Chapter 18. Meeting 18, Delay and Reverb

18.1. Announcements

- Recording session this Monday, 23 April, in Killian Hall

  Engineering crew: four students [names removed for privacy]

  Instrumentation: piano and horn

  Location: Killian Hall

- Need four person schlep crew for 3:00 PM on Monday
- Next quiz will be Wednesday, 25 April

18.2. Recording Session 1 Review

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18.3. Reading: Katz: Aesthetics Out of Exigency: Violin Vibrato and the Phonograph

- What is a phonograph effect?
- What sources of evidence does Katz bring together to demonstrate the changes in vibrato practice?
- Katz offers five alternative theories on why vibrato usage increased. What are they, and why are each of them rejected?
- Why was vibrato useful for violinists making recordings?
- Are there other examples of necessity (or practicality) being the mother of aesthetics?

18.4. Processing Signals: Concepts

- Dry (unprocessed) and wet (processed)
- Sometimes replace dry with wet

- Sometimes mix a percent of wet and with dry

18.5. Processing Signals: By Replacement

- Three terms: serial processing, inserts, in-line processing
- Applications: EQ, Dynamic Effects (compression, limiting, expansion, gating), Time Shifting, Spectral Effects

18.6. Processing Signals: By Mix

- Three terms: parallel processing, auxiliaries, side-chain processing
- Applications: Time-based effects
- Side-chain can always be pre or post channel fader

18.7. Parallel Processing in Live

- Use "Insert Return Track" to create (only two are permitted in Live Intro)
- Small, unlabeled boxes appear in each track's lane to show return level (which can be automated)
- Pre- and post-signal routing selected in the Return track, not the source track

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18.8. Time-Based Processors

- Reverbs
- Delays
- Flangers, chorus, and phasing

18.9. Time-Based Processors: Common Attributes

- All employ delays
- All are often processed in parallel (with an auxiliary track or with mix controls)
- All are often best used in stereo rather than mono
- All are easily over-used

18.10. Reverb: Goals

- Coherence: reconnecting tracks recorded in isolation or without space
- Recreating an acoustic space
- Special effects

18.11. Reverb: Parameters

- Time domain graph

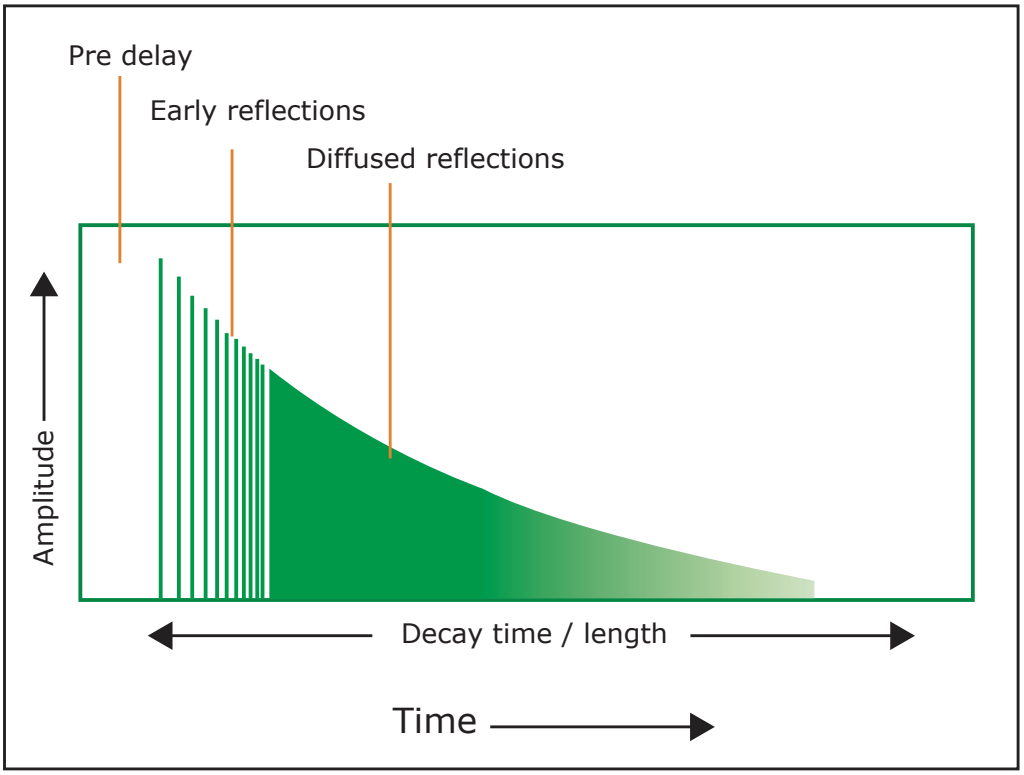

Image by MIT OpenCourseWare.

- Decay: duration of reverberations (time of tail to fall -60 dB)
- Size: color or type of diffusion algorithms
- Pre-Delay: time before reverb starts, a bit (30 ms) is generally needed to get reverb away from dry signal

- Early reflections
- Diffusion
- Wet / dry mix

18.12. Reverb in Live

- Basic reverb plugin

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- Pre-processing filters
- Early reflections controlled by "Shape" parameter: higher values mean faster decay of early reflections
- Spin modulates the early reflections (not recommended)
- High and low frequencies in reverberation can have scaled decays
- Freeze/Flat/Cut: special effect of sustained reverb

- Density and scale: adjust reverberations
- Reflect and Diffuse: level setting for early reflections and reverberations

18.13. Reverb: Two Processing Approaches

- Algorithmic (cheap, fast)
- Sampling or convolution based (expensive, slow)

18.14. Reverb: Parallel Processing

- Reverb plugins should (almost) always be instantiated in auxiliary tracks and used with sends
- When in an aux track, reverb plugins should always be at 100% wet
- Having many tracks share a single reverb gives a sense of cohesion or shared space
- Aux sends permit adjusting how much of each channel will be processed as reverb
- Aux sends should (almost always) be post fader
- Aux track permits global reverb adjustments (level, filtering)
- Aux sends permit using a stereo reverb with a mono channel strip

18.15. Reverb: Two Needs

- Cohesion
  - Decay: under a second; pre-delay: 5 to 10 ms
  - A short reverb to add ambience
  - Can simulate leakage
  - Can help tracks glue together
- Space
  - Decay: over a second; pre-delay: 30 to 70 ms
  - A longer reverb to simulate an acoustic space
  - Places a recording in an environment

18.16. Reverb: Algorithm Types

- Often determine arrangement of early reflections and timbre of reverberations
- Good to start with a preset then adjust
- Standard spaces: halls, rooms, chambers, ambience
- Unusual spaces: cathedrals, bathrooms
- Mechanical reverbs: springs and plates

18.17. Reverb: Filtering

- All reverbs need filtering
- Carefully shape (and reduce) high frequencies, avoiding metallic sounds
- Avoid extra low frequency reverb
- Use a full-function EQ to shape reverb
- Filtering should be tailored to the music

18.18. Reverb: Applications

- Not all tracks need reverb
- Use a shorter decay time than you think necessary
- Use sparingly on low-end tracks (kicks, basses)
- Use less reverb than you think necessary (mastering likely to increase)

18.19. Reverb: Auditioning

- Start and stop tracks to listen to reverb alone
- Vary aux channel level to boost level to adjust timbre, then reduce

18.20. Microphone Positioning: Exercise

- Exercise: You are to recording a piano and a horn. You have 6 AT 4041, 4 AKG 414, 2 Earthworks TC20mp, and 2 Sennheiser MD-421.

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