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Social dimensions of melodic identity, cognition, and association

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• **ABSTRACT**

While music researchers are interested in developing tools for automatically culling related melodies and psychologists seek a clearer understanding of how people learn, recognize, and remember melodies, musicological and ethnomusicological studies offer numerous studies of tune families. Tune families cohere, it seems, partly on the basis of cultural agreement. Melodies seem to be similar if people say they are. Are there particular musical characteristics which are favored in the formation and cohesion of family members? Music scholars have been investigating this question for a half century. As their investigations have accrued, respect for complexity of melody and the many ways in which two melodies can be the same or different has increased proportionally.

This study examines five tune families and evaluates selected members of each according to a previously proposed cognitive-distance measure. Concordances and cases of musical divergence in the context of claimed relatedness are evaluated in relation to collection-formation types, melodic types, and transmission methods (printed, oral, both). Neither hand-picked members of families nor those culled by title preservation necessarily show a high degree of musical coherence. However, among the families chosen, the predominance of pieces originally associated with dancing is conspicuous. This suggests that even when contour and other features vary, lengthy rhythmic patterns may underlie the social identity of "melodic" similarity.

1. INTRODUCTION

In an earlier article (Selfridge-Field, 2004), a subset of melodies related to what is sometimes called the Dance of Mantua was used to derive a provisional metric for "cognitive distance" in melodic similarity. The parent series, a collection formed from works published between *c.* 1500 and *c.* 1800, contained 68 candidates (an unusually large number) representing several countries and three centuries (an unusually long time span). It was formed by a single person, the distinguished organist and musicologist Luigi Ferdinando Tagliavini (1994). For the purposes of

my earlier article, Tagliavini's collection was taken as an example of an "expert" system. It was found to base what in the parlance of music query would be called "match candidates" on musical features. Among these it tolerated deviance of meter, mode, and interpolated or excluded notes provided that the accent and harmonic structure remained relatively stable. Among the several dozen other articles which have been written by musicologists on melodic similarity and musical borrowing (on which see Burkholder et al., 1994), Tagliavini's extensive study stands out in its scope and the high degree of cognitive coherence that the 68 examples exhibit.

The literature on musical borrowing and melodic similarity can be said to emphasis one of the following approaches: (1) searches for works with common titles conferred by long use, (2) searches for works with common melodies, and, more rarely, (3) works with a common social function. There has also been recent interest in intentional quotation in art music. As we might expect works culled under the first rubric can be numerous but not closely related melodically. Works culled under the second are more difficult to identify and are therefore generally, within any given family, fewer in number. Works culled under the third category are generally ethnomusicological in focus (e.g., List: 1975). These lines are blurred in some studies, where an accidental discovery of "similarity" relates two or more works with no known primogenitor. However, ethnomusicologists themselves warn against the concept of primal melodies. In folk repertories, one melody may be formed of strands of other melodies. Cowdery (1984) calls these "recombining" melodies, as opposed to those which preserve contour ("outlining") and those with sectional divisions, each of which may have an independent set of associations "conjoining". The musical examples offered in most of the studies can be contrasted with those of Tagliavini in that they demonstrate a far looser degree of inherent musical association.

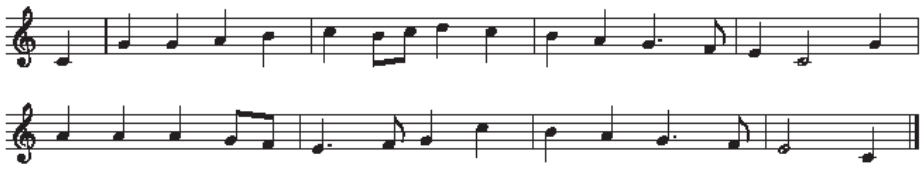
In this study we attempt to test the preliminary estimation of cognitive distance in the selected examples of these previously well-studied families: (1) the Morris-dance tune (Ward, 1986), (2) the Londonderry Air (Audley, 2000), (3) the Dance of Mantua (Tagliavini, 1994), (4) "Go Tell Aunt Rhody" (Sickbert, 1999), and (5) variants of a single-author song, Stephen Foster's "Oh, Susanna" (Spitzer, 1994). All the studies are based on printed music, although oral transmission has obviously filled gaps between prints. The Morris tune illustrates the first type noted above. It represents what might be called a consensual collection: the title persists even as the music changes. The titles "Londonderry Air," the "Dance of Mantua," and "Go Tell Aunt Rhody," on the other hand, pertain to tune families which exist under multiple names. All three collections were culled by single individuals. The examples of "Oh, Susanna" discussed come from a very concentrated period of time in the mid-nineteenth century.

2. Five Case Histories

Case 1: The Morris-Dance Tune

The Morris Dance, associated with folk dancing since the sixteenth century, is a melody of two strains (distinct melodies ideas of relatively equal length). It is in a major key and in duple meter. If one were to judge by Ward's study of the Morris tune, one would conclude that social factors play a significant role in defining melodic similarity as tunes migrate over time and space, for the musical similarity in his pool of 15 examples, drawn from four centuries of printed music, is somewhat heterogeneous. In relation to other musicological studies, the most stable elements of continuity in the Morris tune (Ward, 1986) have been shown to be its (extra-musical) association with dancing and its necessary preservation of meter. Its confounding changes include melodic extensions, the coupling of new strains with old, and changes (including inversions) of melodic contour.

Ward points out that while the Morris tune was, by reputation, the most popular dance in England for several centuries, its exact melodic definition is uncertain. Some variation is hardly surprising, given the relatively unmemorable melodic contour and rhythmic monotony of chronologically early instances (e.g., Example 1a). More than any other melody discussed here, the Morris-dance tune was associated with dancing.



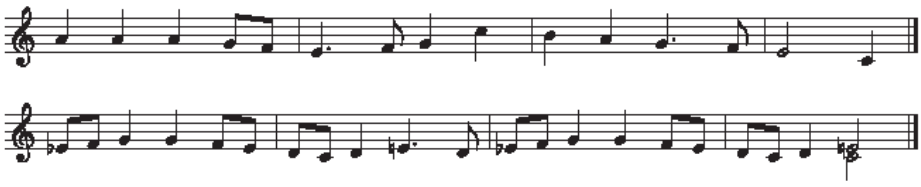
Example 1a.

