21M.380 · MUSIC AND TECHNOLOGY
RECORDING TECHNIQUES & AUDIO PRODUCTION

MIXING STRATEGIES

SESSION 16 · WEDNESDAY, NOVEMBER 2, 2016

# 1 Student presentations (PA1)

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- ███████

# 2 Announcement: Schlepping reminder

- Please remember if you are signed up for pre- or post-class schlepping for the recording session on Mon, 11/7.

- Pre-class schlepping: Meet at room ██████, 10 minutes before class

# 3 Review early feedback

# 4 Review mixing consoles

## 4.1 Which types of mixer *inputs* do you recall?

- _____     - _____
- _____     - _____

## 4.2 Which types of mixer *outputs* do you recall?

- _____     - _____
- _____     - _____
- _____     - _____
- _____     - _____

## 4.3 Tricky concepts

- Panpot vs. balance
- Routing input channels to *output buses*
- Auxiliaries
- Solo bus and solo modes (AFL, PFL, SIP)

## 5   Preview mx1 assignment

## 6   Mixing workflows

### 6.1   Post-recording mixdown[1]

- Record each individual mic and worry about the mix later

- But to monitor recording, a rudimentary stereo mix is required anyway!

- More flexible, but also more time-consuming

- Requires multi-channel audio interface

[1] This is the approach that we will adopt for our upcoming in-class recording sessions.

### 6.2   Live mixdown on site

- Mix to stereo while recording (monitor mix *is* final mix)

- Less flexible, but also less time-consuming

- No multi-channel audio interface required if mixed before daw

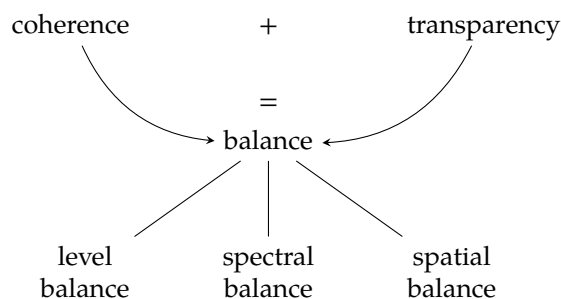- Requires experience and practice

## 7   Balance



Figure 1. Balance as a union of coherence and transparency

- When does a mix "sound good"? When is it well *balanced*?

  – When it conveys a sense of unity, of a meta-instrument (*coherence*)
  – When one can focus on each individual element in it (*transparency*)

- Goal: Always allow listener to switch between detail and big picture

- Regular shift of focus is also a good strategy for mixing itself!

- Balance must be achieved in many dimensions: levels, spectrum, space

- But how to judge whether a mix is well balanced? Useful guidelines:

  – Jecklin (2003) defines evaluation factors *sound*, *image*, *space*
  – Ebu defines similar evaluation criteria (Linkwitz 2015)

## 7.1 Level balance

- Technical means: Mixer's input channel faders

- Potentially complicated through crosstalk between microphones

- Transparency: Can one discern each individual instrument?

- Coherence: Do instrument levels relate to each other in credible ways?

- How to find the 'right' position for a given fader?[2]

  1. Move fader all the way down
  2. Gradually fade signal in again
     - Do so with eyes closed
     - Focus on *other* instruments as you fade
  3. Let fader go when signal 'locks' into place

  Also useful to confirm 'validity' of a previous fader position

- *Subtractive mixing* to prevent upward tendency (Katz 2014a, p. 34)

[2] Cf., Senior 2011, sec. 8.2.
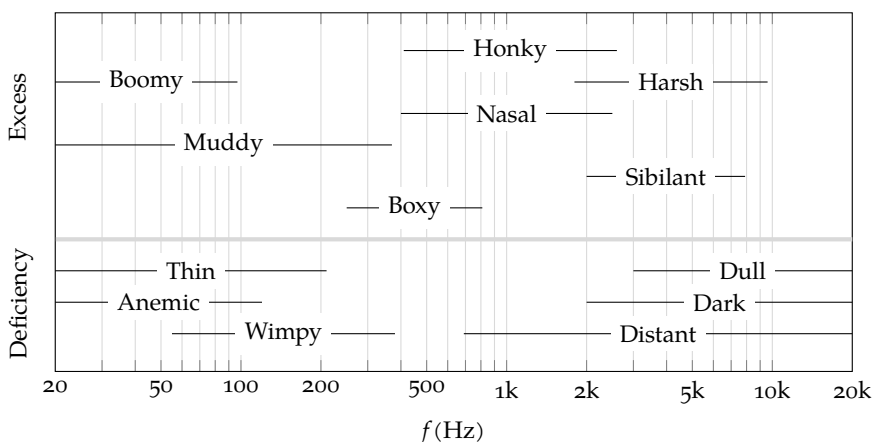
## 7.2 Spectral balance

FIGURE 2. Qualitative descriptions of over- or underemphasis of different frequency ranges (after Izhaki 2011b, fig. 14.4)

- Technical means: Filters and EQS

  - But also very much a matter of orchestration!
  - Fader balance inevitably also affect's mix's spectral balance. Why?

