Larson's musical forces in Schlenker's musical semantics

Abstract Larson's musical forces can provide a way to summarise musical events for Schlenker's musical semantics, to make it more computational, but also to avoid the implication that each note should be mapped to an event.

Overview Philippe Schlenker's musical semantics [Sch19] aims to use events in the world as denotations for musical pieces, to allow one to say a set of events, or situation, is true of the piece in question. The idea is that some virtual source or sources are imagined to be responsible for the sounds that are heard, and that musical events can be mapped to 'world' events via a truth definition. However, the question how to obtain the set or rather sequence of musical events is treated in a somewhat ad-hoc fashion. In short, it relies on a human evaluator to determine what the subdivisions are within the piece, and then to draw inferences as to what each such constituent is to denote in the world.

The late Steve Larson's musical forces approach [Lar97a] attempts to link musical sequences to physical phenomena including gravity, magnetism, and inertia. The first reflects the habit of notes above some threshold to move downward, the second the attraction to notes a half-step away, and the third the tendency of notes to continue a particular pattern. In each case, this is about motion to a stable note, which for Larson is the harmony's root, third, or fifth ([LV05], page 120), and that provides a way to link Larson's approach with that of Schlenker, since stable notes can be viewed as grouping boundaries. In other words, a musical line can be partioned by considering its stable points, and the resulting grouping structure can then be labeled with relevant musical forces, which, taken together, can then be considered as a sequence of musical events.

Even though Larson did not view his approach as constituting a musical semantics per se, he did note that suggestions of feelings, action, or motion may be considered as musical meanings, and that these arise in listeners – who hear a piece of music 'as' something else – because of the interplay of musical forces. But what both approaches clearly share, is that they are both attempts to associate music with the physical realm – though in opposite directions: while for Larson, musical forces are heard as a mapping of physical gesture onto musical space ([Lar97b], page 101), Schlenker seeks to map musical events onto physical ones, i.e. events in the physical world ([Sch19], page 38). The approach outlined here is intended as a step towards a computational approach, which as an added bonus sidesteps an assumption in Schlenker's work noted by Migotti and Zaradzki [MZ19], namely that each note is to be interpreted as an event.

Example The example depicted in figure 1 was taken from ([Lar97a], page 62, example 5, pattern 4). There, it is listed as a sequence of scale degrees, i.e. as 3-4-3-2-1-7-1, and is considered as one of a series of so-called tonic-prolongation patterns. Here it is given in music notation, in the key of *C major* (sound: `http://bit.ly/3hzOPx4`). The aim is to illustrate how an apparently simple melody can be partitioned in a number of ways, and how the partitions give rise to the assignment of musical forces. These partitions act as musical events and are interpreted as a situation in the world, using a modification of Schlenker's truth definition ([Sch19], page 67) – which is not given here due to space limitations. The present example, being stepwise, gives rise to a single Schlenkerian 'virtual source', but for instances containing leaps (i.e. with minor third intervals or larger), it is possible to arrive at denotations with more than one such source.

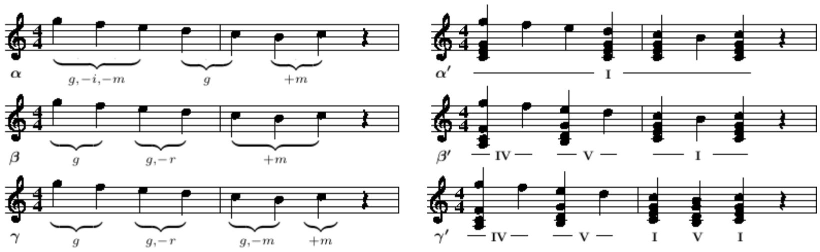

Figure 1: Pattern from [Lar97b] with musical forces and harmonisations

In figure 1, α is a partitioning assuming that the melody's harmony is heard as remaining on the tonic (I) throughout, made explicit in α' next to it (`http://bit.ly/36EGWQs`). β is a hearing under *IV-V-I* harmony (`http://bit.ly/3kdlpql`): while the first α group ends on E, which is the (harmonic) third, the first β group ends on F which is the fourth in case the harmony would be heard as the tonic mode I, and hence unstable. But it is root given it is heard as mode IV, meaning it can be considered (locally) stable so a group ending is admissible. Similarly, the other β group endings are also locally stable. The same goes for γ in the figure, based on a *IV-V-I-V-I* hearing (γ' and `http://bit.ly/3kecEft`).

The musical forces in the figure are as follows. A segment is gravitational, indicated with g, in case the last note moves down. It is downward magnetic ($-m$) if its last interval is a semitone down, and upward magnetic ($+m$) in case this is a semitone higher. It is downward resisting ('opposing attractor', viz. [LV05], page 122) if its final note moves down but would be upward magnetic had it moved up instead. Finally, a segment is downward inertic ($-i$) in case it has length ≥ 2 with continuous downward motion. Note that in partitioning γ, the last note is singleton, which is treated as a pair by considering it together with the last note of its preceding segment, else no force could be assigned.

Each partitioning in figure 1 now gives rise to a set of musical events as a sequence of quintuples $M = \langle harmony, gravity, magnetism, resistance, inertia\rangle$, where *harmony* of a segment takes the value of the harmonic function at the segment's end. Then $M_\beta = \langle\langle IV, g, 0, 0, 0\rangle, \langle V, g, 0, -r, 0\rangle, \langle I, 0, 0, 0, +m\rangle\rangle$, while $M_\gamma = \langle\langle IV, g, 0, 0, 0\rangle, \langle V, g, 0, -r, 0\rangle,$ $\langle V, g, 0, 0, -m\rangle, \langle I, 0, 0, 0, +m\rangle\rangle$. A proposed denotation $K = \langle object, events\rangle$ is *kite-landing*, given as K_β and K_γ below with $K_\gamma \models K_\beta$; a desirable property given Schlenker [Sch19] can be considered as a form of event semantics, and K_γ is more specific than K_β.

$$K_\beta = \langle kite, \left\langle \begin{matrix} altitude = higher, \\ motion = down \end{matrix} \right\rangle, \left\langle \begin{matrix} altitude = lower, \\ motion = down, \\ cord = pull \end{matrix} \right\rangle, \left\langle \begin{matrix} altitude = ground, \\ distance = further \end{matrix} \right\rangle\rangle$$

$$K_\gamma = \langle kite, \left\langle \begin{matrix} altitude = higher, \\ motion = down \end{matrix} \right\rangle, \left\langle \begin{matrix} altitude = lower, \\ motion = down, \\ cord = pull \end{matrix} \right\rangle, \left\langle \begin{matrix} altitude = lower, \\ motion = down, \\ distance = closer \end{matrix} \right\rangle, \left\langle \begin{matrix} altitude = ground, \\ distance = further \end{matrix} \right\rangle\rangle$$

This is a mapping $M \longrightarrow K$, with harmonic stability mapped to *altitude*, gravity to *motion*, resistance to *cord*, and magnetism to *distance*. As work in progress, the latter is considered problematic: it follows Schlenker's idea that higher pitch either means more energy or smaller size ([Sch19], pages 52-53), and here this implies the kite lands further from the observer, whereby it has a smaller size. This is not intuitive as harmonic resolution should signal stability without forcing orientation, but a solution will be forthcoming.

References

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