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B. ON MELODICAL SIMILARITY IN VERSIONS OF A SWEDISH FOLK-TUNE

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Abstract

A set of different versions of the Swedish folk-tune "Fiske-skärsvisan" collected by Moberg is studied as regards the question why they are felt to be melodically similar. The observations of common elements made in an analysis of the melodies are integrated into a rule system by means of which new versions of the folk-tune can be generated. The rule system shows that signaling the constituent structure is important, and that melodical similarity seems to be closely related to the marking of constituents and the prominence values of the notes.
Introduction

Variation, sequencing, thematical relation as well as musical style are used to denote different degrees or kinds of similarity in music theory, and most of us will agree that similarity plays a very important role in composing and perceiving music. The phenomenon of similarity seems to be regarded as a self-evident psychological fact, which is experienced by all music-minded persons. Still, the phenomenon as such seems to be weakly explored from the side of music theory. This is rather remarkable. On the one hand, similarity is a basic phenomenon in music and we readily recognize when and where it appears. On the other hand, we are not able to tell explicitly what conditions should be fulfilled in order to evoke this phenomenon, and consequently our understanding of this basic phenomenon must be said to be rather poor.

Moberg (1950) has collected a large number of folk-tunes which according to him have a common origin. Moberg's support for this is their apparent melodical similarity. Consequently, his material may be useful in an investigation of what actually makes two melodies sound similar. The purpose of the present investigation is to explore some of the conditions that must be fulfilled if melodies shall be felt to be similar. These conditions will be formalized in a rule system which can be said to explicitly describe the similarity observed in the versions considered. The rule system is generative so that the type of similarity which it describes can be demonstrated by a set of generated versions of the "Fiskeskärsvisan".

Data

Fig. III-B-1 shows the versions of the folk-song that will concern us here. They were selected from Moberg's material on the criterion of apparent melodical similarity. Versions with extra bars inserted, with major changes in the meter, and so on were excluded. All the versions in Fig. III-B-1 have the function of a lullaby.

An apparent common denominator of the songs is the preference in half-notes at the ends of the even-numbered bars. Also, we note that all melodies end on the fundamental of the tonic, and that all even-numbered bars end on this note or on the fifth of the dominant.

A closer analysis of the songs reveals some additional common features. Fig. III-B-2 gives an overview of them. Specific pitches, pitches
Fig. III-B-4. Eight versions of the Swedish folk-tune "Fiskekärsvisan", selected from Moberg's (1950) article on that song.
Fig. III-B-2. Occurrence of various phenomena in the melodies shown in Fig. III-B-1.
belonging to a specific chord, intervals between odd-numbered beats, and the direction of such intervals are invariable in certain positions within the period. Also, we see that the positions for these phenomena form a regular pattern in the period. As was previously found to be the case in some Swedish nursery tunes, the position within the period seems to be an important factor even in this material (see Lindblom & Sundberg 1970). It seems reasonable to interpret this segmentation as an indication of a constituent structure.

**Rule system**

In order to account for these and other observations we need a generative rule system. As there seems to be good reasons for assuming a constituent structure deciding which modifications that are allowed where, a mapping of the constituent structure and a generation of the corresponding prominence contour are required.

We propose that the melodies be regarded as an 8-bar structure in which bars 5 and 6 are repeated once. This agrees with the observation that, in fact, bars 7 and 8 generally repeat bars 5 and 6 metrically and melodically, see Fig. III-B-1. The transformation needed is used so often in music that it has a special sign of its own, \( \| : :\| \). The slightly asymmetrical tree we obtain is shown in Fig. I-B-3. It depicts the hierarchical order between the constituents: period, phrase, feet, and beat.

Next step is to transform the tree diagram into a string of prominence values. The derivation can be followed in Fig. III-B-4. The procedure is exactly the same as in the case of the nursery tunes. First, each beat is assigned the prominence rank of 1 and each constituent is embedded in a pair of parentheses. Then, the innermost pairs of parentheses are cyclically erased until all parentheses are eliminated. Thereby, as soon as two prominence ranks of 1 appear within the same parenthesis the leftmost or rightmost has priority and retains its prominence while all other prominence ranks fall one step. Left priority is applied at the feet level, and right priority on higher levels. The final result is the prominence contour shown in the bottom line of the figure. This contour represents the prominence relationships between the beats on a scale of integers where 1 is the highest rank.
Fig. III-B-3. Tree diagram illustrating the hierarchical order between the constituents of the melodies shown in Fig. III-B-1.
FIG. III-B-4. Transformation of the tree diagram in Fig. III-B-3 into a string of prominence values.
The prominence ranks play a decisive role in the rule system. The rule system is shown in Fig. 1-B-5. It consists of two groups of rules, one for tonality and melody, and one for the meter.

The harmony is rudimentary in this material. This is rather natural, since the song is normally performed without any accompaniment. However, certain rules are followed. The introduction of the opening and closing phrases and the beginning of the last subphrase give chord notes of the tonic. The end of each subphrase contains the fundamental of the tonic or the fifth of the dominant. The main function of these few rules seems to be to establish the tonality of the song.

The prominence values play an important role in the assignment of other pitches as well. The notes are treated in an order determined by their prominence ranks. With the prominence rank of four the distance to the following note of higher prominence is decisive to the order of tone assignment. The prominence rank of five is determined in relation to the following note of higher prominence. It may be observed that the rules for this prominence rank are applied cyclically and are ordered in such a way that smaller intervals will occur more often than larger intervals.