- Transparency: Different instruments occupy different parts of spectrum

- Coherence:

  - Spectral separation should not result in mix 'falling apart'
  - Avoid over- or underemphasis on specific frequency bands

- Consider *all* frequency bands in the audible spectrum

- Don't cramp too much into 2 kHz to 5 kHz range (Eargle 2003, p. 330)

- Roads (2015, p. 380) lists "magic frequencies" for mixing purposes

### 7.3 Spatial balance

- Technical means: Panpots, stereo recording techniques, reverb

- Always do a "mono reality check" (Eargle 2003, p. 330)

- Transparency:

  - Does each phantom source appear from a stable direction?[3]

  - Consistent phantom source localization at *all* frequencies?

  - Does each source occupy a credible width, depth[4] & height?

- Coherence:

  - Avoid over- or underemphasis on specific locations

  - Otherwise might result in *I mix*, *V mix*, or *W mix* (Izhaki 2011e))

  - Spatial separation should not jeopardize balance of *stereo image*

    The essence of stereo is a sense of spatiality, not a set of mono images panned to different positions on the stereo stage. (Eargle 2003, p. 330)

  - Stereo image properly centered? (phase correlation meters)

  - Frequency response of diffuse reverberation?

  - Depth of reverberation? (Some reverbs can sound rather flat.)

- Useful criteria to evaluate spatial balance:

  - Envelopment: "experience of being surrounded by sound" (Kendall and Ardila 2008, pp. 129 f.)

  - Presence: "sense of being inside of an (enclosed) space" (Kendall and Ardila 2008, pp. 129 f.)

  - Spaciousness (Blauert 1996)

  - Liveness (Rumsey 2002)

  - Rumsey (2002) distinguishes between *source*, *ensemble*, *room* & *scene*

## 8 Decision making strategies

- Make decisions quickly, but be prepared to revise them.

- *Comparative listening* usually leads to decisions more effectively

  - Usually hard to judge whether *X* "sounds good" in absolute terms

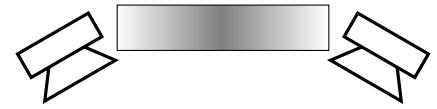  - Much easier to say whether *X* sounds better or worse than *Y* ☺



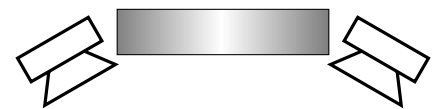FIGURE 3. I mix (after Izhaki 2011d, fig. 6.5)



FIGURE 4. V mix (after Izhaki 2011d, fig. 6.6)



FIGURE 5. W mix (after Izhaki 2011d, fig. 6.7)

[3] Try also off-sweet-spot listening positions to reliably judge phantom source stability.

[4] Depth is a very real factor in stereo production, starting with the tendency of coincident and binaural stereo recording techniques to convey a better sense of depth than spaced or mixed techniques. Katz (2014b) discusses how to achieve depth and dimension in recording, mixing, and mastering. Eargle (2003, pp. 330 ff.) suggests to approach a mix in terms of *layers* between foreground and background. Jecklin (2003, pp. 6 f.) defines (in German) four specific such layers through which to assess a mix.

- We always can find a *Y* to compare *X* to, since mixing unfolds *over time*.

- Example of such *iterative editing* by Roger Nichols (Senior 2011, sec. 8.2):

    – Turn bass up by +1 dB. Does the mix sound worse?
    – If yes, retreat to original fader position
    – Now, turn bass down by −1 dB. Does the mix sound worse *again*?
    – If yes, then the original fader position was probably pretty good. ☺

- Keep the mix simple and never commit to an edit

    – which does not noticeably improve the mix, or:
    – whose effect you cannot hear at all.

# 9  Mixing scenarios

## 9.1  Main stereo, spot & ambience mics

- Common in classical music production

- Raise faders in following order:[5]

    1. Main stereo mic
    2. Outrigger mics (if applicable)
    3. Ambience mics
    4. Spot mics

- Use real-world situation as guideline for direction, width & depth

- How to pan a spot mic with respect to a main stereo mic:

    1. Bring up faders of main stereo mic (panned hard left/right)
    2. Determine direction of instrument in main stereo image
    3. Bring up fader of spot mic to be panned (at relatively low level)
    4. Pan spot mic until it 'locks' with main stereo mic phantom source

- Optional: Delay spot mics

    – Idea: Compensate runtime differences to main stereo mic
    – Exercise: How to quantify the required delay time?

