Walking and playing: What’s the origin of emotional expressiveness in music?

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Background
A recent review compared musical and vocal expression of emotions. Strong acoustical similarities between the two domains were identified, supporting the hypothesis that emotional expression in music originated as an imitation of vocality. Alternatively, it might be hypothesized that such commonalities are due to a common origin of these domains in motor activity, influenced by the emotional state. We tested this view studying human locomotion sounds, investigating both production and perception.

Aims
We tested whether [a] emotional intentions affect acoustical structure in similar ways as musical performance does; [b] listeners recognize emotional intentions; [c] recognition criteria resemble the acoustical means for emotions expression; [d] emotion recognition is influenced by the degree of musical expertise.

Method
[a]: eight musically-untrained participants were asked to walk as if angry, happy, fearful, sad, and in an emotionless way. Signals were characterized with 21 descriptors inspired by the literature on music performance and source perception. [b]-[d]: fourteen listeners were tested with respect to their ability to recognize the properties of the walkers (emotion, gender, weight, shoe size, sole hardness). A variant of the semantic differential was used, bi-polar rating scales being defined by one adjective and its contrary (e.g., angry - not angry). Acoustical response criteria were modeled using regression procedures.

Results
[a] strong similarities between walking and musical expression of emotions were found with respect to acoustical variables likely to have been controlled by walkers (tempo, timing, and level, but not timbre and articulation). [b] recognition performance was above chance level, although emotions were less well recognized than other walker properties (e.g., gender). [c] recognition performance was unrelated to the level of musical expertise of listeners. [d] emotion recognition was mainly based on signal level and temporal structure.

Conclusions
It might be argued that similarities between music performance and locomotion are observed because expression of emotions in music originates, at least in part, as an allusion to locomotion sounds. Alternatively, similarities might be explained by the common origin of music and locomotion (and vocality) in motor activity, modulated by emotional states. We find this latter view more plausible.

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