When the tone assignment is completed, the meter may be modified. No modifications are tolerated in the bar containing prominence 1, and no insertion of prominence 6 is allowed in the bar containing prominence 2. Prominences 3 and 4 may be divided into two notes if it is a half-note. If so, the extra note approaches the following by a scale tone step in accordance with the adjacency principle or it simply repeats the preceding note. Inversely, a sequence of two identical pitches, the first of which has the prominence of 4 may merge together to a half note. Remaining notes of prominences 4 and 5 may be divided into two eighth notes provided that this gives a sequence of scale tone steps with or without one repetition. Another allowed alternative is that the extra note fills in a fifth interval. These restrictions as regards insertion of eighth notes are the main reason why the meter is modified after the melody in the case of the folk-song. This seems logical in view of the fact that the melody is used for different texts.

Generation

As was pointed out before, our rule system does not represent more than a mere hypothetical description of the melodical similarity between
TONALITY AND MELODY

\[ p = 1 \rightarrow \begin{cases} 1 \text{ of } T \\ \end{cases} \]
\[ p = 2 \rightarrow \begin{cases} V \text{ of } D \\ 1 \text{ of } T \\ \end{cases} \]
\[ p = 3 \rightarrow V \text{ of } D \]
\[ p = 4 \]
\[ A: / _{-} 5 q, \\
q = 1 \text{ identical} \\
q = 2 I \text{ identical} \\
q = 3 \begin{cases} ID \text{ identical} \\ ID = 0 \end{cases} \]
\[ B: / _{-} 5 4 5 q, \\
q = 1 \text{ identical} \\
q = 2 ID \text{ identical} \\
q = 3 \begin{cases} ID \text{ identical} \\ ID = 0 \end{cases} \]
\[ C: / q 5 \_ \\
q = \begin{cases} 1 \\ 2 \end{cases} \text{ chord note of } T \\
q = 3 \begin{cases} \text{identical} \\ \text{ID identical} \\ \text{identical but delayed by 1} \end{cases} \]
\[ p = 5 \text{ Interval re. following is } \begin{cases} S, \text{ adjacency principle?} \\ S? \end{cases} \\
S? \\
0? \\
3, \text{ adjacency principle?} \\
3? \\
4, \text{ adjacency principle?} \\
4? \\
5, \text{ adjacency principle?} \\
5. \]

METER

\[ p = 3 \]
\[ \frac{4}{4} \rightarrow \{ \frac{4}{4}, \frac{4}{4} \} \]
\[ \text{second note} = \begin{cases} S \text{ re. following, adj. princ.} \\ \text{the first one} \end{cases} \]
\[ p = 4 5: \]
\[ \begin{array}{c}
\frac{4}{4} \\
\frac{5}{5} \\
\end{array} \rightarrow \begin{array}{c}
\frac{4}{4} \\
\frac{5}{5} \\
\end{array} \]
\[ p \geq 3: \]
\[ p \rightarrow p6 \text{ if this gives a sequence of } S \pm \text{ one } R \]

Fig. III-B-5. The rule system used for generating the versions of the folk-song shown in Fig. III-B-6. The notes constituting a chord are given by their step number (e.g. V denoting the fifth) and the tonic chord by T and the dominant chord by D. I refers to the interval re. the nearest following note of equal or higher prominence, and ID refers to the direction of such intervals. S=scale tone step, R=repetition.
the folk-songs concerned. The test of the hypothesis is obtained by generating versions and judging whether or not they are felt to be similar to the melodies studied. The generation involves nothing but random choice among the alternatives that each rule allows. The generated melodies are shown in Fig. III-B-6. The general reaction of musicologists is that the melodies do give the impression of being versions of the "Fiskskärsvisan" even though they differ in quality.

Discussion and conclusions

The rule system presented above is highly similar to the rule system previously suggested as a description of the style of some nursery tunes written by the Swedish composer Alice Tegnér. Apparently, this reflects a similarity between the folk tunes and the nursery tunes. Both possess a hierarchical constituent structure which is certainly a common denominator for most kinds of music. More specific of the two kinds of tunes may be that the constituent structure is so simple - as evidenced for instance by the high degree of symmetry in the parsing trees - and that this structure is so carefully signaled to the listener. Presumably this is a consequence of the social function of these tunes: they are meant to be easy to remember (c.f. Restle 1970).

Our investigation has shown that in order to generate melodies which sound melodically similar it is necessary to pay attention to the prominence of the positions within the period. For instance, the prominence of the positions determines the alternatives allowed in our rule system. The alternatives seem to represent different degrees of similarity. The highest degree is of course pure identity with respect to both pitch and duration. This case is observed in the most prominent positions. Lower degrees of similarities are identity with respect to interval size and the direction of an interval, and these cases occur in less prominent positions. In positions of prominence ranks 5 and 6 the freedom of choice is maximum and consequently minimum the degree of similarity. These close ties between prominence and degree of similarity seem to suggest that the prominence is a psychological reality in the percept, and that melodical similarity is intimately related to prominence.

Evidently, similarity in style is not a prerequisite for melodical similarity. Still, in the melodies generated by our rule system the folkloristic style of the folk-tune seems to be retained. This probably reflects
Fig. III-B-6. Examples of rule generated versions of the folk-song.
the difficulties in separating rules that mirror stylistic features from rules associated with melodical similarity. It appears that more research on style characteristics - in terms of generative theories - is needed before such a separation can be made.

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References