## 9.2  Spot mics only

- Common in pop, rock & jazz production

- Eargle (2003, p. 328) suggests to raise faders in following order:

    1. Rhythm tracks (drums, bass, rhythm guitar)
    2. Lead tracks (lead guitar, vocals)
    3. Sweetening (strings, synths)

[5] Cf., Eargle 2003, p. 331.

- Eargle (2003, p. 328) suggests to process in order of:[6]

  1. Basic mix (level balance & panning)
  2. EQing & dynamics
  3. Reverb & other effects

- Flexible stereo imagery (no main stereo mic to match). Rules of 👆:

  – Center-pan bass, kick drum & solo lead instruments (e.g., vocals)
  – Large instruments use more stereo width (e.g., drumkit, piano, choir)
  – Aim for a well-centered stereo image
  – Look for symmetry (e.g., pan lead guitar half left, lead sax half right)

- Eargle (2003, p. 332) provides examples of how to layer along depth

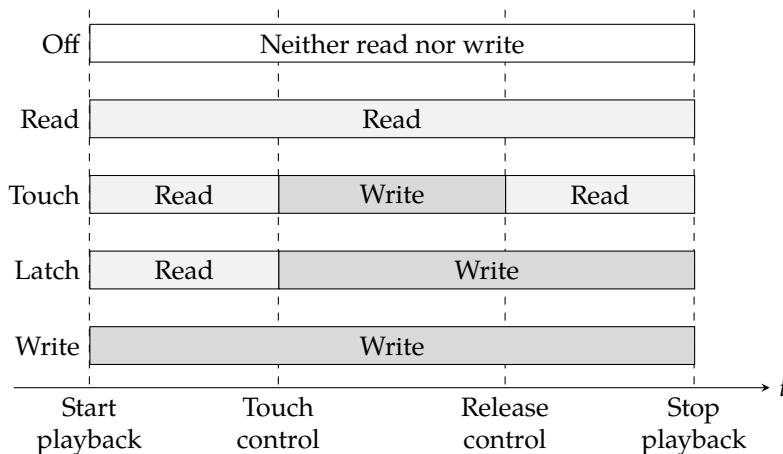## 10  DAW parameter automation

FIGURE 6. Five common automation modes (after Izhaki 2011d, fig. 27.2)

- Basic idea: Record fader movements to make mix *dynamic*

- Can be extended to include *all* parameters of a mix. Examples:

  – Automate filter cut-off frequency
  – Automate decay time of a reverb plugin

- Different *automation modes* support different workflows (cf., figure 6)

  – *Read* mode completely disregards pre-playback fader positions
  – *Touch* and *latch* mode particularly useful; allow for *iterative mixing* ☺

- Particularly convenient with external MIDI controller (rather than mouse):

  – *Write*, *touch*, and *latch* require motorized faders
  – *Touch* and *latch* require touch-sensitive controls

[6] This order has to be taken with a grain of salt. If you EQ an instrument specifically to fit it into the overall mix, it makes sense to do so after the basic mix has been established. But if you EQ to fix instrument-specific problems regardless of balance with other instruments (e.g., remove a hum from a guitar amp), you may want to address this *before* worrying about the mix. Likewise, if you are working exclusively with close-miked signals and need to build all reverberation from scratch, it might make sense to apply artificial reverb to individual instruments *before* mixing them.

## 11   Automation in Reaper

### 11.1   Overview of Reaper automation modes

- Reaper offers standard *read*, *touch*, *latch* & *write* modes

- Additional *trim/read* mode (default mode in lieu of *off* mode)

  - Applies automation *envelope* relative to pre-playback fader position
  - Pre-playback fader position serves as 'master' level
  - Envelope adds changes 'on top of fader'

- Additional *latch preview* mode

  - Like *latch*, but does not actually write changes
  - Useful for rehearsing complex edits before recording them

- Switching between modes:

  - Per track: Envelope button in track control panel (trim by default)
  - Global: Envelope button right of transport bar (overrides per-track)

### 11.2   Recording automation data

1. Click automation icon for target track in track control panel

2. Select parameters to be automated (try Volume and Pan first)

3. Envelopes for selected parameters appear beneath audio track

4. Envelopes need to be *armed* (analogous to audio) for data to be written

5. Hit play button (no need to *record* audio to capture automation data)

### 11.3   Editing automation envelopes offline by mouse

Preferable for coarse edits (e.g., adding +3 dB to the bridge):

1. Set automation mode to *Trim/Read* (which is Reaper's default)

2. ⇧ + left-click on automation envelope to create a new point

3. Drag points around while holding left mouse button

## References & further reading

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