Beyond Musak

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Musak

US Army Major General George Owen Squier
1910: invented multiplexing—multiple signals over single wire
1922: sold patent for music over power lines and founded Wired Radio
1934: Introduced “background music” called Musak (Music + Kodak)
My background

Physician-musician

Parents, wife, kids all musicians

Daughter: Music Therapist

Anencephalic adults
Autistic children
Behaviorally challenged
United Cerebral Palsy
Music, Brain, and Behavior
Mechanisms of Arousal by Music

Mechanisms of Arousal by Music

Hypothesis

Music elicits biologic reactions related to human survival
It affects brain at multiple adaptive levels from primitive to complex
Suggesting ways to use it therapeutically
Mechanisms of Arousal by Music

Brain stem reflex
- Startle response
- Focuses attention – think Haydn’s Surprise Symphony
- Rapid
- Pre-birth
Rhythmic entrainment

- Facilitates motor coordination – think music tied to dance
- Periodic pulses around 2 Hz (120 beats per minute)
- Pre-birth
Mechanisms of Arousal by Music

Evaluative conditioning

- Pairs objects or events with positive (e.g., happy) or negative outcomes
- Used often in opera – measurable sympathetic nervous system changes
- Unintentional, subconscious, effortless
- Pre-birth
Contagion

- Group cohesion (e.g., between mother and infant)—emotional expression mimics internal expression
- Choral music, vocal music
- First year
Mechanisms of Arousal by Music

Visual imagery
- Internal simulations of events that substitute for overt & risky actions
- “Program music”
- Pre-school years
Mechanisms of Arousal by Music

Episodic memory
- Conscious recollections of previous events, binding self to reality
- Nostalgia – “they’re playing our song”—robust musical memory
- Age 3 to 4
Mechanisms of Arousal by Music

Musical expectancy
- Musical structure – evokes interest, anxiety, surprise, chills, hope, disappointment
- Facilitates symbolic language with complex semantics (R v. L cortex)
- Age 5 to 11
Sound was a major design determinant in this project because of the two grand pipe organs housed within it. All vertical walls undulate providing curved surfaces to reflect sound. The goal was to have a reverberation time of 2.8 seconds and no echo.
Cleveland Clinic

Every life deserves world class care.