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1 **Sound-induced motion in chimpanzees does not imply shared ancestry for music or dance**

2
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7
8 Hattori & Tomonaga (1) report that seven captive chimpanzees moved in response to piano sounds, more
9 so than in silence. On this basis, they argue, "some biological foundation for dancing existed in the
10 common ancestor of humans and chimpanzees ~6 million years ago".

11
12 Music's universality suggests it has deep phylogenetic roots (2). Understanding music-like behavior in
13 non-human animals is therefore valuable for understanding the evolution of music (3). But the paper's
14 claim of shared ancestry for music or dance is unjustified, for three reasons.

15
16 First, the effects were heterogenous across a small sample. The most-active chimpanzee (Akira) moved
17 more than 50 times longer than the least-active chimpanzee. Such dramatic variability challenges
18 conclusions about species-wide typicality. This is further complicated by the chimpanzees' prior
19 experience, in pilot experiments, with the same rhythmic patterns in other timbres (sounds the
20 chimpanzees apparently found aversive; personal communication, Yuko Hattori).

21
22 Second, the chimpanzees did not entrain to the beat, a signature of rhythm perception (4) that has
23 evolved in many species (5). Akira moved comparably when the rhythms were randomized (obscuring the
24 beat) and when the sounds were more obviously rhythmic. The motion thus had little to do with musical
25 rhythm, complicating generalizations about the evolution of music. A control condition testing whether
26 chimpanzees respond less to non-musical sounds (e.g., white noise, natural sounds matched in arousal
27 levels) and/or jittered rhythms, as in prior research (4), could determine whether the motion is indeed
28 attributable to music qua music. But Akira's behavior suggests it would fail.

29
30 Third, non-human primates often sway in response to arousing or aversive stimuli. Chimpanzees sway
31 not only when they hear piano sounds (1) but also when deprived of food, when given amphetamines,
32 and when subjected to bursts of loud white noise (6). Captive gibbons and sooty mangabeys display
33 similar behaviors during increases in arousal (7, 8). That the chimpanzees swayed in response to piano
34 sounds may reflect a general response to arousing stimuli rather than a musical behavior.

35
36 Akira did choose to spend time near the sound's source, suggesting a preference for it. But the enclosure
37 made it impossible to escape the sound; and interest in a stimulus does not necessarily imply a
38 preference for it. Moreover, music is not necessarily appealing to non-humans, as auditory preferences
39 differ across primate species. Tamarins show no preference between a screeching fingernails-on-
40 chalkboard sound, which is highly aversive to humans, and amplitude-matched white noise (9). When
41 offered a choice between two stimulus types, tamarins and marmosets preferred silence over music (10).
42 The chimpanzees in (1) may similarly have preferred silence to the sounds (e.g., if they found them
43 arousing or aversive) but their preferences were not measured.

44
45 Future experiments that isolate bona fide music-specific preferences and responses in non-human
46 primates, consistently across individuals, would clarify whether and how these results bear on the
47 evolution of musicality. Until then, an alternative explanation is that some chimpanzees find some sounds
48 aversive or arousing, leading them to move more, via a mechanism unrelated to music.

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