

Perceptual Differences between Novice and Professional Music Theater Singers

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Summary: Objective. Research examining contemporary commercial music styles of singing has increased significantly over the last 10 years. While acoustic analysis has helped determine which characteristics define various vocal genres, a discrepancy still exists in how those acoustic characteristics are perceived, described, and evaluated.

Methods. The current study recorded seven novice and four professional musical theater singers performing belt, legit, and mix vocal samples. Novice singers were defined as first- and second-year students in an undergraduate musical theater program, while professional singers were defined as having played at least one major role in a music theater production in regional Equity theaters. Five regional Equity casting directors listened to the recordings and rated each sample on the basis of style (belt versus legit) and tone quality (brassy versus fluty and bright versus dark). Results were compared across experience level (novice/professional) and pitch. Additionally, relationships between style (belt/legit) and quality (brassy/fluty, bright/dark) were examined.

Results. The statistically significant correlation emerged between the raters' perceived singing style and the singers' indicated singing style. Auditors identified the style (belt/legit) more reliably for the professional singers than for novice singers, and ratings of other qualities varied significantly between raters.

Conclusions. The singers were successfully able to produce voicing styles that matched the perceptual expectations of the casting directors. Not surprisingly, professional singers were somewhat more successful in this regard than were the novices. There appears to be little consensus among the auditors, however, about which acoustical qualities define a belt, mix, or legit style.

Key Words: Singing–Music theater–Belt–Legit–Voice perception.

INTRODUCTION

Research examining contemporary commercial music styles of singing has increased significantly over the last 15 years. Despite the plethora of recent information, however, consensus has yet to be reached on many aspects relating to contemporary methods of vocal production. A primary source of confusion is the lack of a uniform, codified language to describe these vocal sounds, which often leads to a disconnect between those in the vocal community (singers, voice teachers, voice scientists) and those in the music theater industry (directors, choreographers, casting agents). The developing lexicon of common terminology has seen frequent use of the words “belt” and “legit” to represent ways of singing that often carry along descriptors such as bright and brassy or dark and fluty, respectively. A third way of singing, “mix,” is often described as on a spectrum between bright and dark or brassy and fluty. Although these terms are regularly used by both voice professionals and music theater industry professionals, their precise meanings prove highly subjective.

In the literature, belting is often associated with the perception of a bright timbre.^{1–5} For instance, in one study involving casting directors and music theater majors, all of the participants reported that “belters needed a bright vocal quality to be considered elite.”⁶ In this same study, the authors note that belters do not seem to employ “cover” as they ascend through the *passaggio*, which has been associated with a slight darkening

of tone, as reported by Hertegard et al (1990).⁷ Instead, belters avoid the timbral darkening that occurs as $2f_0$ crosses above F1 by modifying vowels to raise F1 as pitch increases and delay this crossing.

Another study examined five “substyles of belting,” one of which was simply referred to as “brassy.”⁸ At least one source for singing voice rehabilitation characterizes belting as both “bright” and “brassy” and, in a chapter called *Speaking Voice Therapy for Singers*, compares “safe yelling” to belting as both produce a “brassy quality.”⁹ Yet another source compared belting to yelling because both are “loud” and “brassy.”¹⁰

The current study, therefore, examines the sounds contemporary commercial music singers make (specifically female music theater singers) when asked to sing in belt, mix, and legit styles. It further examines how casting directors perceive these same sounds on a spectrum from belt to legit, bright to dark, brassy to fluty, and “no roughness” to “severe roughness.” In undertaking these tasks, the authors hope to investigate how close the perception of one group (performers) is to the perception of the other group (casting directors) when it comes to the terms belt, mix, and legit. Further, it examines whether pitch and/or experience level influence the ability of a singer to produce sounds that can be believably identified by those terms. Finally, it explores if, from the perspective of casting agents, there is a correlation with bright/dark and/or brassy/fluty to the above modes of singing.

MATERIALS AND METHODS

Subjects and raters

For the study, the authors recruited four professional female singers, all of whom have performed in regional Equity music theater productions, alongside seven additional female singers

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who were all in their first or second year of vocal study in a BFA program in either theater or music theater.

The expert auditors who analyzed the sounds are all casting directors for equity music theater productions. Although they have all been involved in professional theater in various capacities, none of them have extensive training in singing. The first auditor performed as a dancer on Broadway and in national and international tours, and now serves as executive artistic director and director/choreographer for a regional Equity theater. The second auditor is a member of the Actor's Equity Association as a stage manager and, as producing director of a regional Equity theater, assists in casting for musicals. The third auditor is associate artistic director of a regional equity theater and serves as assistant director of their musicals. The fourth auditor serves as director and choreographer for theaters across the country, is an artistic director of a regional Equity theater, and is a voter for the Tony Awards. The fifth auditor performed as a dancer on Broadway, serves as associate choreographer and production dance supervisor for a long-running Broadway production, and has assisted in casting for professional productions in the United States and Europe.

