Lexical Cohesion in Linguistic and Musical Discourse

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Abstract: An analogy is presented between music and linguistic discourse in terms of lexical cohesion. Linguistic discourse and music are two different manifestations of human communication. They are both meaningful and coherent, and both are processes inherently temporal. Lexical cohesion is a semantic relation manifested in the lexical level of language. A short sample of discourse is analysed and compared with a sample music analysis, regarding lexical cohesion. Their similarities are discussed, and the term Musical Cohesion is established.

1 Introduction

Linguistic discourse analysis, namely the analysis of text, and music analysis have developed in parallel and have studied similar phenomena. However, no systematic comparison of both techniques and their potential results exists to date. In this paper, linguistic discourse and music are compared with respect to cohesion. First, a linguistic analysis of a short sample of text is performed to demonstrate the concept of lexical cohesion. The musical counter-part follows, with an extended and modified paradigmatic analysis. The two are juxtaposed, making the similarities explicit, and the term Musical Cohesion is established. Finally, the property of linguistic cohesion contributing significantly to coherence and intelligibility is discussed in terms of music.

The analogy between language and music is here investigated from a perspective which is different to various influential existing approaches in three respects. Firstly, the focus is on discourse rather than sentence level. This seems appropriate since both music and linguistic discourse are instances of human communication, carry some kind of meaning, are intelligible, and above all both are inherently temporal. Secondly, a semantic rather than a syntactic relation is examined, namely cohesion,

which makes it possible to address a semantic level in music, and finally, the investigation focuses on the surface level by looking at associative features, without making any claims concerning underlying structure.

2   The Discourse Analysis Background

Discourse[1] is any linguistic passage that forms a semantic unity, spoken or written, of whatever length or form. The major and necessary factor that causes a linguistic passage to be a text rather than an arbitrary string of sentences is *cohesion*. Cohesion occurs when some element in the discourse either presupposes the existence of another for it to be interpreted, or is semantically linked to one. For example, in the following beginning of a discourse: "A thermodynamics professor had written a take home exam for his graduate students (...)", the interpretation of his presupposes the existence of thermodynamics professor. This type of cohesion is called *reference*.

The type of cohesion discussed here is *lexical cohesion*, a semantic property manifested on the lexical level by the use of specific words that are either identical or semantically close. It can be divided into reiteration and collocation.

Reiteration includes the exact repetition of a word, a synonym, super-ordinate, or general word, for example, in "I turned to the ascent of the peak. The ascent is perfectly easy", the word ascent is repeated. Instead of its second occurrence, one could have also used the climb, task, thing as examples of reiteration ([4], p.279).

Collocation is manifested by the use of words that are semantically related in some more distant way, but can still be thought of as belonging to the same semantic network. Examples are the pairs exothermic-endothermic and answer-proof in "Is hell exothermic or endothermic? Support your answer with a proof."

The above examples demonstrate only pairs of related words, where in fact there can be whole strings, named *cohesive chains*. In "As for souls entering hell, lets look at the different religions that exist today (...)", the chain is souls-hell-religions.

Lexical cohesive chains are sets of words classified together according to semantic closeness or similarity. There can be several chains in a text, running in parallel, and interweaving. They can be global (during the whole discourse) or local (for a part of it).

2.1   An example analysis

In the following text, five cohesive chains are displayed by using different font styles. Reference is also noted (by an asterisk), but only when the presupposed item belongs to one of the lexical chains. Reiteration and collocation are not distinguished.

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[1]The approach described here follows [4], which is considered to be the standard and most well-accepted account on cohesion. Note that the terms Discourse and Text are used interchangeably.

Soon |her* eye| *fell on a little glass box that was lying under the* table: *she* opened it, and found in it a very small* (cake(, *on which* the words "*|eat| *me*" were beautifully marked in* |currants|. 'Well, I*'ll |eat| *it*,"* said |Alice|, *"and if it* makes me** |LARGER|, *I* can reach the key; and if it* makes me** |SMALLER|, *I* can creep under the door; so either* |way| *I*'ll get into the garden, and I* don't care which happens!"*

She* |ate| a little bit, and said anxiously to herself*, "Which |way|? Which |way|?" holding |her* hand| on the top of |her* head| to feel which |way| it* was |GROWING|, and she* was quite surprised to find that she* remained the same |SIZE|: to be sure, this generally happens when one |eats| |cake|, but |Alice| had got so much |*into the way*| of expecting nothing but |*out-of-the-way*| |THINGS| to happen, that it seemed quite |dull| and |stupid| for life to go on |*in the common way*|.

So she* set to work, and very soon finished off the |cake|*.

(text quoted in [4], p.319).