The Morris tune, Strains 1 and 2, as given by Thomas Weelkes in Ayres… for Three Voices (London, 1608).

Although traditionally associated with Whitsuntide (the Christian feast of Pentecost), it was not restricted to that feast, nor to the courtly society that could afford printed music, nor to the countryside with which it is so often associated. Its definition lay as much in its suitability to a generalized choreographic form as in a specific melodic contour. "The more versions one has," Ward (1986: 301) points out, "the more dubious familiar resemblances become." This finding obviously makes sense for a loosely knit family of melodies whose function was explicitly to enable a dance that could be defined by patterns of gestures and by cultural significance.

Ward traces variants of each of the tune's 8-bar strains separately. In the scoring

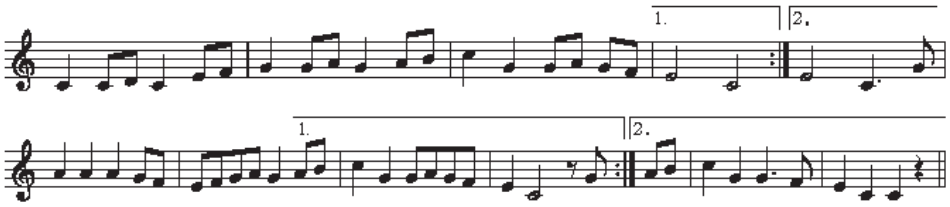
system proposed by Selfridge-Field (2004), many of the variants of both strains would produce low scores, for they retain few of the accentually defining notes of the melody. The harmony is too unremarkable to create a distinctive profile. Significant deviations, especially in mode and implied harmony, occurred in the second strain as transcribed by Daniel Wright in the early eighteenth century (Example 1b).



Example 1b.

The Morris tune, Strain 2, (1) as given by Weelkes and (2) by Daniel Wright, A Collection… of Pleasant and Merry Humours (London, c. 1713).

By the nineteenth century, the tune was more shapely and had acquired more elaborate rhythmic articulation. However, the contour and accented harmonies of Strain 1 had changed significantly, with some carry-over into Strain 2 (Example 1c).

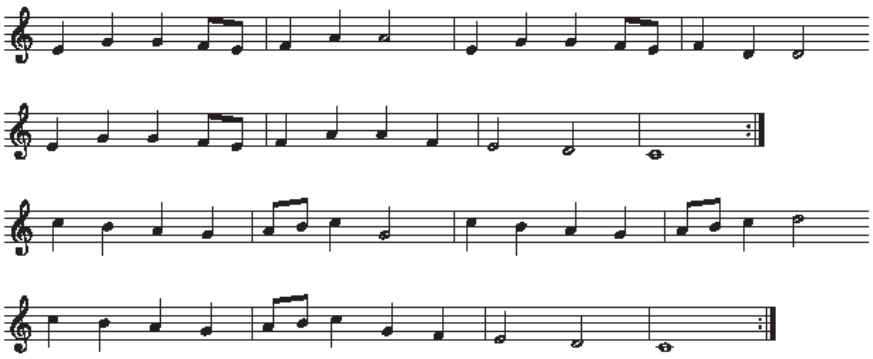


Example 1c.

The Morris tune, Strains 1 and 2, as given by Edward Jones, The Bardic Museum (1802).

As published by Sharpe and Karpeles in 1951, the rhythmic interest had decreased. Contour and harmony were so changed from the time of Weelkes that the sense little sense of resemblance remains (Example 1d).

Folksong researchers are usually interested in how songs with a common ancestor change over time, and, as Ward himself concludes, the Morris tune gives ample cause to find change predominating over cohesion, except in the preservation of meter. The separation and recombination of strains is known to be endemic in the folk music of the British Isles (Cowdery, 1990).



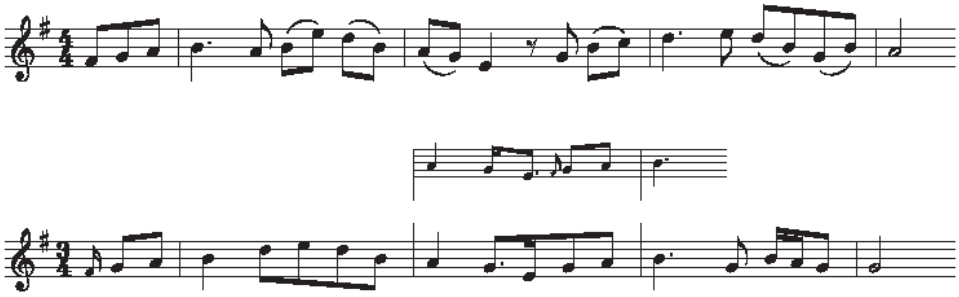
Example 1d.
The Morris tune as given by Cecil J. Sharpe and Maud Karpeles, The Sword-Dances of Northern England (1951), after John Ward (1986).

CASE 2. THE LONDONDERRY AIR

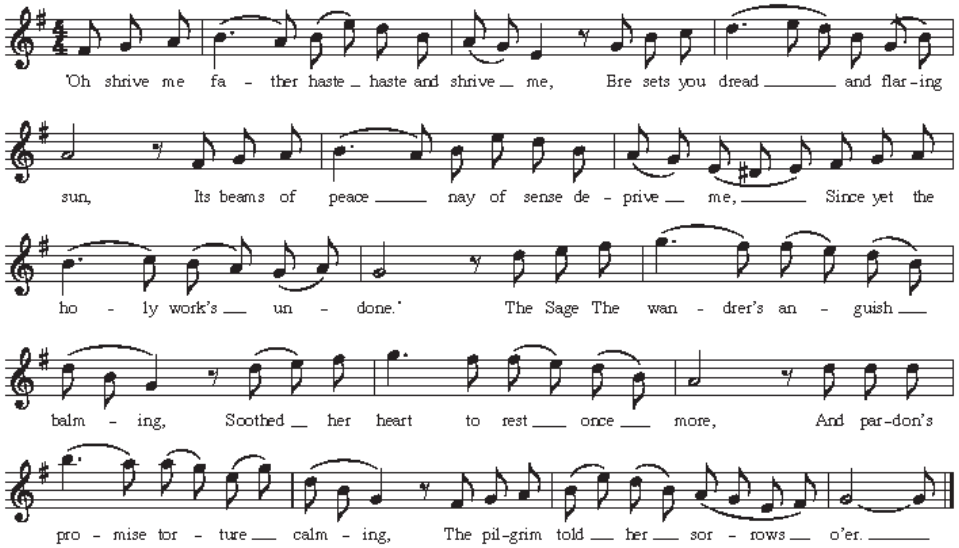
Singers will recognize immediately that the well-known melody of the Londonderry Air (or "Danny Boy") and its musical cognates form a corpus which requires a broad tessitura (a 13th). Unlike the Morris tune, it is a texted work, or, more accurately stated a multi-texted work. Like the Morris tune, it consists of two "strains" (in textual terms a verse section and a chorus section) and is in a major key. Audley's original purpose in studying it was to explore its qualifications as an "ancient" melody, but these were largely refuted. Widely variant titles and lyrics have been welded together in various ways over three centuries to produce what is not so much a single tune-family as a cluster of songs, elements of which have similar features. Differences of meter, mode, scansion, phrase- and song-length, and melodic detail affecting contour are evident from example to example.

