

AUDITORY SCENE ANALYSIS

Fundamental Question: What is out there, and where is it?

1. Auditory Scene Analysis

- a) Auditory system used to analyze, or parse the scene, or world around us

2. Auditory Scene

- a) Sum of all auditory events, all sound sources (note, focus is on the sound-producing events, not the sounds)

3. Auditory Streams

- a) The sounds that denote a single, continuous sound-producing event

4. Stream Segregation

- a) Top-down
 - i. Automatic schema activation
 - ii. Voluntary schema activation

- b) Bottom-up: primitive auditory scene analysis
 - i. Use acoustic regularities to “calculate” likely stream segregations
 - ii. GESTALT principles describe some segregation processes (strategies??)
 - iii. Unrelated sounds seldom start/stop at the same time
 - 1. Common fate
 - 2. Good continuation
 - “Old plus new”
 - “Tone through noise”
 - iv. Gradualness of change
 - 1. Single sounds change slowly and smoothly
 - 2. Sequences of sounds from the same source change slowly
 - 3. Note: Takes some time (~4 sec) to build up evidence for a stream
 - v. Harmonic relatedness

vi. Holistic effects

1. Co-modulation masking release (CMR)

5. Streaming and Gestalt Principles (Summary)

| GESTALT Principle | Stream Effect or Example |
|----------------------|---|
| Proximity (Nearness) | Frequency, time or space proximity |
| Similarity | Harmonic relatedness |
| Connectedness | Pitch glides pass through noise |
| Good continuation | Gradual increase in loudness of approaching train |
| Common fate | Musical counterpoint |
| Symmetry | Rising pitches tend to fall again |
| Closure | Masking, CMR |