Sound Effects
Van Sijll

More than just the sounds of a scene
• layers of meaning
• can reveal
• can suggest
• can hide/disguise
• can establish
• can be tied to specific event or character
Diegetic and non-Diegetic Sound

- Diegetic
  - organic to the scene
  - realistic
  - can be altered for effect
  - can be contextual or narrative

- non-Diegetic
  - not logically heard in the scene
  - added for narrative effect
Diegetic and non-Diegetic Sound from Platoon
Diegetic Sound from Platoon scene

- water dripping
- jungle sounds
  - insects
  - owl
- slapping bugs
- snoring
- movement sounds
- explosion/guns
- provide context
non-Diegetic Sound from Platoon scene

- **Music**
  - dissonant
  - builds to crescendo
  - pitch is high--lower notes added
  - timbre is “scratchy”

- **Heartbeat**--builds to crescendo

- Builds Tension--

- Leads to release

- Narrative role
Diegetic Sound from ET

(Van Sijll) elicit emotional response
identify characters (antagonist)
Diegetic Sound from ET

identify characters (antagonist)
elicit emotional response

◆ identify characters (antagonist)
  ● sound tag
  ● keys displayed prominently
  ● we know (hear) where they are
◆ elicit emotional response
  ● metallic sounds are perceived negatively
  ● we see no faces..........sound is identifier
Diegetic Sound from ET

identify characters (antagonist)
elicit emotional response
from ET shooting script

24. THE CREATURE’S POV car door opens, man steps out, seen only from waist down, dark pants, heavy boots, and a huge ring of KEYS hanging from his belt. The KEYS make a tremendous racket, displacing all other sounds of the night.
Diegetic Sound from ET
identify characters (antagonist)
elicit emotional response
from ET shooting script

◆ 26. WIDER: MORE CARS ........More cars converge on the scene. We SEE bright headlights and HEAR slamming doors and muffled voices. Then we HEAR the creature break a branch......THE SOUND OF KEYS
Diegetic Sound from ET

identify characters (antagonist)
elicit emotional response
from ET shooting script

◆ 27 EXT. RAVINE--NIGHT-LONG
SHOT......we see shadows of men
jumping the ravine. THE CREATURE
hides in the near end of the ravine. KEYS
is the last to jump. The SOUND of KEYS
is hideous
Diegetic Sound from ET

identify characters (antagonist)
elicit emotional response

◆ we code the sound of keys
  ● the threat of the antagonists
◆ the sound also draws us in
  ● like the creature, we listen to determine distance
◆ the key sound raises tension
  ● volume
  ● timbre
IV. Silence

◆ A famous director said after using silence after a very dramatic scene: "Silence was the most awesome sound we could get".
◆ If we expect sound, silence very powerful.
◆ Absence of sound creates expectation.
◆ Absence of sound is eerie, unnatural.
Silence--not necessarily silent
by Matthew Wright; from Aspect Ratio, a Cinema Blog

- “the silence around the solo instrument”
- Gary Rydstrom
  - sound for Terminator 2: Judgment Day, Jurassic Park, Saving Private Ryan
  - believes that effective sound design begins with contrasts:
- But it’s also about how frequencies work together. There’s a trick to making a
  gunshot big using multiple layers of elements. You take the high snap of a pistol
  and add to it the low boom of a cannon and the midrange of a canyon echo. You
  orchestrate it. On an über scale then, we do that to the whole soundtrack, making
  sounds work together.
- Silence can be thought of as a type of sound. It’s like when somebody years ago
  figured out that zero was a number. And silence is just as valid as an amazing
  sound.
Use of Silence and contrasts from MI-1
MI-1 Contrasts
Gary Rydstrom
sound designer

- mix of near and absolute silence
- CIA -- get computer files
- vault sound and heat sensitive
- very quiet with sonic reprieves
- total silence as knife falls
  - heightens tension
  - emphasizes the choreography
- When sound returns.....more powerful
- Brian De Palma ultimately said, “No, take it all out.” And for the most part, that scene plays with nothing on the track. I went to see it with an audience and it had the desired effect: It made everyone lean in, pay closer attention, get nervous. Tension comes from the silence of that scene.
IV. HOW DO WE RECORD
SOUND-microphones

◆ Electro-Mechanical Transducers
◆ Convert acoustic energy into electrical energy
◆ Different pickup elements
◆ Different pickup patterns
Microphones

- Carbon
  - Rugged
  - Cheap - $1 to $5
  - Limited Frequency Response 100Hz to 5KHz
  - Most Common type in the world
  - Inside telephones
Microphones

