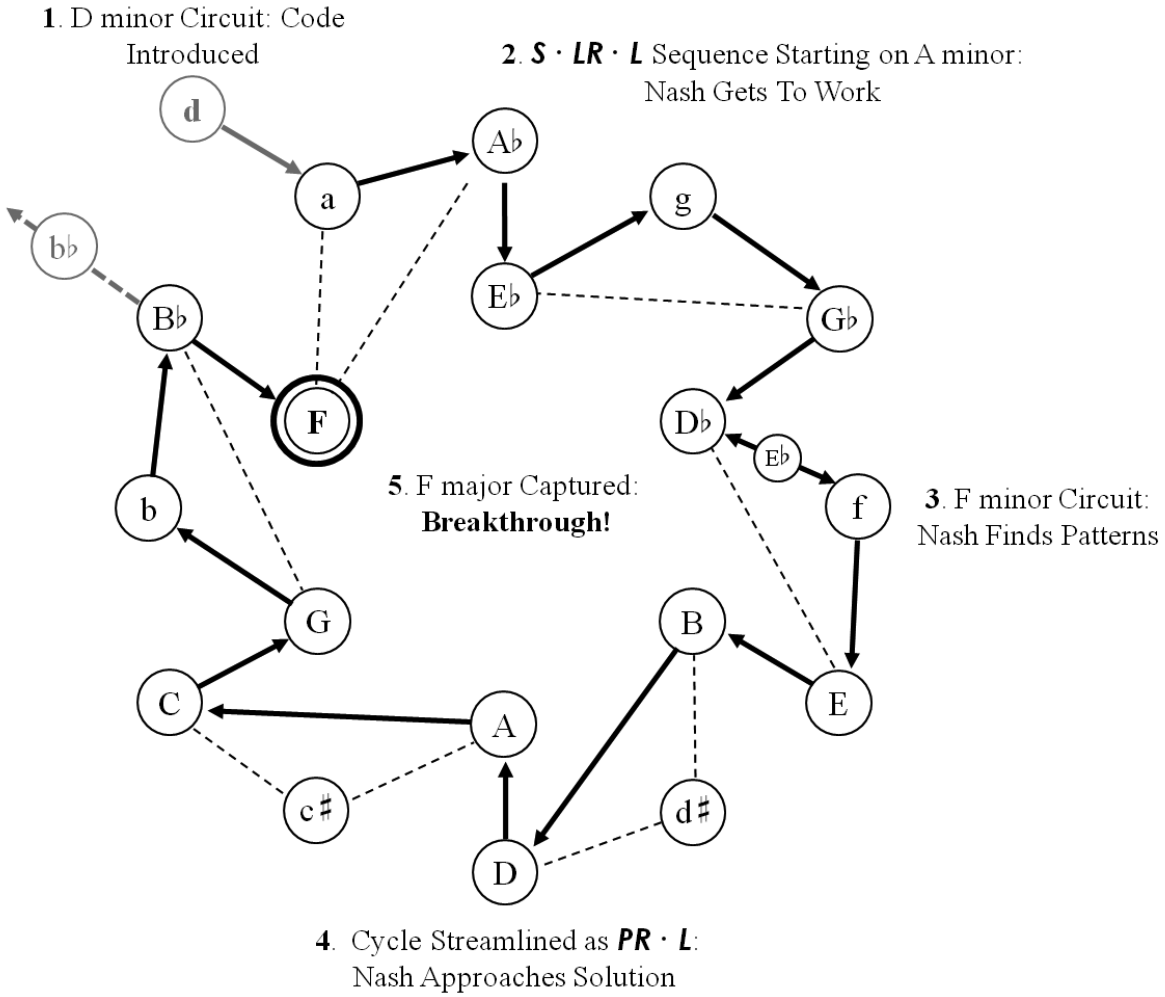
Horner leaves this musical mark on the narrative through a cue with considerable transformational elegance. The musical backdrop for this pattern-hunt follows a problem-to-work-to-epiphany narrative. First, Horner provides a buildup of minimalist churning of intense focus on D minor. This is followed by a harmonically elaborate and timbrally dense leg for Nash's almost mystical communion with the raw, chaotic data of the number panels. Finally, Horner conveys a clear breakthrough in his score, and follows it up with music of invigorated triumph that ends abruptly as Nash claims "I need a map." Supporting a rapid succession of triads is a sturdy structure built out of a single transformational cell. This unit, shown in Example 12, comprises an ordered succession of semitonal (**S**), fifth (**RL**), and major third (**L**) motions. While heard elsewhere in the score, only here is this four-chord cell developed to the point where its cyclical potential is realized.

