MULTILEVELED CONTENT FROM THE BOTTOM UP: DIFFERENTIATED HIERARCHICAL STRUCTURING

Each section of Mozart's piece is melodically memorable. Just how differentiated the various melodies are can be demonstrated by analyzing their hierarchical structuring. Relying on the analytical rules of the implication-realization model (Narmour, 1977, 1989, 1990, 1991a, 1992, in press), the next three analyses show the hierarchical melodic structuring of measures 1–4, 4–8, and 9–10.[2] The bracketed structures in all these examples (see Figures 3–5) represent realizations of implications, based on concepts of bottom-up processing that assume that (1) small melodic intervals imply continuation of registral direction and intervallic motion and that (2) large melodic intervals imply reversal of registral direction and intervallic motion. Behind these concepts is the hypothesis of an intervallic parametric scale (Figure 2). Some psychological evidence suggests that this scaling hypothesis and the realized processes [P] and reversals [R] generated by it are veridical with listeners' perceptions (see Cuddy & Lunney, 1995; Krumhansl,

1. Of course, not all observations about content in this piece are as theory-laden as those involving voice-leading reductions. Few theorists would disagree, for example, about the way that Mozart differentiates the dynamics, the rhythmic textures, and the tempos of the various sections. In measures 1–4, for instance, dynamics are constant (although the precise initial level is left unspecified); in measures 4–8, they change abruptly from piano to forte, typical of the expressionistic, *Empfindsamkeit* music written in the 1770s. In the secondary theme (mm. 9 and 10), they are again largely constant (piano). In the first closing area (mm. 11 and 12) they are forte, whereas in the second closing area (mm. 13–15) they again quickly alternate, as they do in the ensuing digression (the "development," in mm. 16–21), In measures 17 and 19, we encounter our first written crescendi (see the actual music).

2. The analysis includes the downbeat of measure 4, the tonic of the cadence to which the phrase moves. If we let the downbeat E♭ stand for all of measure 4, which confirms the tonic while it texturally initiates the transition, and if we conceive of the last three eighth notes of measure 4 as an upbeat—and they certainly function that way—then both the principal theme and the transition become a symmetric phrase of 4 + 4 (mm. 1–4 and 5–8) instead of an asymmetric one of 3 + 5 (mm. 1–3 and 4–8).

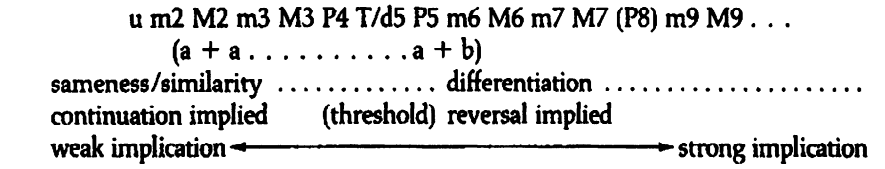

Fig. 2. The intervallic parametric scale, hypothesizing from the bottom up specific implicative functions of musical intervals. (After Narmour, 1990.)

1995; Russo & Cuddy, 1995; Schellenberg, 1996a, 1996b; and Thompson, Cuddy, & Plaus, in press).

Let us take the simplest theme first, the melodic structures of the secondary theme (mm. 9 and 10). Figure 3 shows how higher-level melodic structural tones of the secondary theme arise at various initial and terminal points (indicated by the bracket interfaces and the dashed vertical lines). For example, each manifest motive (PR-P, P-P) lasts about two beats. On level 2, the level of the beat, pairs of motives create discrete, zigzagging IP-IP sequences. These in turn generate smooth IPIP groupings on level 3, and so on, up to the prolonged B♭s at the highest level in the hierarchy.[3] Because of the amount of motivic and phrasal repetition, levels in the secondary

3. For the uninitiated, a brief introduction to the basic structures of the theory may be useful. The theory says that melodic implications are both registral and intervallic. Hence, melodic realizations can be complete or partial as well as prospective or retrospective. Complete prospective realizations of continuation generated from small implicative intervals create process [P] and duplication [D]. Both occur in the same registral direction (P = up or down; D = lateral), involve intervallic similarity (A + A), and are inherently nonclosural. Complete prospective realizations of reversal [R] from large implicative intervals involve two different registral directions (up/down, down/up, up/lateral, down/lateral) and differentiated intervals moving from large to small (A + B). Reversal is inherently closural. Partial prospective realizations from small implicative intervals include intervallic process [IP] and intervallic duplication [ID], both of which deny the implied registral direction but not the intervallic similarity. An example of IP is C-D-B (up/down) with similar intervals (M2/m3); ID is nearly alike except that the intervals are exactly the same size, for example, C-D-C (up/down; M2/M2). In partial realizations, the names indicate which implication is realized and by inference what is denied (mnemonics: I = interval; V = vector = registral direction). If registral direction is realized but intervallic similarity is denied, then the realization is a registral process [VP]. Partial prospective realizations from large implicative intervals include intervallic reversal [IR] and registral reversal [VR]. In addition to these eight prospective realizations [P, D, R, IP, ID, VP, IR, VR], retrospective analogues to all these are also possible; in the analyses, such realizations appear in parentheses. Structures of two notes, whose implications are suppressed, create dyads (numerically symbolized in melody by the size of the implicative interval). Some melodic tones stand alone in context and thus create monads [M]. The remaining basic structures are exact or near registral return (symbolized aba or aba^1, respectively). Registral return points to a discontiguous relationship whose pitches often create overlapping structures (e.g., networked processes). Symbols are defined in the captions.

