Session 3aPP

Psychological and Physiological Acoustics: Auditory Organization and Representation

William M. Hartmann, Cochair
Department of Physics, Michigan State University, East Lansing, Michigan 49824

Hideki Kawahara, Cochair
ATR Human Information Processing Research Laboratories, 2-2 Hikaridai, Seika-cho, Soraku-gun, Kyoto, 619-02 Japan

Chair's Introduction—8:00

Invited Papers

11:20

3aPP13. Recognition of concurrently-sounding musical instruments with different fundamental frequencies. Gregory J. Sandell (Parmly Hearing Inst., Loyola Univ., Chicago, IL 60626) and Christopher J. Darwin (Sussex Univ., Brighton BN1 9QG, UK)

The "double vowel" paradigm [P. F. Assmann and Q. Summerfield, J. Acoust. Soc. Am. **88**, 680–697 (1990)], in which recognition for two concurrently-sounding vowels is measured over various fundamental frequency ($F0$) separations, is applied to natural musical instrument sounds. The findings of the previous work, in which recognition reaches peak by 1 to 2 semitone difference, is replicated here, with about 35% greater accuracy overall for musically experienced over naive listeners. Attention is given to special cases of instruments that are frequently confused for one another even when $F0$ separations are wide (e.g., clarinet and English horn, or flute and French horn), since such combinations may have special value in musical orchestration. In another condition, concurrently sounding instruments are adjusted in level by listeners so the two sound equally salient. The double-timbre study is then run with variable relative levels between the two instruments. Translations between the effects of semitones separation and difference in level are explored.

11:35

3aPP14. An illusory transfer of temporal gaps between crossing tones. Kyoko Kanafuka (Kyushu Inst. of Design, 4-9-1 Shiobaru, Minami-ku, Rukuoka, 815 Japan), Shunsuke Tanaka (Matsushita Electric Industrial Co., Ltd., Osaka, 571 Japan), Yoshitaka Nakajima (Kyushu Inst. of Design, Fukuoka, 815 Japan), and Takayuki Sasaki (Miyagi Gakuin Women's College, Sendai, 980 Japan)

When a long ascending tone with a temporal gap in the middle and a short continuous descending tone cross each other, a long continuous ascending tone and a short descending tone are often perceived with a temporal gap in the middle. This is an illusory phenomenon because the physical temporal gap of the ascending tone seems to be transferred to the descending tone perceptually. This phenomenon was named "the gap transfer illusion." Many related stimulus patterns were compared which confirmed the robustness of this illusion. An onset and a proximate termination tended to be connected to each other perceptually, forming an auditory event. The proximity of the temporal dimension seemed more important than the proximity of the frequency dimension. When onsets had no proximate termination, the illusion disappeared. Several new phenomena to which the same idea can be applied were found.

Sandell

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