

177.7 MUSICAL THOUGHT DISCLOSES A HIGHLY STABLE PSYCHOBIOLOGIC CLOCK, M.Clynes, B.McMahon* and N.Nettheim* NSW State Conservatorium of Music, Sydney 2000 Australia.

Musical thought has the ability to activate psychobiologic clocks with a long term stability of 1 part in 500 or better¹. The existence of such clocks presents a theoretical challenge. The unexpected findings also suggest that under proper experimental conditions such a psychobiologic clock could become a sensitive vehicle for the study of highly specific neurohormonal or drug influences and function.

This stability has been demonstrated through:

1. Performances over a number of years of major portions of several minutes duration of musical compositions by single performers as well as by ensembles (including string quartet). Pieces with a regular motoric pattern show greatest stability. For slow pieces stability tends to be less.

2. In experiments involving repeated tapping to silently thought music (each tap period measured to 0.00001 sec.) mean tapping-rate of groups of 1000 taps can be stable to within 1 part in 500 when a musician taps to the beat of a specific known allegro musical theme (e.g. Mozart K467 1st Movt.) thought silently and repeatedly. It was found in a series of experimental runs involving 4000 taps each that under these conditions the stability of the mean tapping rate increases with the number of taps whose duration is being averaged; over a range of groups of 1 to 1000 taps, the standard deviation decreases from 4% for single taps to less than 0.3% for groups of 1000 taps (only a factor of 2 less than the theoretical limit for the signal/noise improvement if the period consisted of a constant plus random noise.)

Other experiments comparing performances thought in real time with actual performances consistently show the thought performance to be slower by several per cent; as tested in 400 performances of professional musicians. (Clynes, in press).

These findings indicate that musical thought can activate highly stable psychobiologic clocks whose stability within the above limits is not affected by inner and outer environmental factors encountered by these musicians under normal working conditions.

1. M.Clynes & J.Walker, Rhythm, Time and Pulse in Music: Neurobiologic Functions, pp.171-215 in Music, Mind and Brain: The Neuropsychology of Music, ed.M.Clynes, Plenum New York, 1982.