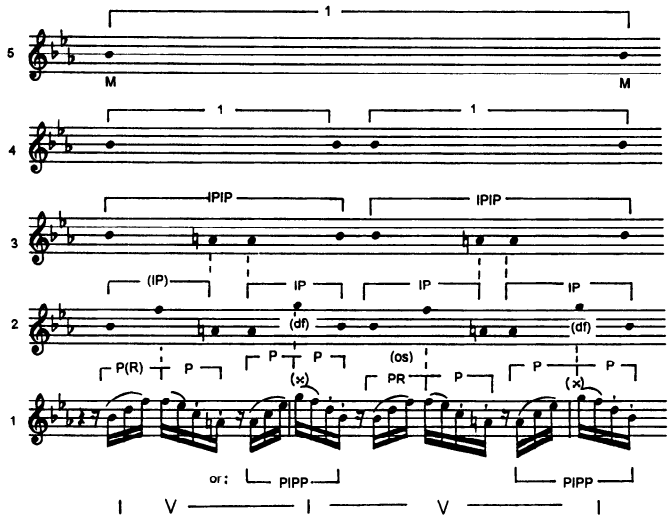

Fig. 3. A hierarchical analysis of the secondary theme using the implication-realization model (Narmour, 1990, 1992). Brackets outline structures on various levels; note their nested regularity. Dashed lines track initial and terminal tones transformed to higher levels. P = process, R = reversal, (R) = retrospectively realized reversal, IP = intervallic process, (IP) = retrospectively realized intervallic process, 1 = dyad of a unison, M = monad, (x) = weak dissonance, (os) = influence of intraopus style, making what was retrospective prospective, (df) = higher-level deformation.

theme thus emerge in a highly regularized, geometric way, each chunk nesting in another chunk twice as long, until the phrase ends.[4] Owing to this regularity, the systematic hierarchical structuring thus strongly contributes to the naive, childlike quality of the secondary theme.[5]

The hierarchical content of the principal theme (mm. 1–4) is less systematic. A look at its higher levels shows a noticeable lack of regularizing features (Figure 4). Even though the three-bar phrase divides exactly in the middle (on the dominant cadence on beat 2 of m. 2), the structural realizations of each subphrase are quite dissimilar. No regular nesting occurs, and

4. The appoggiatural Gs [marked (x)] are only mildly dissonant. In fact, they begin life as acoustical consonances (major sixths; see the music) and take on a dissonant function only in the light of the harmonic context of I-V-V-I. In addition, these "added sixths" mimic the motives preceding them. For these reasons, I have analyzed them as terminating their processive ascents and transforming to level 2. But I have also marked the medial tones of the IPs on level 2 (the Gs) as being deformed [(df)]. Others may feel that these Gs are completely dissonant and do not transform; thus, the alternative analysis shown underneath the example (the PIPP chains with corresponding changes to the dyads [2] of B♭-A and A-B♭ on level 2). The alternative analysis would, of course, argue for a lack of symmetry between all four motives, which seems to me perceptually incorrect.

5. Although they speed up a bit, the melodies of measures 10–15, the closing music, are also hierarchically quite systematic, but I cannot take the space to discuss that here.

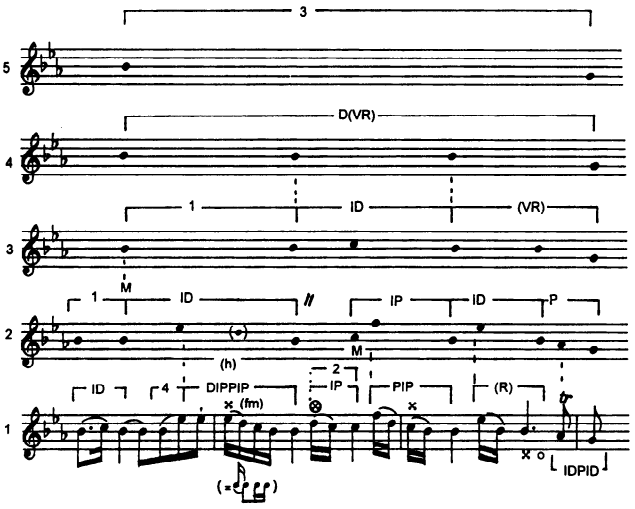

Fig. 4. A hierarchical analysis of the primary theme. Note the complexity of the hierarchy. Brackets outline structures on various levels. Dotted interfaces of brackets symbolize articulated (untransformed) beginnings. P = process, (R) = retrospectively realized reversal, IP = intervallic process, 1, 2, or 3 = dyad, ID = intervallic duplication, (VR) = retrospective registral reversal, (fm) = formational tone, which almost reaches a higher-level transformation.