Somewhat in contrast to Ward's study, which assumes the gradual separation of two strains which originally belonged together but were subjected over time to separate lines of musical variation, Audley has determined that the verse and refrain sections of the Londonderry Air were conjoined after more than a century of independent development. He provides 22 examples and others are cited. Some relate only to specific passages of the Air we know today. Although treated in folklore as an "ancient tune," Audley shows that the Londonderry Air (1855) is a concatenation of two earlier pieces, "The Young Man's Dream" (verse) and a Gaelic refrain (*ullogaun*) which seems to have been added to it during the "Castle Hyde" phase of transmission, forming a song circulated as "O Shrive Me Father" (*c.* 1830). Numerous variants and predecessors of both contributing songs are cited, but only a few can be reiterated here. Example 2 shows (a) the Londonderry Air and (b) "The Young Man's Dream" (known in later editions as "Castle Hyde" or "Younghall Harbour"), here with its own manuscript variant, and (c) "O Shrive Me Father."

An interesting footnote to the history of the Londonderry Air for cognitive



Example 2a, b.
First strains of (a) the Londonderry Air and (b) "The Young Man's Dream" (Dublin, 1793), with an alternative reading from a manuscript source.

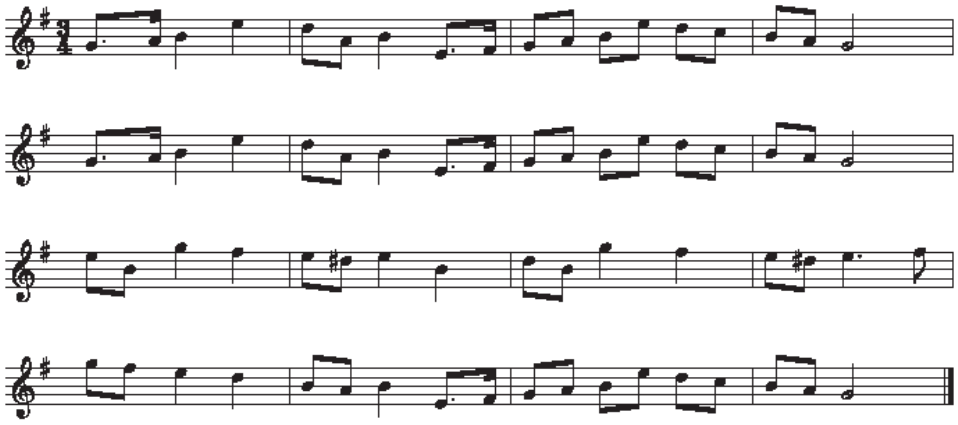


Example 2c.
"O Shrive Me Father" (c.1830), after Audley (2000).

psychologists (but an unsurprising one to ethnomusicologists) is that some of the relevant transcriptions in this tune family (e.g., Example 2b) are in 3/4, while others are in 4/4. However, no examples of "The Young Man's Dream" in 4/4 are known. Also, a few of the examples given by Audley from prints seem simply to be incorrectly notated. A Scots variant of "The Young Man's Dream" called "I Dreamt I Lay" (not shown) raises a different conundrum: it is in a minor mode, and the refrain, prior to its reincarnation as the Londonderry Air, was known in variants ending in both major and minor. Changes which entered into the creation of the Londonderry Air from its forerunners included phrase elision and the re-ordering of

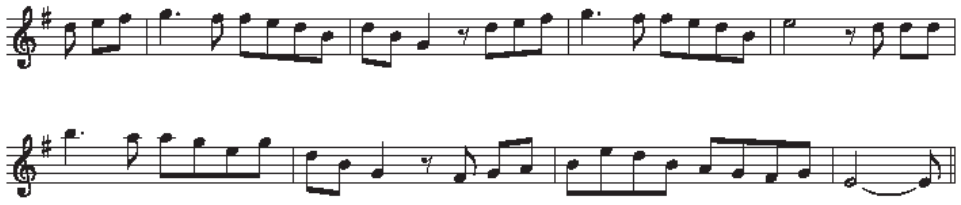
note sequence, particularly in moving the high B from a weak accentual position (as a sixteenth note at the end of the second beat) to the downbeat of the measure.

The phenomenon of metrical recasting makes some theories of derivation seem tenuous at best. Audley contrasts the transcription of "The Young Man's Dream" as given in Example 2d with the Londonderry Air (2a). In the 1793 transcription of "The Young Man's Dream" (2d), preservation of contour is strong in relation to the Londonderry Air (2a), although the compass of the "chorus" is more restricted.



Example 2d.
"The Young Man's Dream" as transcribed by Bartlett Cooke (1793), Strain 1.

Identity is more emphatically sustained in the metrical and contour relationships between the earlier Air (2a) and the second strain shown in Example 2e, from 1903, despite the fact that the final cadence reverts to the minor mode.



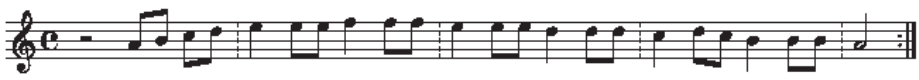
Example 2e.
The Londonderry Air, Strain 2 (Chicago, 1903).