◆ Crystal or Ceramic
  ● Fragile
  ● Inexpensive $5 to $15
  ● 80Hz to 8KHz
Microphones

- Dynamic Ribbon
  - First Pro Quality Mic
  - Somewhat delicate
  - Expensive - $150+
  - 50Hz to 15KHz
  - Slow Transient Response
  - Very Smooth/silky sound
Microphones

- Dynamic Moving Coil
  - Very Rugged
  - Reasonably Priced - $60 to $350
  - 50 Hz to 15 KHz
  - Most popular Pro Mic
Microphones

◆ Studio Condenser
  ● Fragile
  ● Costly - $150 to $7,000
  ● 20Hz to 20KHz
  ● Requires constant Polarizing Voltage--Phantom Power or external
  ● Excellent Transient Response
Microphones

- Electret Condenser
  - Rugged
  - Small
  - Reasonably Priced - $100 to $500
  - 30Hz to 18KHz
  - Requires 1.5 volt battery
  - Lavalier
  - Cell phone
Pickup Patterns

◆ Omni-Directional
  ● Accepts sound from all around mic
  ● Ideal for interview situations
Pickup Patterns

- Cardioid
  - Accepts sound primarily from the front
  - Ideal for live sound applications
Pickup Patterns

- Hyper-Cardioid & Super Cardioid
  - Accepts sound only from the front
  - Ideal for isolating sound—directional
  - “Shotgun” or “Boom” are common names
Pickup Patterns

- Bi-Directional
  - Accepts sound from front & back
  - Used in music studio recording
  - Also called “Figure of Eight”
Digital--pulse code modulation

- analog converted to dig, then back for playback
- quality excellent
  - increased dynamic range -96 db
  - reduced noise and distortion,
  - most analog problems eliminated (esp gen loss)
- Five steps
5 steps
1. Microphone--transducer

- Changes sound vibration into electrical signal
- this is an analog step
2. Anti-aliasing

- unwanted high frequency signals
  - above the normal hearing range but can be "aliased" into the audible range in sampling.
- pass the original analog (from the mike) signal through a low pass filter.
3. Sampling

- Sample voltages at fixed intervals along the waveform of the analog signal.
- How often you measure the voltage
- The more often the better the signal
  - Sampling frequency
    - Twice its frequency.
    - For 20,000 Hz, 40,000 rate
  - Digital audio today uses 32, 44.1, and 48 kHz
    - 32 is for broadcast (max bandwidth is 15k)
    - Pros use 44.1 and 48
Sampling

lower sample rates take fewer snapshots of the waveform.....
resulting in a rough recreation of the waveform.

faster sample rates take more snapshots....
resulting in a smoother and more detailed recreation of the waveform.
4. Quantizing

- samples are converted into discrete values called quantizing levels
  - greater number of levels, greater the accuracy of the representation of the signal.
Quantizing--bit depth

Original Waveform

Waveform Sampled at 16 bits

Waveform Sampled at 8 bits
5. Coding/storage

- Analog voltages converted to binary digits
  - --series of pulses
    - (0--no voltage, 1--voltage)
- each digit is a bit
- each bit allows two levels of quantification
  - 2 bits gives 4 levels
- 16 bit system (65,536)
  - sufficient to deal with quantizing noise
    - artifact of the process of quantizing.
- some 20 bit systems used.
n bits = 2 to the n quantizing levels

- 2 squared...4
- 2 cubed......8
- 2 to the 4th...16
- 2 to the 5th...32
- 2 to the 6th...64
- 2 to the 7th...128
- 2 to the 8th...256
- 2 to the 16th...65,536
- 2 to the 32nd...4.3 million
V. WHAT IS GOOD SOUND?

- sound that is technically and aesthetically excellent
technical

- frequency response
- signal to noise ratio
- dynamic range
- clean
  - no distortion,
  - no hum
  - no phase cancellation
aesthetic

◆ intelligibility--words are clear
◆ tonal balance--
  ● no one range stands out
    ◆ too much low--muddy
    ◆ too much high--sibilance + noise
    ◆ too much mid--harsh, shrill
◆ timbres sound natural
◆ ensembles blend
aesthetic

- spacial balance
  - clear where sounds are coming from
- Definition
  - --each element is defined
- Airiness
  - --open sounding
- Appropriate acoustics
  - radio announcer not in reverberant setting
- production values- combination grabs or moves you.
Slumdog Millionaire
open