

***A Study into the Effectiveness of 'Mix' Strategies for
Male Contemporary Commercial Music Singers***

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Introduction

Adult male CCM singers often present with register transition issues, such as:

- 'Reaching'
- 'Shouty' tone
- Pitch irregularities
- Tonal disparity

To successfully facilitate smooth transition ('mix'), effective strategies are required.

Existing research on 'mix' is mostly on classical and/or female voices.

Introduction

This study aims to:

- Establish how laryngeal and acoustic factors influence 'mix'
- Gain insights into singers' experience of passaggio
- Identify and trial research-based (yet relevant) teaching strategies

It intends to benefit:

- Singers
- Voice teachers
- The voice pedagogy community

Personal learning outcomes include:

- Deepening professional specialism by expanding knowledge, teaching strategies and experience.

Literature review

‘Mix’ - a voice configuration facilitating seamless register transition, avoiding abrupt shifts in pitch, tone or projection (Castellengo, Chuberre and Henrich, 2004; Henrich, 2006; Bozeman, 2013b; Traser et al., 2013; Echternach, Traser and Richter, 2014; Mayr, 2017).

Voice registration, still a controversial topic (Herbst, 2020), is influenced by both **laryngeal** and **acoustic** factors; these may also impact upon each other (Titze, 2018).

Laryngeal factors

- Glottal adduction
 - Bottom adduction controls registration
 - Top adduction controls how 'pressed'/breathy tone is
 - These can be independently adjusted by **mimicking** demonstration (Herbst *et al*, 2011)
- Vocal fold vibratory patterns
 - Theory one: M1 / M2 patterns **always distinct** (Roubeau, Henrich and Castellengo, 2009)
 - Theory two: an **intermediate glottal shape may** be possible (Titze, 2014)

Laryngeal factors

- 'Mix' may be facilitated by:
 - **Reducing transglottal pressure** (Sundberg, Gramming and Lovetri, 1993; Titze, 2014), e.g. with **semi-occluded vocal tract exercises** (SOVTEs) (Guzman, Laukkanen, et al., 2013).
 - Balancing top/bottom adduction, through gradual adjustments (Herbst et al, 2011; Titze, 2014)
- **Descending vocal tasks** may improve stability through male passaggio (Echternach and Richter, 2012 p.440)

Acoustic factors

Vowel adjustments may create a more optimal formant/harmonic alignment (Miller, 2008 p. 114, Bozeman, 2013b p. 106).

Open vowels

For smooth transition, male singers should:

- **Avoid ‘yelling’:**
 - F1/H2 tracking (Miller, 2008 p.124)
 - larynx raises, mouth widens (Bozeman 2013b, p.22)
- **Allow H2 to cross F1**, by maintaining:
 - Stable vertical larynx position (VLP) (Bozeman, 2017, p. 68; Ritzerfeld and Miller, 2017)
 - “close, speech-like” mouth shape (Bozeman, 2013a p.35)

SOVTEs, particularly 3mm straw phonation, may **lower VLP** (Guzman, Castro, et al., 2013, p. 715).

Acoustic factors

Close vowels

- Aid access to 'falsetto' (Bozeman, 2013a, p. 5)
- Open through transition area "to avoid whoop timbre and stay in a more virile mixed timbre" (Bozeman, 2013a p.46)

Semi-close vowels

- Discourage larynx-raising, aid F1/H2 crossing (Miller, 2008; Bozeman, 2013a)

Gaps in research

- Research into 'mix' mostly relates to classical singing
- Existing research into CCM 'mix' is on the female voice (Sundberg, Gramming and Lovetri, 1993; Lovetri, Lesh and Woo, 1999)
- Gap in research for studies into male CCM 'mix'

Relevance to CCM may be established by:

- Integrating repertoire into exercises (Chandler, 2014; Green, cited in LeBorgne and Rosenberg, 2019)
- Using scales such as minor pentatonic (Chandler, 2014; Benson, 2018)