Example 12: Transformational Cell from "Cracking the Russian Codes"



The starfish-like cycle that results from multiple iterations of the cell is rendered in Example 13, along with indicators of what stage in the problem-solving

Example 13: Analysis of "Cracking the Russian Codes"



process Nash finds himself at given areas within the harmonic structure. The law-like and orderly configuration of cycle enables Horner to project a harmonic telos once it gets underway: the complete traversal of the symmetrical sequence from origin (A minor) to chromatic aggregate-completing F major. That triad represents a completion of an emergent pattern, and concurrently a successful visit to each of the twelve major triads exactly once. The structure of the cycle only becomes apparent gradually, and at several points is veiled by traversal of novel (but equivalent) routes through this pitch space, such as a brief circuit around F minor at m. 26. But the moment that the consummating triad of F arrives (along with an orchestral tutti) synchronizes *precisely* with the quick zoom to a numerical pattern that Nash uses to unlock the entire crypto-panel.[28] Where the screenplay leaves this mental event undetermined, the score picks up the reins in signaling the very instant of Nash's epiphany.

Horner's music for this cue is based on a transformational process—an unfurling epiphany through which we as listeners actively intuit, assemble, and have blazingly confirmed a dynamic, chromatically constructed tonal space. What the composer invites us to hear in "Cracking the Russian Codes" is not a succession of autonomous chordal objects, static and weighted in a predetermined pitch space. Instead, we follow a single sonorous host as it is sent through a kaleidoscopic succession of orderly chromatic transformations. To treat the cue's structure as a function of transformational rather than

28 Note that F major's capture is not mechanically equivalent to a successful cadence, though the expressive rhetoric is similar. F major is not heard as the tonic (indeed, it is quickly treated as a dominant of B♭ minor!); its status as harmonic epiphany is vouched by the quintessentially non-functional, non-tonal logic of cycle completion.

monotonal thinking is not simply a way to dodge the requirements of diatonic syntax. These strictures, as I have suggested throughout this article, are demoted in importance in much film music, and where they are recruited, it is for expressive ends. Interpreting "Russian Codes" as directed flux rather than a series of "Cartesian" objects (to use a comparison favored by Lewin) best captures Horner's strategy of musically representing the creative thought process.[29] Transformational analysis encourages us to hear the triad as an *idea*, in all its propulsive mutability. In the triadic chromaticism of Horner's "Russian Codes," the cue's roving triad is first presented as an obsessed-over but inchoate harmonic notion. The path it takes mirrors Nash's own arc in the film, blending schizoid unpredictability and deep rationality. This triad-as-idea seeks out a specific tonal goal post, thus adhering to its scene's need for a code-cracking telos. But it also relishes pure harmonic experimentation and surprise, and thereby fulfills the scene's need to communicate—and hopefully reproduce—some of Nash's intellectual thrill in his mathematical prowess.

Transformation theory is a powerful and versatile tool, uniquely suited to the practical needs and tonal resources of film music. It capably handles varied hermeneutic tasks, such as: quantifying the elements of harmonic signification (as in *Raiders*); tracking the vagaries of thematic development (as in *King Kong*); and giving shape to abstract tonal processes insofar as they power dramatic trajectories (as in *A Beautiful Mind*). Film music in turn carries the prospect of breathing vitality and conceptual clarity into this still-young analytic implement. Experiencing the best films can leave the cinemagoer dazzled, enriched, and transformed; I hope to have shown that what is true for the filmgoer might also be true for music theory.

29 Henry Klumpenhouwer's (2006) reconstruction of Lewin's anti-Cartesian philosophical ideology provides necessary intellectual contextualization for the "change-over-objects" ethos at the heart of transformation theory.

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