Perception of music by infants

Sir — The origins of the perception of consonance and dissonance in music are a matter of debate, well-illustrated by the difficulty in assimilating contemporary atonal music, where dissonance is prominent. Here we suggest that infants are prepared to find consonance perceptually more attractive than dissonance.

Consonance and dissonance are concepts that refer to the pleasingness of two music theorists. By exposing young infants to consonant and dissonant music, we tested the hypothesis of an innate bias favouring consonance over dissonance. We presented a sample of 32 4-month-old infants (16 males, 16 females) with two different, unfamiliar melodies of 35-second duration in a consonant and a dissonant version for a total of four trials. We created or more frequencies occurring together. The most basic example is an interval, which is the difference in pitch (frequency of vibration) between two tones. Some intervals are considered consonant, others dissonant.

Although Helmholtz and other psychophysicists believed that consonance judgments rested on inborn properties of the auditory system, biological preparedness has never been demonstrated. Psychoacoustic laws, as formulated by Helmholtz and others, could reflect acquired, rather than inborn, mechanisms of auditory processing. Thus, it has been argued repeatedly that consonance judgments are acquired through exposure to the music of a particular culture. This view has become prominent among modern composers and to the dissonant versions of each melody (see figure). We believe these data suggest that the infants prefer the consonant to the dissonant versions of the melodies.

Two main factors control duration of visual fixation in the infant: preference and discrepancy. The dissonant versions of the melodies deviate from what the infant is used to hearing and therefore can be considered discrepant events. However, because the infants do not show longer fixations to the dissonant stimuli, it is fair to assume that it is preference, and not discrepancy, controlling the infants’ fixation time. Motor activity reflects arousal, but arousal can be pleasant or distressed. Because the dissonant versions elicited increased motor activity but less fixation time, motor activity probably reflects a distressed state rather than a pleasant one.

There is no relation between infants’ previous exposure to music (as assessed by a questionnaire) and their behaviour in the experiment. Although less extreme forms of consonance/dissonance might be subject to cultural influence, we suggest that the human infant may possess a biological preparedness that makes consonance perceptually more attractive than dissonance.

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Protrusible eyes; retractable noses

Sir — The closest thing to the protrusible eyes in the vertebrate caecilians described by O’Reilly et al., are the tentacles of snails and slugs. The posterior tentacles of terrestrial gastropods (Pulmonata, Sty- lommatophora) similarly house an eye and an olfactory organ, and they are fully retractable. Terrestrial pulmonates are strongly dependent on environmental water, so, like the caecilians, they are essentially amphibian.

In contrast to the stylommatophores (eyes at the tentacular tip), freshwater pulmonate species (Basommatophora) have their eyes in the head, at the bases of the tentacles. Thus, it can be argued that the retractable tentacle is an evolutionarily stable, if functionally tentative, device for exploration of the terrestrial environment, with obvious advantages for accessing relevant chemical and visual stimuli.

A matter of further interest is the