

## **Psychoacoustic experiments with virtual violins**

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This study is the first step in the psychoacoustic exploration of why some violins sound better than others. A method was used which enabled the same performance to be replayed on different "virtual violins", so that the relationships between acoustical characteristics of violins and perceived qualities could be explored. Recordings of real performances were made using a bridge-mounted force transducer, giving an accurate representation of the signal from the violin string. These were then played through filters corresponding to the admittance curves of different violins. Initially, the limits of performance in detecting changes in acoustical characteristics have been characterized. Thresholds were measured for the detection of different modifications of a violin's acoustical response, such as a shift in frequency or an increase in amplitude of one or several modes, using a three-interval forced-choice discrimination task. Thresholds were higher for an input of a musical phrase than for a single note, but depended strongly on the choice of the note. The lowest threshold corresponded to a simultaneous shift in frequency of 1.5%, or an increase in level of 3 dB, of several modes, but thresholds appear to be dependent on the musical training of the listeners.