Equipment and procedures

The singers were recorded using a Countryman Isomax B3 (Menlo Park, California) head-mounted microphone, worn at a constant mic-to-mouth distance of 6 cm and positioned approximately 45 degrees medial to the mouth to avoid the airstream during phonation. The signal, sampled at 44,100 Hz, was amplified via an FMC (model RNP; Austin, Texas) preamp and recorded digitally using an ADInstruments (Colorado Springs, Colorado) Powerlab (Colorado Springs, Colorado) digital converter with Labchart 7 pro software (proprietary software for Powerlab).

All 11 singers were instructed to perform an ascending five-tone major scale, sustaining the highest pitch for at least 5 seconds (indicated by the researcher). This exercise was repeated at four pitches, increasing by one semitone with each repetition, with sustained pitches at C5, Db5, D5, and Eb5. Finally, the complete sequence was repeated in three styles—belt, mix, and legit—for a total of 132 tokens (11 subjects \times 4 pitches \times 3 styles). Singers were instructed to perform an /a/ vowel but to feel free to adjust as required by the pitch and/or style. They were also allowed to repeat any token if they did not feel that they had successfully performed the intended style or if there were pitch instabilities. The intent was to capture a sample of each singer's ideal belt, mix, and legit sound at each pitch.

Following recording, the researchers excerpted a steady 2.5-second segment of each sustained pitch. Loudness was normalized, and a 250-millisecond linear fade-in and fade-out was applied to each sample for listener comfort and to diminish the effect of level on rater perceptions. To the 132 original samples, 10% of the exercises were repeated, adding 13 additional recordings. The resulting 145 recordings were then randomized and uploaded as wav files to a Microsoft (Redmond, Washington) PowerPoint slide presentation. The sound files were played for the auditors on a MacBook Pro laptop (Cupertino, California), and they listened through Sony stereo headphones (Minato, Tokyo, Japan), model number MDR-XD100.

In an accompanying packet, auditors were asked to rate each excerpt on a spectrum of belt to legit by placing a vertical mark on a 100-mm visual analog scale (VAS), anchored on the left by "belt" and "legit" on the right (Appendix A). In the same way, the auditors rated each tone from brassy to fluty, bright to dark, and on a scale of no roughness to severe roughness. Auditors were allowed to listen to each sound excerpt as many times as necessary in order to make a satisfactory evaluation for each category.

THEORY/CALCULATION

The raters' visual analog results from all four characteristics were converted into numerical scores by measuring the distance in millimeters from the left end of the VAS to the point at which the rater's tick mark crossed the scale. For example, a tick mark placed at exactly the middle of the scale would result in a score of 50. These scores were then recorded for all five raters and the mean, median, and standard deviation were calculated for each token.

Pearson's r correlation coefficients were calculated using the raw median rater scores and the performers' indicated style choices—belt, mix, or legit (coded as 1, 2, and 3, respectively). Additionally, median rater scores were recoded into three distinct categories corresponding to the three style choices. This was accomplished by transforming median rater scores of 0–33.33 to category 1 (belt), 33.34–66.66 to category 2 (mix), and 66.67–100 to category 3 (legit). A second correlation coefficient was then calculated using these values. Two-way interaction plots were created to identify any interaction that the moderating variables of pitch and experience level (professional or beginner) might have had on the relationship between rater scores and the singers' indicated style choices. Finally, the reliability of the raters was assessed using all cases for interrater reliability and the repeated cases for intrarater reliability. Intraclass correlation coefficients were calculated for all relationships.

RESULTS

The results of the analyses described above indicate that a statistically significant relationship exists between the performers' indicated performance style and the raters' ability to predict that style. Using the raw scores (0–100), the raters' scores exhibited a strong positive correlation with the singers' indicated styles ($r = 0.737$, $P < 0.01$, Table 1). However, it was noted that any change in rater score, regardless of magnitude, could correlate with the change in performer style code (1–3). For this purpose, raw rater scores were recoded into three categories and the correlations were calculated again. Using these data, the correlation dropped slightly but remained strong ($r = 0.700$, $P < 0.01$, Table 2), indicating that the correlation truly is a measure of the strength of the relationship between the performers' style choices and the ability of the rater to identify that style, robust to the magnitude of difference in rater scores necessary to differentiate between three styles across a 100-point scale.

In addition to whether or not raters could classify a sound as belt, mix, or legit, the authors also questioned what effect the performer's experience level had on the rater's ability to classify the sound. Separate correlation calculations indicated that

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