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Prenatal behavioural and biochemical emotional communication and the origins of music

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Why does music communicate strong emotions although it has no clear adaptive value? Musical emotions are carried by learned patterns of sound and movement. The earliest such associations occur prenatally. Human audition and proprioception begin four months before birth. The human fetus processes information about the (emotional) state of the mother both biochemically (via hormone concentrations that quickly pass both placenta and brain-blood barrier) and behaviourally (via maternal sound and movement). Evidence for prenatal biochemical-emotional communication converges from several sources. Experiments on prenatal learning and conditioning (e.g. in rats) document fetal biochemical sensitivity. In early parent-child conflict, the placenta hormonally manipulates maternal nutrient supply. The postnatal adaptive value of mother-infant bonding creates pressure for prenatal bonding. Prenatal behavioural-emotional communication involves sound patterns associated with maternal vocalization, respiration, circulation, movement, footsteps and digestion, all of which depend on maternal (emotional) state. Following changes in that state, the fetus receives behavioural information before biochemical information, enabling classical conditioning. Prenatally established associations may then feed into postnatal behaviours such as motherese, play and ritual via operant conditioning: emotionally charged patterns of sound and movement are reinforced. The theory predicts that prenatal associations between sound, movement and emotion exist in all prenatally hearing animals including primates. But they did not become “music” in the sense of deliberate sonic-emotional manipulation until reflective consciousness emerged during the cultural explosion in the past 100 000 years.