While a pentatonic impression is made by both the modern and early versions of the melodic material, no exemplar is explicitly pentatonic, for leading tones always occur in a few positions. However, some variants cadence to the parallel minor key (or, as Audley 2000: 235 puts it, to the sixth degree of the major scale).

CASE 3: THE DANCE OF MANTUA

The Dance of Mantua (*Ballo di Mantova*) and its large extended family has been discussed at length (Tagliavini, 1994; Selfridge-Field, 2004). Its rich heritage can be mentioned only briefly here. Like the Morris tune, the melody appears to have originated in the context of dance music and therefore to have been controlled to some degree by gestural association. However, texted examples are known. Like the Londonderry Air, the Dance of Mantua has been notated (arguably, at least) in various meters and modes. The collection of material makes a useful assemblage for hypothesizing about melodic difference because its "arch" contour is so straightforward and many of its instantiations are so close to one another.

More than with the other collections, one can begin to see how a systematic metric for melodic difference might be developed, how parameters might be weighed relative to one another, and how "best matches" might be culled. The postulated procedures raise at least as many questions as they satisfy, however. A seventeenth-century example of the *ballo* is shown in Example 3a.

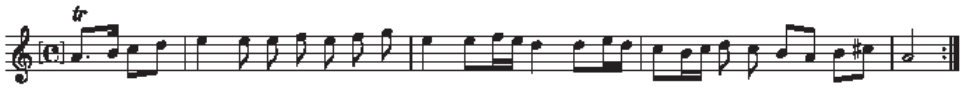


Example 3a.
The seventeenth-century Dance of Mantua.

The eighth-note run on the upbeat is widely retained and the presence of an eighth-note "turn" on the last two beats of the fourth measure are common, while in many cases only quarter notes are seen in bars two and three. A variant identified as "Fuggi, fuggi, dolente cuore" ("Flee, flee, grieving heart") is familiar from several settings in seventeenth-century string ensemble music, and listeners conversant with symphonic repertory of later centuries will recognize Smetana's "Moldau" theme from *Ma Vlast* (*My Homeland*) in this melody, neither considered in depth in Tagliavini's compendium. Nor is Hatikva, the national anthem adopted by Israel in 1948, included in his study, which concentrates on instrumental examples up to 1800.

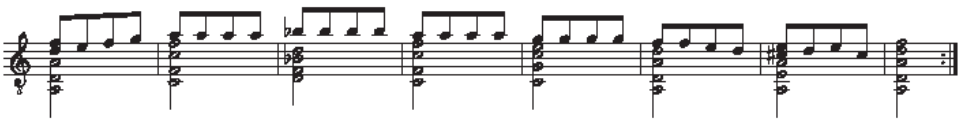
In the large repertory culled by Tagliavini, questions which do not occur in smaller collections arise. These particularly concern how to weigh one musical feature against another in comparisons intended to determine whether two melodies are the same. What should be the allowance for dotted replacements of even note

values? Of syncopation? Of melodic ornamentation? Of melodic simplification? Of the insertion of ornamental tones in place of long note values? Of grace notes? Of modalization? Of metric change? Of slurring? Of textualization? Of harmonization? Of octave substitution for individual notes within the melody? Of the *tierce de Picardie* (the substitution of a major third in cadential formulae in the context of minor keys)? In the end, questions of melodic identity may be ill-posed. A few of these questions are brought into focus by Example 3b. Perhaps categories of similarity should be specified at the outset in order to avoid arbitrary adjudications in an unranked list of "similar" instances.



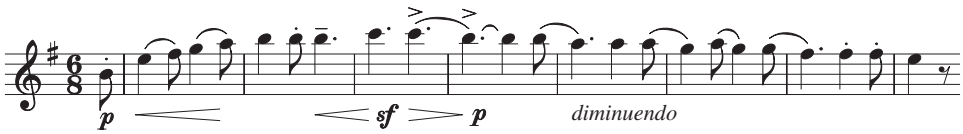
Example 3b.
A variant of the Dance of Mantua notable for its rhythmic figuration and modal change.

Among the many variants of the Dance of Mantua provided by Tagliavini one of the most perplexing is provided by a guitar arrangement of the eighteenth-century in which the chordal accompaniment realized diverges from chordal arrangements familiar today. This documents a tonal "rehearing" which challenges much current thinking about thinking about the role of implied harmony, for commonalities of implication are generally assumed. Yet in Example 3c the use of a series of major chords in Bars 2-5 (i-III-VI-III-VII-i-V-i) makes it appear that the performer did not know how to play minor chords except on the tonic. The harmonic progression defies the more usual implied one, i-i-iv-i-VII-i-V-i.



Example 3c.
A setting of the Dance of Mantua altered by harmonic realization and texture.

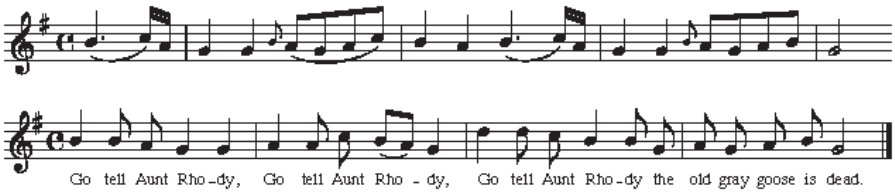
It is certainly instructive to consider later, more familiar uses of the theme. In the case of Smetana's "Moldau" (1874), the familiar arch melody now represents the River Moldau (Vltava in Czech) as it courses through Bohemia. The meter is 6/8, which occurs infrequently in Tagliavini's large collection of examples. The driving dance rhythm is gone; some of the notes linger. This is folk music transformed for a sophisticated but nostalgic audience of listeners (Example 3d).



Example 3d.
The river theme from Smetana's "Moldau" (1874).