Teaching strategies:

- 3mm straw phonation
- SOVTEs
- Close, semi-close, open vowels
- Descending patterns
- Minor pentatonic
- CCM song excerpt
- Adduction demonstration

Methodology

Methodological position:

- Subjectivist epistemology, 'becoming' ontology (Gray, 2004 p.17)
- Pragmatic paradigm - problem-centred research (Mackenzie and Knipe, 2006, p.4; Morgan, 2014, p. 1045)

Mixed methodology:

- Focus on qualitative methods allowed "greater depth of understanding" (Berg, 2001, p.2)
- Quantitative elements allowed triangulation (Berg, 2001, pp.4–5; Schwandt, 2001, pp.257–258; Denzin, 2009, pp.297–313).

Research design comprising three exploratory case studies well-suited to small-scale project

Methodology

Purposive sampling:

- Three adult male CCM singers
 - Wanted to develop ability to use 'mix'
 - Professional singers - to allow deeper exploration within six sessions
- Three independent CCM voice teachers who teach 'mix'

Methods:

- 'Before' and 'after' recordings
- Teacher questionnaire
- Singer questionnaire & semi-structured interview
- (To avoid insider-research subjectivity (Unluer, 2012, p. 3), observations were avoided)

Methodology

Overview of research undertaken:

- Literature review - informed the design of 'mix' strategies
- Singers: questionnaire
- 'Mix' strategies trialled: 6 x 60min weekly online lessons
- Before/after recordings
 - Vocal exercises (13431 scale and major 3rd pitch glide on /a/)
 - CCM song excerpt requiring 'mix'
- Singers: interview
 - Listened to recordings
 - Reflected on progress
- Teachers: questionnaire
 - Listened to recordings (**before/after randomised**)

Methodology

Data analysis:

- Questionnaire & interview data:
 - 'Split' using initial 'in vivo' coding (Saldaña, 2016)
 - Organised into categories/themes
- Before/after exercises:
 - Spectrographic analysis

Ethics:

- Informed consent obtained
- Anonymity assured
- Participants made aware of right to withdraw

Risks:

- Research conducted online, eliminating risk of Covid-19 transmission.

Findings

Singers - potential impact

Singers felt **successful 'mix' training** would impact positively on:

Emotions (2/3 singers), including increased:

- Confidence
- Enjoyment
- Freedom

Thoughts (3/3 singers), including:

- Viewing self as more accomplished
- Shift from 'fixed' to 'growth' mindset (Dweck, 2006, cited in Holding, 2020)

Behaviour (3/3 singers), including:

- More ambitious career choices, and vocal choices during performances
- Expansion of repertoire choices

Singer - sensory perceptions ('After' versus 'before')

Singer P1

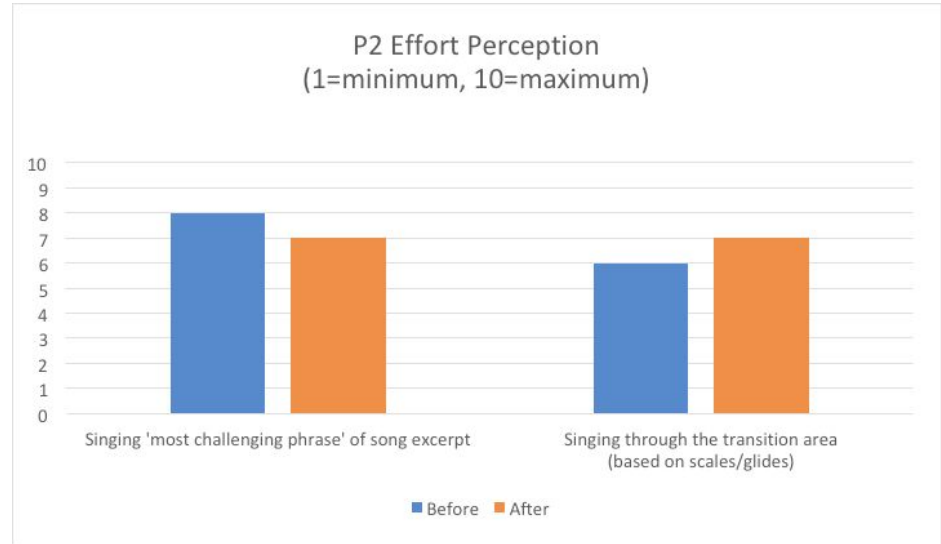
- Much less effort (see chart)
- No 'build-up'/pushing
- Larynx lower, no longer 'reaching'
- Focus on vocal fold engagement (rather than breath support)
- Improved resonance
- During 'after' recording, tension caused by anxiety "created an issue"



