

## **A New Pitch Circularity Illusion**

**Diana Deutsch, Kevin Dooley, and Trevor Henthorn**

**Department of Psychology**

**University of California, San Diego**

This paper describes a new algorithm for producing pitch circularity using a full harmonic series. As each scale descends, the amplitudes of the odd-numbered harmonics are reduced relative to the even-numbered ones by 3.5 dB for each semitone step. In consequence, the tone with the lowest fundamental frequency is heard as though displaced up an octave. When such scales are traversed in semitone steps, impressions of infinitely ascending or descending scales are obtained. Similar effects are obtained with glides. In an experiment employing two such scales, all possible ordered tone pairs from each scale were presented, making 132 ordered tone pairs for each scale. Sixteen subjects judged for each pair whether the second tone was higher or lower than the first. The data derived from these pairwise comparisons were subjected to Kruskal's nonmetric multidimensional scaling, and excellent circularity was obtained. Individual differences in the subjects' judgments were also explored.