CASE 4: "GO TELL AUNT RHODY"

The earliest known instance of the melody we today call "Go Tell Aunt Rhody" occurs, according to Sickbert (1999), in a gavotte in Jean-Jacques Rousseau's early vaudeville opera, *Le Devin du village* (1752). The scene in which it occurs is labeled a pantomime; the melody shown in Example 9 ushers a group of villagers onto the stage and then is repeated in various elaborations. Despite the initial impression it might give of having begun life in august circles, staged dances and other choreographed events (which is what these events apparently were) in operas and operettas often made use of already popular and sometimes anonymous material. This tune migrated, according to Sickbert's account, through anthem books, hymnals, virtuoso piano arrangements, love songs, and other musical genres on its route to preservation. The melody has been especially widely used in American Protestant churches. It was repeatedly transcribed and arranged in the twentieth century by Alan Lomax, Burl Ives, and others. The degree of distance between the earliest example and the best known modern version is musically slight or great, depending on what value one assigns to harmonic difference and scale degree on the most heavily accented notes. See Examples 4 a and b. The half-cadence on V 4a seems worlds apart from the half cadence to I in the folksong. The ascent to the fifth degree at the start of Bar 3 (4b) also stretches the contour.

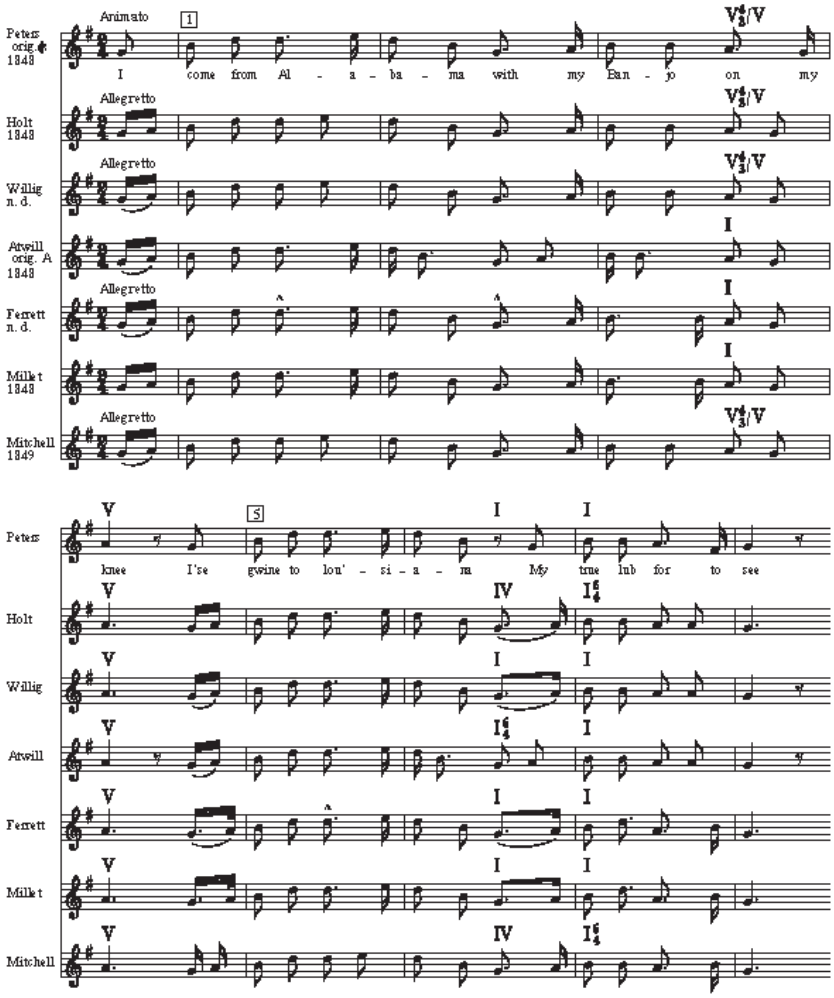


Example 4.
(a) The gavotte from Rousseau's Le Devin du village and (b) the folksong "Go Tell Aunt Rhody."

4a has the most limited compass (a fourth) of any example shown.

CASE 5: "OH, SUSANNA"

In the travels of a composed "folk" melody, changes in Stephen Foster's "Oh, Susanna", are documented by Spizter (1994). In contrast to Cases 1-4, musical content is little changed from one example to the next. The original print and six reissues are quoted in Example 5. That they vary at all is somewhat confounding, since the melody was composed by a single individual, was conveyed in print, and is of relatively recent origin (1848). Spitzer conjectures that these qualities may be residues of oral transmission because Foster songs were popular among traveling minstrels. Reversion to pentatonicism in North American folk music is a common characteristic of heavily transmitted repertories (that is, pentatonicism may be less a feature of the music itself than of the extent of its transmission!). This seems an important point to



Example 5.
Stephen Foster's original and six early prints of "Oh, Susanna" (c. 1848-1850).

keep in mind, because in general musical discourse pentatonicism is, outside the context of East Asian music, sometimes considered musically primitive, as though it was a preliminary phase of development. Spitzer's work suggests the opposite.

Other features of oral transmission noted by Spitzer include (1) alteration of rhythm to clarify the beat, (2) a tendency of a "salient harmony" to draw the melody to the root of the chord, and (3) the elimination of minor differences between parallel passages. Some of these can be observed in Example 5. The material used in the present study, however, is too limited in extent to provide grounds for testing these tendencies, since it comes from a short span of just a few years.

3. Evaluation: A Provisional Cognitive-Distance Metric

Since the original purpose of Selfridge-Field (2004) was to test the viability of a proposed cognitive-distance metric, we turn to computing such a metric for the examples shown against the five target melodies. The metric's primary purpose is to enable sorting of large quantities of similar material into rank order which would make "common sense" to ordinary listeners, though validity would necessarily rest on a common notion of musical similarity. Since relatively few examples of each melody are given here, the effort is directed toward the more fundamental question of gauging the degree of relatedness as it emerges from social practices (Cases 1 and 3) vs. those traced by individual musicians (Cases 2 and 4). Case 5 is more beholden to the culture of print, which aims to avoid corruption in transmission, than the others are.

Briefly, the proposed metric attempts to evaluate both explicit and implicit elements of information and to combine them into a single score. The main features considered are pitch and implied harmony, with weights given for each event according to its accentual position. Duration is coupled with both variables *de facto* but is not evaluated separately. The scores for "pitch" and "harmony" are then added (a variant for sorting large datasets uses multiplication to spread the results more precisely). A maximum score is 10. Pitch takes into account some global information, such as scale degree and modal preservation. The procedure is designed for tonal repertories and variants for duple, triple, and compound meter are recommended. The basic outline is given in Tables 1.1 and 1.2.