Singer - sensory perceptions ('After' versus 'before')

Singer P2

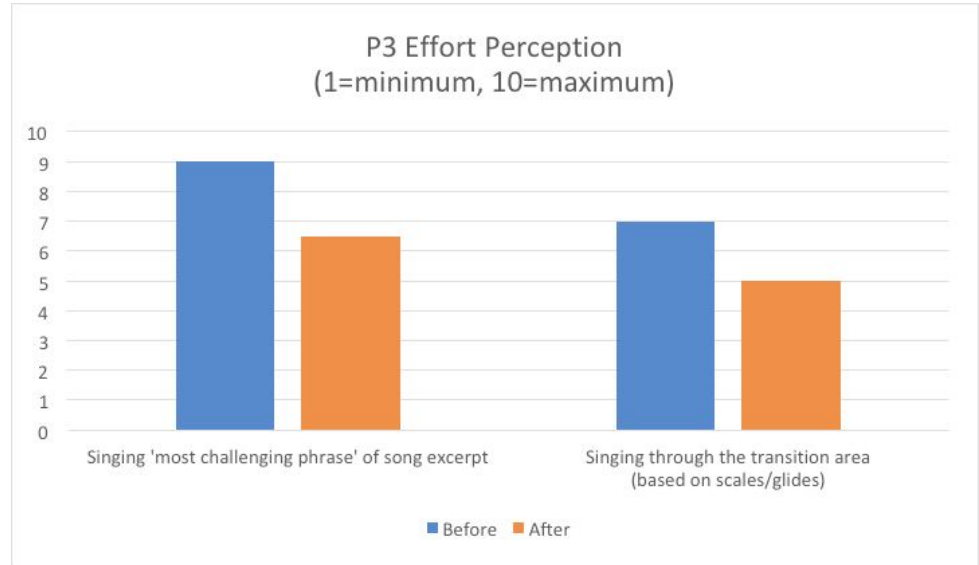
- Effort levels similar (see chart), but “different kind of effort”
- Clearly improved sense of vocal security, strength, stability
- Less pushing, tension
- More comfortable, coordinated
- Less obvious flip
- More consistency between registers



Singer - sensory perceptions ('After' versus 'before')

Singer P3

- Less effort (see chart)
- No longer straining/'reaching'
- More accurate and assured
- Improved resonance



Singer - aural perception

Singer P1

SONG - After versus before

- Recordings sounded “similar”
- Increased “resonance”, “power”, “energy”
- Improved tone
- Reduced tension

EXERCISES - Before

- “Reaching”, “forced”
- “Break”; “no mix”
- Upper register “weaker”, “more breathy”, “less resonant”
- Poor coordination

After

- “A marked difference”
- Improved “smoothness”
- “Anxiety or tension... affected the overall sound”

Singer - aural perception

Singer P2

SONG - After versus before

- Less effort / pushing
- Better intonation
- High parts sounded less “hooty”

EXERCISES - Before

- “Very clear flip” / “yodel”
- “Wobbly”
- “Uncertain”

