Musical F
orces: Motion, Meaning, and Metaphor in Music was written by Steve Larson and published in 2012 by Indiana University Press, Bloomington. This book serves as a culmination of over twenty years of his research in music theory, cognitive linguistics, and experimental psychology. The book is a remarkable explanation and defense of his theory of musical forces. In addition to reviewing this text, I hope to outline key points and motivations for this theory and comment on them. As the title and the book both address motion, meaning, and metaphor, I will do so in this review. These three concepts are crucial factors in both the development and defense of the theory of musical forces.

My primary motivation for choosing this book was as an opportunity to continue bringing together my backgrounds in physics and music theory. Additionally, I hoped to gain further insight into new ideas in music cognition and perception. This book served as a sufficient resource.

Central Theoretical Arguments

The theory of musical forces argues that our intuitive understanding of physical motion shapes the way we create and experience Western classical tonal music and contributes to its meaning in specific and quantifiable ways. In other words, we draw on our embodied knowledge of moving about and simply existing in the physical world in our experience and perception of classical music. This experience is governed by three musical forces – musical gravity, inertia, and melodic magnetism.

Additionally, the theory argues that music is derived from our ability to recognize patterns, which, in turn, can form higher-level hierarchies. In this theory, Larson carefully invokes metaphors and analogies as tools to move between the physical world and our world of experience.

Motion and Musical Forces

Why do we talk about music as if it actually moves? Why does music move us? Larson presents such thought-provoking questions right from the start to springboard his investigation of how we use specific motion-related language to describe musical behavior and our experience of it. When listening to music, we often feel that melodies are inherently pushed and pulled by various forces – for example, when we are anxiously awaiting that tendency tone to properly resolve.
Our experience of musical motion is derived from our inherent knowledge of physical motion. Musical motion is governed by three musical forces – musical gravity, inertia, and melodic magnetism. Musical gravity describes the tendency for a note to descend. As in our physical experience, we feel the effects of gravity locally rather than globally. When we throw a ball up in the air, it comes down. We can find a significant pattern throughout classical tonal melodies – what goes up, must come down. Melodic magnetism is the tendency for a note to move to the closest stable pitch, and this tendency grows closer as the end goal of stability (tonic) is reached. Lastly, inertia is the tendency for a note to continue in the same direction or manner; a common musical example of this is sequences.

At first, I seriously questioned the appropriateness of using vocabulary which specifically applies to terms directly from the field of physics – terms which describe physical forces and properties that are observable, quantifiable, and knowable. It seems on the surface that Larson is invoking a physicalist approach to his musical theory – the idea that music is, in a way, given to us by nature, and all of the sounds and structure which comprise it are determined by the physical facts which underlie them. However, by invoking metaphor theory and using such terms specifically as descriptive analogies of musical structure and behavior, the theory certainly becomes intriguing to both the music theorist and physicist, and could perhaps serve as an important example of a beneficial interdisciplinary crossover to further our understanding of music.

Metaphor

Larson notes that “…people have no robust way of conceptualizing musical motion without metaphor and all reasoning about musical motion and musical space inherits the internal logic of such metaphors” (Larson, 2012, p. 66). He uses the phrase “cross-domain mappings” to describe this process of how we use metaphors to make claims about our conceptualizations of something based on our direct past experiences. He attributes to the Theory of Conceptual Metaphor and then applies these ideas to outline several specific metaphors defined in the context of this theory.

The Moving Times metaphor illustrates our conceptualization of moving objects as facing in the direction of their motion; we imagine figures are moving relative to a stationary observer. Time itself is a moving construct (like, how we say “time is flying by”). The Moving Observer Metaphor pictures an observer moving through a landscape and times are points on the landscape. Time is fixed, and we observers are moving through it.

In a musical context, we have the Moving Music metaphor - where a musical event is conceptualized as an object that moves past the stationary listener. This is how we normally experience music. Contrastingly, the Musical Landscape Metaphor constructs a musical work as an extended three-dimensional landscape through which the observer moves; it’s as if you could actually traverse through a piece of music as it unfolds into a musical space.

I personally am not well-exposed to literature on metaphors and metaphor theory, so I found his explanations quite abstract and hard to understand. In many ways, it makes me (as a scientist, mainly) question the verifiability of his argument – how can we possibly empirically test
for such a theory grounded in metaphorical relationships? I have struggled with similar questions in my journey to find balance in being both a physicist and musician. I, like Larson, have noticed similarities between the natural sciences and this art, and the idea that music could behave (metaphorically) like it exists in a (metaphorically) physical realm is an attractive and comforting idea, to an extent.