The method for computing the score of beat-sensitive items (1b, c; 2b, c, d) addresses each individual beat indicated in the numeral of the time-signature as shown in Table 5.3.

As currently developed it is focused only on tonal works in regular meters. It is not suitable for music with persistence syncopation, such as most jazz, without adaptation. Lyrics and title are completely ignored.

A score of 10 indicates exact duplication of all essential details through the tertiary level of metrical evaluation. Scores above 8 seem usually to be necessary to warrant further evaluation. All scores are reported in Table 1.4 and discussed below.

Table 1.1
Pitch-accent structure evaluation

1. Basic Pitch-Accent Structure	Range = 0-4
A. If meter matches target	Max = 1.00
and If subunit (e.g. quarter note) is the same	Score = 1.00
or If subunit is different (e.g., 4/8 vs. 2/4)	Score = 0.50
Else	Score = 0.00
B. Percentage of matched pitches on primary beats*	Max = 2.00
If matching number of scale degrees=100%	Score = 2.00
or If matching number of scale degrees =>90%	Score = 1.33
or If matched number of notes/unit =>80%	Score = 0.67
Else	Score = 0.00
C. Percentage of matched pitches on secondary beats	Max = 1.00
If matching number of scale degrees=100%	Score = 1.00
or If matching number of scale degrees=>90%	Score = 0.67
or If matched number of notes/unit =>80%	Score = 0.33
Else	Score = 0.00

Table 1.2
Harmonic-accent structure evaluation

II. Basic Harmonic-Accent Structure	Range = 0-6
A. Mode of work (major, minor, other)	Max = 1.00
If modes match	Score = 1.00
Else	Score = 0.00
B. Percentage of matched chords on downbeat**	Max = 2.50
If unambiguous matches on primary beats =>90%	Score = 2.50
or If unambiguous matches on primary beats =>80%	Score = 2.00
or If unambiguous matches on primary beat =>70%	Score = 1.50
Else	Score = 0.00
C. Percentage of matched chords on secondary beats**	Max = 2.00
If unambiguous matches =>90%	Score = 2.00
or If unambiguous matches =>80%	Score = 1.50
or If unambiguous matches =>70%	Score = 1.00
Else	Score = 0.00
D. Percentage of matched chords on tertiary beats	Max = 0.50
If unambiguous matches =>90%	Score = 0.50
Else	Score = 0.0

Table 1.3
Beats considered at the three highest levels of intrabar activity

Meter	Primary	Secondary	Tertiary
2 / 4	1	2	
3 / 4	1	2, 3	
4 / 4	1	3	2, 4
6 / 8	1	4	2, 3, 5, 6
12 / 8	1	7	4, 10

Table 1.4
Scores for the examples given above

Target and Example	Score
1a. The Morris tune (1a, after Weelkes, 1608)	
1b. Strain 2 (Wright, *c.* 1713)	1.0
1c. Strain 1 (Jones, 1802)	4.5
1c. Strain 2 (Jones, 1802)	5.5
1d. Strain 1 (Sharpe, 1951)	2.0
1d. Strain (Sharpe, 1951)	2.0
2a. the Londonderry Air	
2b. Strain 1 (anon., 1793)	2.5
2c. Strains 1 and 2 (anon., *c.* 1830)	10
2d. Strain 1 (Cooke, 1793)	[cannot be evaluated]
2e. Strain 2 (Chicago, 1903)	4.17
3a. The Dance of Mantua	
3b. Early variant	8.57
3c. Guitar arrangement	5.00 [9.63 with "corrected" harmony]
3d. Smetana: "Moldau" theme	7.5 [incomplete score; see comments]
4a. "Go Tell aunt Rhody"	
4b. Folk-song version	4.5 [incomplete score; see comments]

4. Case Discussion

(1) In the case of the Morris tune, title preservation and the persistence of meter, mode, general pitch contour, and phrase length (before the twentieth century) seem to account for what similarity there is. The duplication of phrases and the introduction of cadential variations in 1d do little to destroy this very general level of similarity, though they obviously change the literal content and cause substantial change in the overall harmonic scheme at designated points. The work is sectional and can generally be classified as belonging to Cowdery's second category ("conjoining").

(2) Metrical differences make comparisons for the Londonderry Air quite

difficult, especially when the conceptualization of accent may be flawed in the transcription, as could be the case in Example 2d. The Londonderry Air is also an example of Cowdery's "conjoining," but with far more vivid differences between the sections than between the strains of the Morris tune. Upon comparison, significant divergences in pitch-direction (i.e. contour) emerge. So too do harmonic changes, which are shifted on and off the principal beats. A low score for some candidates on the distance metric reflects the blurriness of the comparison, and this seems deserved. Otherwise the item-by-item comparisons are uncontroversial, but instead of generating scores that cluster in the mid-range, the results gravitate towards one or other extreme. Whereas the Morris tune is subjected to various forces of modernization (progressive rhythmic definition and various kinds of symmetries at the phrase level), the Londonderry Air and its forebears as identified by Audley consists either of (a) a set of two sections with melodies of significantly broad tessitura sprung from relatively undistinguished parent melodies, or (b) a set of sections extensively elaborated in transmissions which are evidently sometimes oral but mostly written. It depends on whether one proceeds from the present to the past or vice versa. Audley's collection does not rest on title identity, and some of his choices could be challenged on the basis of cognitive distance. At best, they come from a grey buffer zone between belonging and not belonging.

(3) In the Dance of Mantua set, Example 3b is obviously closely related to the model melody. The collection can be considered to belong to Cowdery's first category ("outlining"). The cognitive-distance metric seems to show promise in ignoring superficial differences involving the interpolation of several extra notes, since they do not disturb the accentuated pitches or their harmonies. Example 3c is given two (alternative) scores, the first to represent an assessment based on the music as given. The score in parentheses indicates that if its rather unconventional harmonization were changed to the customary chord progression, it would achieve a very persuasive result. Here again the interpolation of extra notes does little to disrupt the evaluation. Example 3d earns a score of 7.5 on the basis of the preservation of mode, melodic contour, and underlying harmony through the primary-beat level. Because of the disparate meters, however, the sub-units are not directly comparable, so its score might be regarded as "incomplete."