After

- “Definitely noticeable” difference
- Less noticeable flip on ascent
- Mostly smooth on descent
- Tone now different

Singer - aural perception

Singer P3

SONG - After versus before

- Much better coordination on the two vocal runs

EXERCISES - Before

- “Struggling to hit the note properly”
- “Obvious flip”
- “Head voice...weak”

After

- “Transition pretty seamless, for the most part”
- More controlled

Teachers - aural perception

P1

SONG

- Transition area more skilfully tackled **before** training (all teachers)

EXERCISES

- Smoother transitions in **after** recording (all teachers)
 - Substantial improvement (T1,T2)
 - T3 chose the option “notable differences between the recordings, but overall, neither is smoother”, but then commented: “parts of the bridge was smoother”

Teachers - aural perception

P2

SONG

- Transition area more skilfully tackled **after** training (all teachers)

EXERCISES

- Smoother transitions in **after** recording (T1, T2)
- **Neither** recording smoother (T3)

Teachers - aural perception

P3

SONG

- Transition area more skilfully tackled **after** training (all teachers)

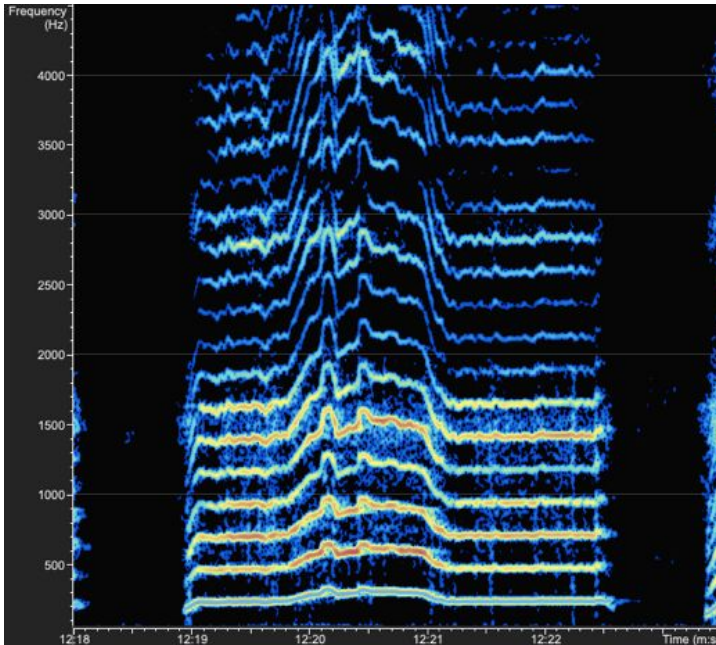
EXERCISES

- Smoother transitions in **after** recording (all teachers)

