

Reading Guide – Phillips-Silver Beat Deafness

Bibliographic Information

Phillips-Silver, J., et al. (2011). Born to dance but beat deaf: A new form of congenital amusia. *Neuropsychologia* 49(5): 961-969.

Reading Type/Profile

This is a research article published in a journal that focuses on cognition from a neuroscience perspective.

Author Background

Jessica Phillips-Silver is a researcher who received her Ph.D. in Psychology, Neuroscience and Behavior at McMaster. At the time of this publication, she was working at the International Laboratory for Brain, Music, and Sound Research in Montreal, looking at perception of beat and at synchronization of music in people with cochlear implants. She is also a music educator and vocalist.

Abstract/Summary

In this study, Phillips-Silver and colleagues wanted to study rhythmic amusia

“Humans move to the beat of music. Despite the ubiquity and early emergence of this response, some individuals report being unable to feel the beat in music. We report a sample of people without special training, all of whom were proficient at perceiving and producing the musical beat with the exception of one case (“Mathieu”). Motion capture and psychophysical tests revealed that people synchronized full-body motion to music and detected when a model dancer was not in time with the music. In contrast, Mathieu failed to period- and phase-lock his movement to the beat of most music pieces (meaning he was not able to match his movement to the pulses of energy that indicate beats), and failed to detect most asynchronies of the model dancer. Mathieu’s near-normal synchronization with a metronome suggests that the deficit concerns beat finding in the context of music. These results point to time as having a distinct neurobiological origin from pitch in music processing.”

Important Details

Research Question(s): How did Mathieu’s synchronization response compare to a control group? If there was a deficit in beat synchronization compared to the control, is it due to the type of external physical manifestation of the beat, the tempo, or the type of music?

Methodology: The researchers recruited 33 adults to be in a control group and a 23-year-old student named Mathieu who reported that he felt that he could not keep a beat. After running the Montreal Battery of Evaluation of Amusia (MBEA) on him to make sure that he did not also suffer from congenital amusia (tone deafness), Mathieu and the controls were asked to bounce to

the regular beat of a popular merengue song, as well as to the beat of a metronome. A visual aid of the experimenter bouncing to the beat was also presented. To make sure that any deficit between Mathieu and the controls was not due to the physical activity of bouncing to the beat, the experimenters also had them tap to the beat of the merengue and metronome. Other variations included adding various types of music to be bounced to and changing the tempo of the songs. In order to assess Mathieu's perception abilities separate from action, the researchers showed all participants various clips of a person bouncing either in synch or out of synch with the music.

Results: They found that Mathieu was able to phase- and period-lock with the metronome and when watching the experimenter bounce to the music but could not synchronize to the beat when bouncing to the music, even after seeing the visual aid. This was also true when he was asked to tap the beat. However, he was able to bounce in regular intervals in silence. His inability to synchronize with the merengue generalized, for the most part, to other types of music as well. He was generally able to detect whether tempo decreased or increased, but his sensitivity to such change in music was lower than the controls; however, his sensitivity to change in tempo in a metronome beat was about the same as the controls. This pattern of results was about the same when asked to determine whether a bouncer in a clip was in or out of synch: when the clip was played with music, his ability to detect minute asynchrony was lower than the controls but was about the same when the clip was to a metronome beat.

Discussion: This study seems to suggest that beat deafness is a problem with perception and that it is distinct from tone deafness. Because Mathieu earned normal scores on the pitch sections of the MBEA and his difficulty in perceiving the beat in music did not stem from variations of pitch as in people with pitch deafness, there is strong evidence to suggest that beat deafness is a new form of congenital amusia.