(4) A comparison of "Go Tell Aunt Rhody" with Rousseau's original gavotte brings up a subtle point with regard to the proposed cognitive-distance metric. The "Go Tell Aunt Rhody" family, like the Dance of Mantua family, is also based on "outlining" or correspondence of contours. However, some of the candidate matches are relatively distant in cognitive terms. The collection mixes examples declared to be melodically similar with those identified by name and controlled by frequent reprints, much as in the case of "Oh, Susanna." The evaluation of metrical sub-units can produce two different sets of results, depending on the order of the comparison. If the metrically more highly patterned folksong were given first, the score would be somewhat higher, because every level could be evaluated, but the score given in

Table 1.3 only computes the first metrical level. (The divergent results obtaining by inverting the order of comparison is increasingly recognized in music-query research as an issue to be resolved.) Methods of evaluating ties (which are implied by the dotted notes of the gavotte) and metrical shifts of otherwise coincident pitches and harmonies remain to be worked out.

(5) No evaluation of melodic relationship for the print variants of "Oh, Susanna" is appropriate because by the measures discussed here, all are the same and were intended to be understood as such. Spitzer's observations on generalized tendencies of change over time bear consideration, however. The first and second (beat clarification and root substitution for other chord tones in the melody) are not particularly in evidence in the long temporal paths of the other melodies discussed. On the other hand, regularization of phrases is highly evident in the Morris tune. Is this a function of time and an accumulating number of transmissions? Of cultural values in music/speech/rhyme that prevailed specifically in the centuries (nineteenth and twentieth) from which they come? Of cognitive functioning? Of aesthetic judgment? Does extensive transmission enhance or suppress musical refinements, elements of rhythm, or traits of tonality? The current literature appears to be insufficient to answer any of these questions much less to weigh the extent of their influence.

5. General Discussion

The social dynamics which facilitate community agreement on musical identity are obviously quite lax in their requirements for formal matches. In fact, some studies in ethnomusicology (e.g., List, 1985) describe cultures (here the Hopi) in which similarity of social function is the primary criterion for "musical" similarity.

Two features of the case melodies loom large: (1) their association with dancing and (2) the unpredictable ways in which cultural familiarity impact notation of "similarity." What is most persistent about the Morris tune is the title rather than the tune. The fundamental reason for claiming that that a piece is a member of a defined musical group is likely to have been that the same *choreography* would fit with it. The Dance of Mantua too was first and foremost of a dance. If it had a designated choreography, the details have long since lapsed, but the same questions might be raised. Does a choreographic association merely serve the purpose of convenience, or does some kinesthetic residue of dancing serve as a goad to musical memory? "Rousseau's Dream" is a dance in a more formal sense, but the popularization of a stage work in the broader culture falls into a hybrid social category. The cognitive question which underlies these speculations is whether "embodied cognition", or at least rhythmic entrainment, plays a role in melodic memory. Does gesture reinforce more aspects of music other than basic meter? Recent studies (e.g., Wagner et al., 2004) suggest that gesture can reinforce language learning. Are the correlates in

musical learning? In musical memory? The possibility that gesture plays a pivotal role in establishing long-term memory is tantalizing but unconfirmed.

Further investigation of social definitions of musical, especially melodic, similarity would seem to lie to ethnomusicologists. Within the sphere of psychological studies, however, it would be useful to know whether, or under what circumstances, musical training may override the acceptance of consensual musical identities where musical detail contradicts it. Questions of literacy in recognition and more particularly in the transcription of melodies lie close to the surface in the Londonderry Air collection. Variation in the fundamental elements of construction — meter, mode, and phrase grouping — surely defy many rubrics held to pertain to the conceptualization of musical similarity. It may be relevant to ask what role patriotic associations may have, in the cases of the Londonderry Air and the Dance of Mantua, in reinforcing musical content. European folksong researchers have long recognized the importance of relatively simple songs for certain social functions, among them teaching young children to sing and dance, encouraging congregational participation in religious services, and reinforcing patriotic thoughts. Every song considered in detail here satisfies at least one of those conditions.

This begs a final question: Is the simplest music the most likely to be widely conveyed, most accurately preserved, and longest remembered? The Londonderry Air may illustrate the exception that proves this potential rule. Perhaps it is not simple enough to facilitate *accurate* transmission. On the other hand, Rousseau's gavotte may, like the Morris tune, be too devoid of attention-invoking musical features to leave a clear imprint. It would clearly take a great deal more data and many large collections of "related" tunes to deal fully with such questions.

Despite the perceptual conundrums that spring up from musicological collections of tune-family members, these collections may contain some important clues to the role extra-musical (social? corporeal?) variables play in forming constellations of work which are, to a first approximation, "the same". None of these studies offers a firm foundation for the construction of a theory of melodic similarity. Each gives a different sense of the outer limits of collective notions of it. Without doubt, these allowances are inconveniently broad for modern technologists and frustratingly vague for psychologists. The intellectual challenges posed by determining where in the vast *terra incognita* of melodic cognition the cognitive limits of melodic similarity lie, and of how social dynamics condition them (and, therefore, the shared identity of certain tunes), could keep researchers in several fields occupied for years to come.

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• Dimensiones sociales de identidad melódica, cognición y asociación

Mientras los investigadores musicales se han interesado en desarrollar instrumentos para seleccionar de forma automática melodías relacionadas, y los psicólogos buscan una mayor comprensión de cómo la gente aprende, reconoce y recuerda melodías, los estudios musicológicos y etnomusicológicos ofrecen numerosos estudios sobre familias melódicas. Parece que las familias melódicas forman una unidad sobre la base de un contexto cultural. Las melodías parecen ser similares si la gente dice que lo son. ¿Existen características musicales concretas que favorezcan la formación y cohesión de los miembros de una familia melódica? Los investigadores musicales han estado estudiando esta cuestión durante medio siglo. Sus investigaciones se han intensificado respecto a la complejidad de una melodía y han disminuido proporcionalmente en relación con las múltiples formas en que dos melodías pueden ser la misma o diferente.

