

The Performance of Music *Alf Gabrielsson*

In this chapter, Alf Gabrielsson presents an overview of empirical research of music performance. The assigned section focuses mainly on measurements of performance and touches only briefly on models of music performance and performance evaluation. Because the depth of information presented is far too great to completely cover in this report, I will attempt to outline what I found to be the most interesting or controversial findings in the area of measurement and briefly summarize performance modeling and evaluation.

Gabrielsson begins by outlining some of the challenges of measuring music performance. Most notably, there is a wealth of data to be captured regarding the many variables of music performance such as timing, dynamics, and intonation. While the processing of data has been facilitated by the advancement of computers, the real challenge is figuring out which data are relevant and which can be ignored.

Early investigations in the measurement of music performance began mostly in Europe around the beginning of the twentieth century. Binet and Courtier (1895) and Ebhardt (1898) used specially rigged pianos to study various aspects of piano performance. Some notable findings from this early performance research were the lengthening of accented notes, considerable variation in tempo within a performance, and asynchrony within chords.

Around 1930, an extensive body of research on music performance was carried out at the University of Iowa. Under the direction of C.E. Seashore, a group of researchers explored various aspects of music performance for piano, violin, and singing. By filming the hammer movements of the piano, Henderson (1937) studied the performances of two pianists and found that all chords were played asynchronously, with the spread among the notes in a chord varying from 20 to 200 msec. Accented chords exhibited more spread than unaccented chords. The phenomenon of chord asynchrony is also mentioned in more recent research such as Rasch (1979, 1988) and Rose (1989). Nowhere was evidence provided to show that asynchronization was used intentionally as a tool for expression. I would have been more convinced by the discussion had it been shown that the spreads of 20 to 200 msec were large enough such that they must have been intentional on the part of reasonably skilled performers. Is the human motor system capable of making fine adjustments on the scale of 20 msec or less?

More recently, researchers have examined techniques performers use to convey the structure of a piece. Edlund (1985) asked pianists to perform "Twinkle, Twinkle, Little Star" in 35 differently notated versions to examine how performers conveyed structure. Some of the findings were that 2/4 meter markings were played more slowly than *alla breve* or 4/4 markings and that stress marks resulted in longer note durations. I have trouble seeing the usefulness of such a study since the conventions of performance reported were completely in line with what music teachers have been teaching their students for generations. Is it illuminating to find that stress marks resulted in longer note durations? Or that *alla breve* markings resulted in faster tempi? This is how performers are taught to interpret these markings. Perhaps more interesting questions are *why* these interpretations are taught, and are other interpretations or conventions as effective in communicating the underlying musical structures?

We now turn to models of music performance. Gabrielsson mentions models based on measurements in which performance data are used to create models for things such as the amount of ritard at phrase endings or musical dynamics. Another modeling method is based on

musical intuitions, where rules for music performance were designed after consulting the intuitions of a musical expert. I thought an interesting area of further research would be to combine the two models so as to generate rules to be able to model an individual performer's musical intuitions, thus allowing for the generation of a performance of any piece in the style of any performer.

With regards to performance evaluation, Gabrielsson notes that evaluation occurs in many spheres, but there are few agreed-upon criteria for what should be judged or how judgments should be made. Boyle and Radocy (1987) note that a distinction can be made between global evaluations of a performance and evaluations of specific aspects of a performance. The global or overall evaluation is actually the weighted sum of the evaluation of different aspects such as intonation, rhythm, dynamics, etc. Fiske (1977) found that reliability of musical judgment bore no relation to performing ability. Also, other factors such as visual appearance or listener expectations were found to have an effect on overall evaluation.

In conclusion, Gabrielsson presents a wealth of information regarding research in music performance. While there have been many interesting findings, I often found myself questioning the underlying purpose of some of this research. In several instances, such as the Edlund study mentioned above, it seemed that similar results could have been obtained simply by asking musicians how they have been taught to play expressively. It seemed as though some of the studies put much effort into finding results which are already well known to musicians. Instead of asking how ideas are expressed in performance, I would have been more interested in *why* ideas are expressed using the conventions we are all familiar with, and if there is only one effective way of communicating these ideas. What would this tell us about music cognition in humans?