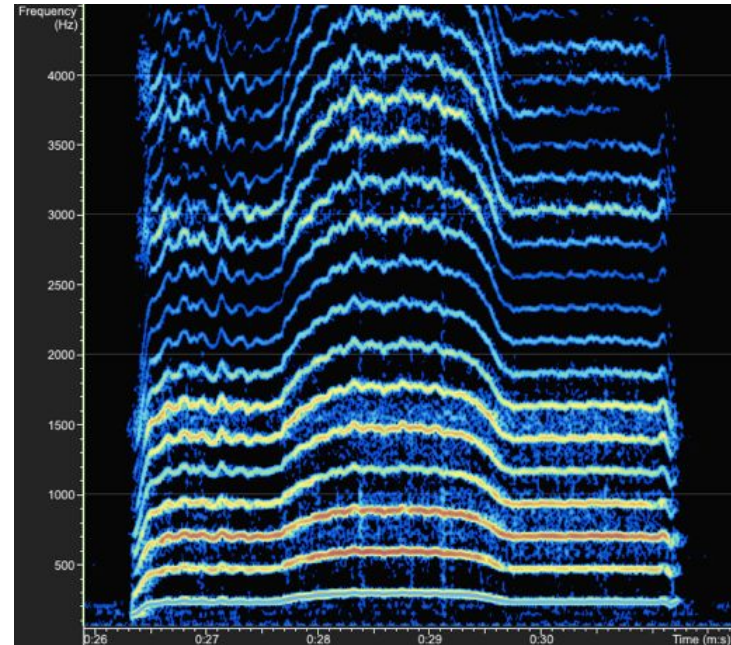
Spectrographic analysis

P1

'Before' glide - pitch instability seen to the slight left of centre (two peaks with a valley in between)



Corresponding 'after' glide - much smoother ascent



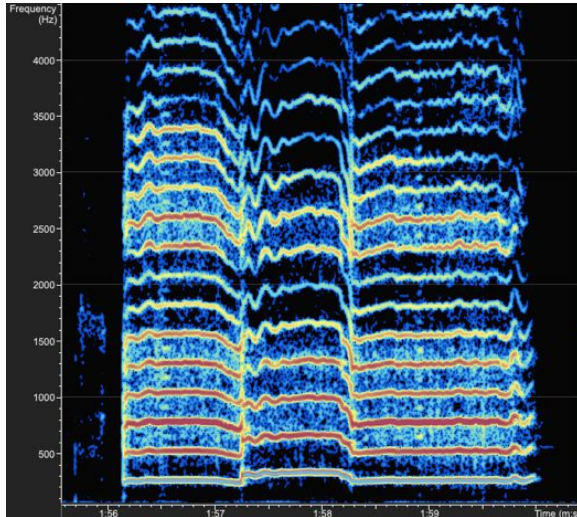
Spectrographic analysis

P2

'Before' glide - instability causes pitch to descend, before singer is able to glide upwards.

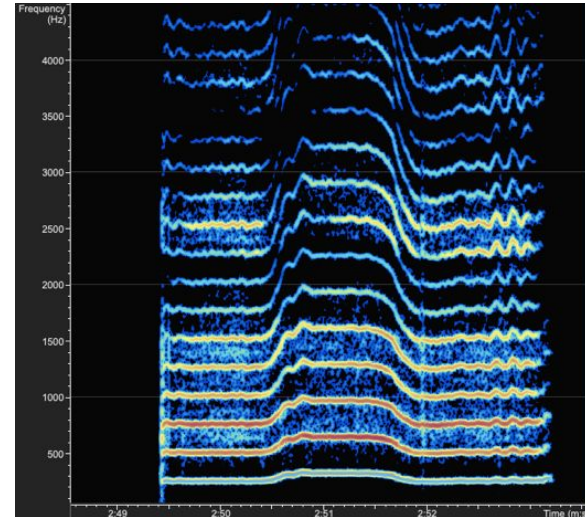
Seen left of centre, as:

- Lines sloping downward (pitch descent)
- Wavy lines (instability)



Corresponding 'after' glide:

- Much smoother ascent
- Less wavy lines (less instability)



Spectrographic analysis

P3

- Top note of each 'before' scale much less accurate than corresponding 'after' scale (see table)
- In 'before' recording, note sung in example 2 very similar pitch to example 1; pitching had plateaued.

	Target pitch	Actual pitch BEFORE	Deviation from target pitch	Actual pitch AFTER	Deviation from target pitch
Example 1	G#4	G#4 – 37ct	– 37ct	G#4 + 14ct	+ 14ct
Example 2	A4	G#4 – 9ct	– 109ct	A4 – 9ct	– 9ct
Example 3	A#4	A#4 – 48ct	– 48ct	A#4 + 3ct	+ 3ct

Singers - reflection on training process

All three singers:

- Feel they have made definite improvement
- Feel positive about progress
- Noticed progress between sessions 3-5; a 'breakthrough' moment when they achieved 'mix'

Straw phonation identified by all three singers as particularly helpful.