**Meaning**

A pattern occurs when individual characters are grouped together into meaningful units we can understand. An important example of this is in language – words are constructed out of strings of individual letters, which are organized in such a way that we can associate a hierarchical meaning. Patterns and groupings also emerge from consistent rhythms. Experiments have shown that when we hear consistent rhythmic clicks, our minds will begin to hear them in groups (usually of two or three) rather than as individual beats. Humans are consistently striving for order and structure in life – symmetry and patterns govern the laws of nature.

According to the theory of musical forces, we create meaning when our minds group things into patterned relationships. Larson states that “…higher-level meanings can emerge in part from patterns of low-level interactions of musical materials and musical forces…” (Larson, 2012, p. 20). Again, thinking about language, we use language to convey our thoughts and ideas. Meaning is derived from low-level groupings of letters, which form words, sentences, or paragraphs.

Such meaning can also be grouped to form higher-level hierarchies. This idea is related to fundamentals of Schenkerian theory – that Western tonal music is constructed as prolonged elaborations of the tonic and dominant harmonies. Larson says that the “theory of musical forces claims that part of the way in which we give meaning to music is to hear notes as relationships to one another in hierarchies of elaboration … and that such hierarchies are central to melodic expectation (Larson, 2012, p. 132).

**Experimental Findings**

Larson draws upon experimental evidence for this theory from a variety of disciplines and sources, including neuroscience, cognition, visual perception, music analysis and compositions. Recent experiments in visual perception provide evidence that visual forces shape visual perception in an immediately intuitive and logically consistent manner.

These visual forces - representational momentum, representational gravity, and the landmark attraction effect - behave analogously to Larson’s musical forces. Representational momentum refers to experimental evidence that shows we tend to visually remember things being further along than where they were originally. Representational gravity has been shown in a number of visual experiments by Timothy Hubbard. The landmark attraction effect refers to our tendency to remember objects as being closer to a visual “landmark” than they actually were.

Additionally, Larson uses evidence from music compositions and improvisations. He asks, how well do distributions of patterns in music pieces agree with distributions predicted by this
theory? The theory of musical forces makes specific claims about the frequencies with which patterns will occur in music - patterns of more favorable judgment. The patterns are predicted by Schenkerian theory as the collection of tonic-prolongation patterns. Larson compares his results to Schenker’s *Five Graphic Music Analyses*.

Larson and Vanhandel ask “whether gravity, magnetism, and inertia…can help explain participants’ judgments about the experienced ‘strength’ of presented pattern completions or help explain the distribution of the same patterns within the body of pieces chosen for [the] content analysis” (Larson and Vanhandel, 2005). In a listener-judgment experiment, participants were asked to make judgments about perceived strength of melodic pattern completions – the melody’s level of “completeness.” The authors then used these judgment ratings to analyze how well they could be accounted for in terms of the musical forces - gravity, magnetism, and inertia. Larson asserts that these forces should behave in specific and quantifiable ways, and he derives a formula to describe how the forces interact in musical contexts based on the results from the listener-judgment experiment.

**Review and Conclusions**

The theory of musical forces is strong in the sense that Larson is very particular about what it specifically claims, and what it does not. I think that it is also strengthened by how Larson cites evidence from a wide range of disciplines. To me, this highlights that music (and theories of music) pervades many aspects of our lives and studies.

I question the visual perception evidence he cites as supporting arguments for the theory of musical forces. An additional weakness of this theory is that it focuses on melodic behavior only. It also draws heavily from Schenkerian analysis, a theory specifically rooted in Western tonal classical music. In her review, Margulis notes that “[h]istorically, work in melodic expectation has positioned itself in opposition to the elaborate hierarchies of [Schenker’s] theories. But Larson successfully integrates these three disparate theoretical orientations – melodic expectation, Schenkerian analysis, and metaphoric transference – into a single, integrated theory of the musical experience” (Margulis, 2013). I often wonder to what extent such theories of music can be upheld when music is a vastly diverse artform. Where could we make broader claims, or perhaps, universalities?

I am also skeptical of the predictability of his melodic model which is derived based on the interactions of these musical forces because, especially in the field of music theory, theories themselves follow practice. The arts, and music particularly, is a dynamic field and claims to make predictions about certain patterns and behaviors can be suspicious.

This book is recommendable to composers and musicians who are interested in learning about music perception, music cognition, or analogies between music and physics. Some experience with Schenkerian theory and analysis is also helpful, as the reading can be quite technical, and the theory is grounded in Schenkerian ideas. Overall, this book is incredibly insightful and certainly worthwhile.
Bibliography