the pacing of events disguises that the three-bar phrase of the primary theme breaks into equal parts (1-1/2 bars + 1-1/2 bars). Indeed, in contrast to the first subphrase, the second subphrase is hierarchically "progressive" in that a greater number of lower levels appears from measure 2, beat 3, onward as the sixteenth notes speed up the pacing of events. The trill on the A♭ (m. 3) culminates the trend toward a faster "tempo," proving that "ornaments" are not ornamental. In addition, the IP-PIP-(R)-IDPID sequence nested into the IP-ID-P in measures 2–3 increases the rate of cognitive chunking and thus the processing load imposed on the perceiver. Seen another way, on level 3 the first subphrase simply prolongs two B♭s (the dyad [1]), whereas the second subphrase on level 3 generates five structural tones and consequently two quite different structures [ID, (VR)]. Even the highest level—the dyad [3] from scale degree five (B♭) down to scale degree three (G)—stands in sharp relief to the prolonged, dyadic B♭ [1] of the secondary theme (see Figure 3 again, level 5).

If the hierarchy of the primary theme is "progressive" in terms of level activity, the transition is even more so (Figure 5). For as the transition approaches the half cadence in the dominant key (the last bar in Figure 5), the music of the transitional theme also increases level-depth, again adding to the perceptual load, despite the prolonged pedal on the dominant harmony (the V of B♭; recall the bass reduction in measures 7 and 8 of Figure

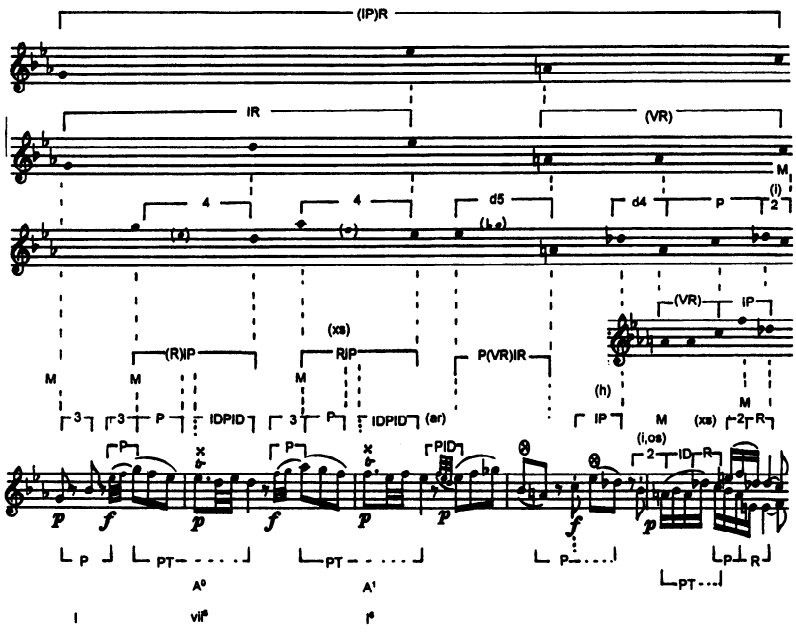

Fig. 5. A hierarchical analysis of the transitional theme. Note the complexity of the hierarchy and the increased number of levels toward the cadence. P = process, R = reversal, (R) = retrospectively realized reversal, IP = intervallic process, (IP) = retrospectively realized intervallic process, 1, 2, 3, or 4 = dyad, M = monad, (os) = influence of intraopus style, making what was retrospective prospective, ID = intervallic duplication, (VR) = retrospective registral reversal, PT = a time-tagged, discontiguously realized process, IR = intervallic reversal, (ar) = articulated tone, (h) = harmonic influence on melodic implication, (i) = implicative initial tone of a dyad, (xs) = influence of extraopus style, making what was retrospective prospective, (x) = weak dissonance, x = strong dissonance, ⊗ = very strong dissonance.

1). Observe in Figure 5 the shift in mode in the last bar, the splitting of the line there, and the overlapping realizations (the PT, shown underneath the music)—all of which add complexity, necessitating the extra staff to analyze the increased hierarchical activity. It is, of course, not surprising in both the principal and the transitional themes that the number of hierarchical levels grows at the cadence. For tonal music routinely relies on this kind of perceptual chunking: because cadences are highly schematic, they remain low in information unless the pace of structural content multiplies as the closural point nears.