P3 found the **minor pentatonic scale** "really, really relevant", whilst he perceives other scales as "just warm up exercises or ...practices".

Analysis of Findings

Potential impact

Findings suggest wide-ranging, profound impact on thoughts, behaviours and emotions.

This may assist voice teachers in motivating singers to undertake 'mix' training.

P1 - ‘before’ / ‘after’

It *appears* that before training:

- **High transglottal pressure** an issue
 - Exacerbating the bi-stable tendency of the vocal folds (Titze, 2014)
 - Causing a register “break” (P1, T1)
 - Afterwards, lowered transglottal pressure facilitated smoother transition (Sundberg, Gramming and Lovetri, 1993; Titze, 2014).
- **‘Yell’** (e.g. rising larynx) was an issue; afterwards, this has improved, suggesting P1 is now avoiding raising F1 to track H2.

Perhaps explained by P1’s “tension caused by anxiety”, all three teachers feel **‘before’** song was the most skilful.

All three teachers identify **‘after’** exercises as smoother; supported by spectrographic analysis.

P1 heard a “marked difference” in “smoothness”; supported by T1 (“much smoother”) and T2 (“marked improvement”).

P2 - 'before' / 'after'

It *appears* that before training:

- P2 switched between **'yell'**(F1/H2) and **'whoop'**(F1/H1)
 - Afterwards, he reports less “pushing” and less “hooty” high notes
 - Creating a “more consistent” tone (T1)
 - i.e. different resonance strategy used
- **High transglottal pressure** an issue
 - May have exacerbated bi-stability of vocal folds (Titze, 2014)
 - Resulting in the more “pronounced and disruptive” (T1) ‘flips’ of the ‘before’ recordings

T1 and T2 heard smoother transitions in the **'after'** exercises; spectrographic analysis supports this. T3 felt neither was smoother.

Teachers' agreement that the **'after'** song was more skilfully tackled suggests clear improvement.

P3 - 'before' / 'after'

It *appears* that before training:

- 'Yell' was an issue
 - All three teachers heard intonation issues
 - "Pitch begins to plateau until he switches to 'head voice'" (T1)
 - 'Plateau' supported by spectrographic analysis
 - Afterwards, effort levels reduced; all teachers agree intonation now more accurate
 - P3 is now avoiding 'yell'

Teachers all agreed that **both 'after' recordings showed a more skilful use of 'mix'**; clearly suggests improvement.

Singers - reflection on training process

All three singers feel the programme has been effective.

Progress seen between sessions 3-5:

- Six sessions was therefore an effective programme duration
- Professional experience may have allowed quicker progress than would have been seen by amateurs

Every singer saw a sudden breakthrough; whether these were caused by laryngeal or acoustic factors, or an alignment of the two, is impossible to conclude.

Straw phonation identified by all three singers as particularly helpful; may have helped avoid 'yell', by lowering VLP (Hijleh and Pinto, 2021).

P3's comments on direct relevance of the minor pentatonic reinforces the importance of incorporating CCM-specific scales into voice training (Chandler, 2014).

Conclusion

The singers' insights suggest successful 'mix' training may impact positively on emotions, thoughts and behaviours.

'Yell' was a common issue in all three singers beforehand, but no longer an issue afterwards, suggesting a more stable larynx position.

All three singers identified straw phonation as helpful; this may have helped facilitate a lower VLP, discouraging 'yell'.

Conclusion

Overall, the findings suggest that all three singers made noticeable progress towards 'mix'. The only exception was P1's song; the effects of anxiety may have compromised his 'after' performance.

In future research, vocal tasks could be recorded in every session, to minimise anxiety and provide a more accurate picture of progress.

Whilst the results of this small-scale study cannot be generalised beyond these three singers, they will be used to inform a larger scale study, in order to further address the gap in research for studies into male CCM 'mix'.

Thank you

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