

Society for Music Perception and Cognition - 1999 Conference. Northwestern University, Evanston, Illinois, 1999.

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Isabel Cecilia Martínez y Favio Shifres.

Cita:

Isabel Cecilia Martínez y Favio Shifres (Agosto, 1999). *The rivalry between structure and surface while judging the similarity of melodies.* Society for Music Perception and Cognition - 1999 Conference. Northwestern University, Evanston, Illinois.

Dirección estable: <https://www.aacademica.org/favio.shifres/99>

ARK: <https://n2t.net/ark:/13683/puga/8rn>

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<< SOCIETY FOR MUSIC PERCEPTION AND COGNITION >>

1999 CONFERENCE

<< AUGUST 14-17, 1999 >>

NORTHWESTERN UNIVERSITY EVANSTON, ILLINOIS USA



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The rivalry between structure and surface while judging the similarity of melodies

Isabel C. Martínez[†] & Favio Shifres^{*}

[†] Universidad Nacional de La Plata
58 No. 1409, (1900)
La Plata, Argentina
(54-221) 451-1489
icmartin@netverk.com.ar

^{*} Universidad Nacional de La Plata
Costa Rica 4469 Dto. 3 (1414)
Buenos Aires, Argentina
(54-11) 4832-6738
shifres@abaconet.com.ar

This study is part of a number of experiments that aims at studying the cognitive reality of some assumptions of Schenker's theory. Although some evidence of the cognitive reality of hierarchic structure has been provided (Serafine, Glassman & Overbeeke, 1989), the nature of the relationships between the surface and the structure of a piece of music evidences a problem to the experimental researcher: while it is possible to modify the surface without changing deeper structural levels, it is impossible to modify the structure without altering at the same time the surface. Previous research faced this problem using i) compound melodies (Serafine et al, 1989) and ii) the GTTM's time-span reduction (Dibben, 1994). But the dialectic relationship between surface and structure has not been experimentally researched enough: surface attributes would contend with structure ones for the priority to process the melodic information in terms of tonal coherence.

We studied the implicit use of structure using similarity judgement tasks between melodies with similar surface and with same or different structure. As Serafine stated we assumed that listeners would rate the melody which shares the structure as the most similar. A correlation coefficient between the melodic contours was run after the composition of the stimuli. It appeared to be a predictor of the contend between structure and surface. In order to verify its predictive power a new experiment was run.

This time, we composed stimuli using the correlation coefficient as a constraint for the compositional process. Thus, we selected 15 melodies (melody A) from the academic repertoire of western music. Each of them were treated as follows: 1) Two melodies with same (melody B) and different (melody C) structure from the model were composed. Within each trio of melodies, the surfaces were monitored using the coefficient in order to obtain the following pattern: 1) lowest correlation between A and B; 2) highest correlation between either A and C or B and C. According to this highest correlation, the 15 trios of melodies were sorted in two groups: Group AC and Group BC.

Subjects (N=146) had to compare the melodies estimating the highest similarity between them after listening to the following pattern: melody X - melody Y ---- melody X - melody Z (where X, Y and Z were alternatively A, B or C). We hypothesised that:

1. When X is C, as there is no contend between surface and structure, listener's choices will be according to the highest correlation prediction (subjects will choose A if the trio belongs to the Group AC; and B if the trio belongs to the Group BC).
2. When X is A or B, listener will prefer B or A respectively, because they share the structure. But,
3. When X is A or B, as there is a contend between structure and surface, listener's choices will reflect the dialectic relationship between them:
 - 3.1. When X is A the contend will be stronger within the trios belonging to the Group AC (Because, although A and B share the structure, A and C's surfaces are higher correlated). Therefore, the listener will rate lower this trios than the ones belonging to the Group BC.
 - 3.2. When X is B the contend will be stronger within the trios belonging to the Group BC (Because, although A and B shares the structure, B and C's surfaces are higher correlated). Therefore, the listener will rate lower this trios than the ones belonging to the Group AC.

Results confirm our hypothesis (X=A: $F_{[1,5108]}=27.391$ $p<.000$; X=B: $F_{[1,5108]}=40.162$; X=C: $F_{[1,5108]}=146,972$).

According to the results: 1) listeners would use structure while comparing the melodies; 2) the conflict between structure and surface is present in their choices; 3) the coefficient would predict the listeners' responses according to this rivalry.