Este estudio examina cinco familias melódicas y evalúa miembros seleccionados de ambas según una medida de distancia cognitiva propuesta previamente. Las concordancias y los casos de divergencia musical en el contexto de la reclamada independencia se evalúan en relación a la formación de conjuntos tipos, los tipos melódicos y los métodos de transmisión — impresa, oral y ambos tipos —. Ni los miembros cuidadosamente seleccionados de las familias, ni aquellos seleccionados por haber preservado su titularidad revelaron necesariamente un alto grado de coherencia musical. Sin embargo, resulta sospechoso entre las familias seleccionadas el predominio de piezas originariamente asociadas con la danza. Esto sugiere que, incluso cuando el contorno y otros hechos varían, en los patrones de duración rítmica puede subyacer la identidad social de similitud "melódica".

• Dimensioni sociali di identità melodica, cognizione e associazione

Mentre in campo musicale i ricercatori s'interessano allo sviluppo di strumenti per la selezione automatica di melodie reciprocamente correlate e gli psicologi mirano ad una chiara comprensione del modo in cui i soggetti apprendono, riconoscono e ricordano le melodie, gli studi musicologici ed etnomusicologici offrono numerose ricerche sulle famiglie melodiche. A quanto pare, la coerenza reciproca delle famiglie melodiche si basa in parte su convenzioni culturali. Le melodie sembrano assomigliarsi se la gente afferma che si assomigliano. Nella formazione e nella coesione dei membri di una famiglia melodica, sono favorite particolari caratteristiche musicali? Gli studiosi di musica hanno indagato sul problema per mezzo secolo. Con l'incrementarsi delle loro ricerche, si è proporzionalmente accresciuta la considerazione per la complessità melodica e per i molti modi in cui due melodie possono essere uguali o differenti.

Il presente studio esamina cinque famiglie melodiche e valuta membri selezionati di ciascuna di esse secondo una misura, preventivamente stabilita, di distanza cognitiva. Concordanze e casi di divergenza musicale nel contesto di una dichiarata correlazione vengono valutati in rapporto a tipi di collezione-formazione, tipi melodici e metodi di trasmissione (a stampa, orale, entrambi). Né i membri

accuratamente scelti di famiglie melodiche, né quelli selezionati attraverso il preservarsi di un titolo mostrano necessariamente un grado elevato di coerenza musicale. Ad ogni modo, tra le famiglie selezionate è cospicua la predominanza di brani originariamente associati alla danza. Ciò suggerisce che perfino quando il contorno ed altri aspetti variano, modelli ritmici durevoli possono soggiacere all'identità sociale della similarità "melodica".

• Les dimensions sociales de l'identité d'une mélodie, de la cognition et de l'association

Alors que les chercheurs s'efforcent de créer des outils permettant d'identifier automatiquement les mélodies qui ont une similarité et que psychologues cherchent à comprendre plus clairement la manière dont les gens apprennent, reconnaissent et retiennent une mélodie, les études de musicologie et d'ethnomusicologie ont réalisé de nombreux travaux sur les familles mélodiques. Il semble que celles-ci sont partiellement fondées sur une cohérence culturelle. On dit que des mélodies sont semblables si les gens les trouvent ainsi. Existe-t-il des caractéristiques musicales particulières qui jouent un rôle particulièrement important dans la formation et la cohérence d'un groupe de mélodies ? Les musicologues étudient cette question depuis cinquante ans déjà. À mesure qu'augmente le nombre de leurs travaux, la reconnaissance de la complexité d'une mélodie et les nombreuses façons dont deux mélodies se ressemblent ou diffèrent a augmenté en proportion.

Ici, nous avons étudié cinq familles de mélodies et nous avons évalué certains éléments de chacune sur la base de la mesure de la distance cognitive choisie auparavant. On a évalué les concordances et les cas de divergence musicale lorsqu'une association était affirmée et ceci en rapport avec des types de collections, les types mélodiques et les méthodes de transmission (écrites, orales ou les deux). On n'a pas trouvé un haut degré de cohérence musicale, ni parmi les membres choisis de familles, ni parmi ceux qui sont choisis sur la base du titre. Mais parmi les familles choisies, il était évident qu'il y avait prédominance des pièces qui était à l'origine liées à la danse. Ceci semble montrer que même lorsqu'il y a variation de contour et d'autres caractéristiques, des structures rythmiques prolongées peuvent servir de base à l'identité sociale de la similarité « mélodique » .

• Soziale Dimensionen melodischer Identität, Kognition und Assoziation

Während Musikforscher sich für die Entwicklung von Instrumentarien zur automatischen Melodienerfassung interessieren und Psychologen untersuchen, wie Menschen Melodien lernen, erkennen und erinnern, bieten musikwissenschaftliche und musikethnologische Forschungen zahlreiche Studien zu Melodiefamilien. Melodiefamilien bilden sich vermutlich teilweise aufgrund kultureller Übereinkünfte. Melodien scheinen so ähnlich zu sein, wie Menschen dies empfinden. Gibt es

bestimmte musikalische Merkmale, die hinsichtlich der Bildung und des Zusammenhalts der Familienmitglieder bevorzugt werden? Musikgelehrte haben diese Frage ein halbes Jahrhundert lang untersucht. Proportional zum Forschungszuwachs steigerte sich der Respekt für die Komplexität von Melodien und für die verschiedenen Arten, wie zwei Melodien gleich oder unterschiedlich sein können. Diese Studie untersucht fünf Melodiefamilien und evaluiert dabei ausgewählte Mitglieder entsprechend eines zuvor vorgeschlagenen Maßes der kognitiven Distanz. Dabei werden Übereinstimmungen und Fälle der musikalischen Divergenz im Kontext des behaupteten Zusammenhangs evaluiert und in Beziehung zu Arten der Sammlungen/Formationen, der Melodietypen und Übertragungsmethoden (gedruckt, mündlich, beides) gesetzt. Weder handverlesene Mitglieder der Familien noch die über Titelerkennung gesammelten Melodien zeigen notwendigerweise ein hohes Ausmaß an musikalischer Kohärenz. Trotzdem ist für die ausgewählten Familien auffällig, dass die meisten Stücke ursprünglich mit dem Tanz assoziiert waren. Dieser Umstand deutet darauf hin, dass die andauernden rhythmischen Muster eine Basis für die soziale Identität „melodischer" Ähnlichkeit darstellen könnten, sogar bei Abweichungen in der Kontur und in anderen Merkmalen.