Figure 1 shows how the above chains (together with their references) unfold through time: the x-axis represents the word number of the discourse, and the level on the y-axis represents the different chains: The first chain (her eye, Alice, her hand, her head, Alice) is shown at level 5, the second (cake, eat, currants, eat, ate, eats, cake, cake) at level 4, the third (larger, smaller, growing, size, things) at level 3, the fourth (way, way, way, into-the-way, out-of-the-way, in-the-common-way) at level 2, and the last (dull, stupid) at level 1. The chains alternate, and some of them are global like "Alice" and "cake", and some local, like "dull".
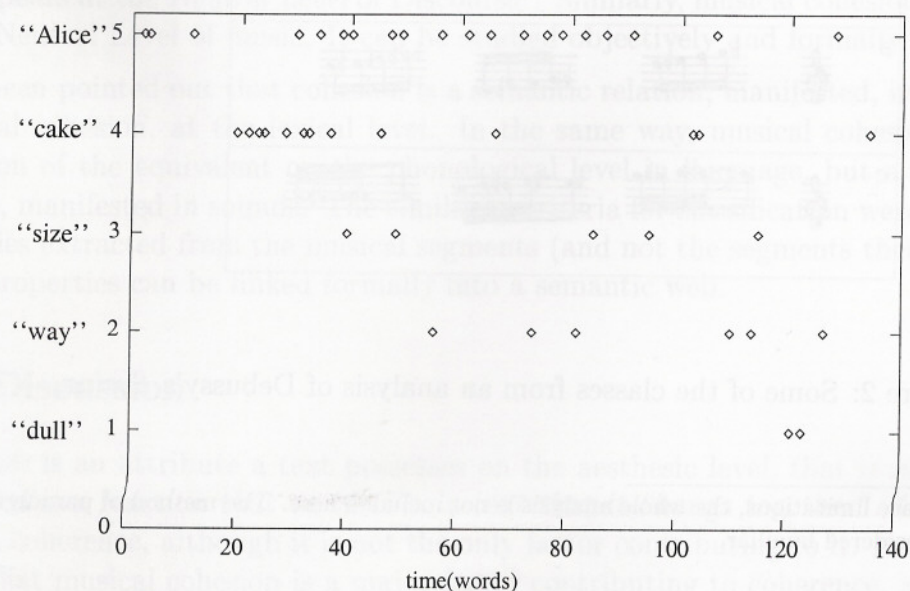

Figure 1: Cohesive Chains from linguistic discourse

3 The Music Analysis

Repetition, variation and transformation have been studied extensively in music. Prime examples are paradigmatic [6] and motivic analysis, and various other classifications of musical material have been carried out, for example [3, 2, 1].

The method of analysis chosen here is a type of paradigmatic analysis, carried out using a computational model of paradigmatic analysis [1]. The analysed piece is Debussy's *Syrinx* for solo flute. The results, some of which are shown here, were very close to Nattiez' second paradigmatic analysis of the same piece [6]. In order to obtain a classification, each musical segment is described as a list of features. These features are chosen by the analyst, and they can be any musical property, for example concerning melodic shape, rhythm, and whatever the analyst chooses to be his criteria for classification. The segments (described as lists of features) are classified by the paradigmatic analysis algorithm. The categorisation of the segments is hierarchical: there can be many levels, and categories can be divided into subcategories. Also, segments that are not repeated are left out.

Figure 2 shows three sample classes: classes A and B are global, whereas C is local. Most of these segments (apart from the ones in class C) are repeated throughout the piece, but here they are included only once in each class[2].

Figure 2: Some of the classes from an analysis of Debussy's *Syrinx*.

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[2]Due to space limitations, the whole analysis is not included here. The method of paradigmatic analysis is considered familiar.

4   Comparison

From the above analyses, two points can be made regarding the similarities between discourse and music.

- Classes of objects can be observed where the objects share common properties and are classified together because of their similarity. There exist various classes with contrasting material which nonetheless can also share certain properties, and form a hyper-class at a higher level.

- These classes are distributed over time. Some classes can be local (like the "dull" chain and the C class above), and some can be global, like "Alice" or A. Classes alternate, following no specific rule). However, one could observe some patterns of sequences, for example occurrence of class 1 might always be followed by occurrence of class 2.

4.1   Musical Cohesion

The formation of classes in both linguistic discourse and music depends on similarity: repetition and variation. In discourse analysis the effect created by these principles is called cohesion. In music, since there is no term for such an effect, the linguistic term can be adopted as *musical cohesion.*

It is important to note that cohesion is a relation that appears in the text itself, it is visible or audible, and can be brought out and studied. Therefore, it is a relation that appears at the *Neutral Level* of Discourse[3]. Similarly, musical cohesion appears on the Neutral Level of music. It can be studied objectively and formally.

It has been pointed out that cohesion is a semantic relation, manifested, in the case of lexical cohesion, at the lexical level. In the same way, musical cohesion is not a relation of the equivalent on the phonological level in language, but a semantic relation, manifested in sounds. The similarity criteria for classification were musical properties extracted from the musical segments (and not the segments themselves). These properties can be linked formally into a semantic web.

4.2   Discussion

Coherence is an attribute a text possesses on the aesthesic level, that is in its perception: it is a reaction that we have to a text that it "hangs together". Cohesion supports coherence, although it is not the only factor contributing to it. It could be argued that musical cohesion is a major factor contributing to coherence, although the degree to which this holds might vary in comparison to language.

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[3]According to Molino's distinction of the three levels, Neutral, poietic, aesthesic, [5].

This issue, and the investigation of other significant factors contributing to coherence (like context) are beyond the scope of the current paper, but are a major direction for future work. Moreover, it would be interesting to investigate how other types of cohesion can be related to music, and in general to explore what discourse analysis has to offer for music analysis. However, as with any parallelism between language and music, although there are self-evident similarities, one should not neglect their differences.

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