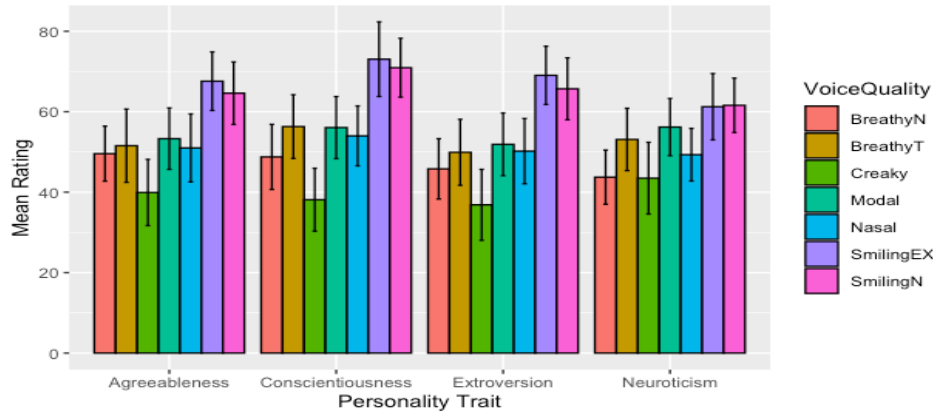


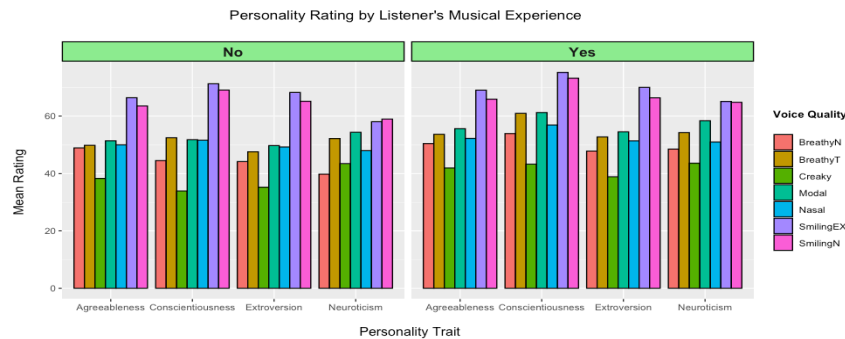
## **The Effects of Different Voice Quality on the Perceived Personality of a Speaker**

From clinical techniques for the best practices to produce a healthy vocal production and avoid vocal strain to popular culture tips to sound more professional or to speak more effectively, there has always been an interest in analyzing and understanding the various vocal qualities of a speaker and how these vocal qualities may impact the perception of speakers' personality traits. Several studies have examined the relationship of independent vocal qualities, such as creaky or breathy voice, on specific personality traits, with many focusing on charisma and charismatic personality traits. Although there are studies which investigate individual vocal quality perception and personality attribution, to our knowledge, there are no studies which simultaneously examine various vocal qualities produced by the same individual. The current study investigates how vocal quality variation (breathy, creaky, nasal, and smiling) of a speaker affects a listeners' perceived personality traits of that speaker.

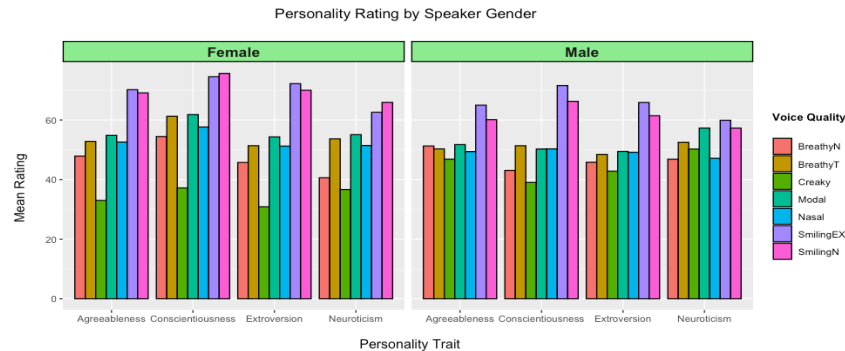
6 native (Canadian) English speakers, 3 male and 3 female, produced two neutral valence paragraphs varying the following (speaker-produced) voice qualities: modal, nasalization (specifically hyper nasalization), glottalization (creaky voice), breathy voice, and smiling (two conditions: natural and extreme smiling), resulting in 84 acoustic stimuli (6 speakers x 2 paragraphs x 7 voice quality condition). Listeners were screened for their musical education and their task was to answer ten questions about each audio stimulus. These 10 questions related to 4 of the Big 5 of personality traits: extraversion (5 questions, e.g. "This professor engages students in the classroom"), agreeableness (3 questions, e.g. "This professor is positive and likeable"), conscientiousness (1 question: "This professor is organized and detail oriented"), and neuroticism (1 question: "This professor is convincing in the way they speak"; openness was omitted) and were answered using continuous sliding scales (*strongly agree* to *strongly disagree*). The experiment was conducted in a sound-proof phonetic lab using the Gorilla platform using high quality acoustic playback conditions (Focusrite Scarlett, Sennheiser HD598). Our results show strong influences of voice quality across all personality traits (see figure 1). Ratings were higher for smiling voice quality for both the natural smiling condition and the extreme smiling condition across all personality traits. Inversely, creaky voice quality was generally perceived less positively. This is in line with previous research (Tartter, 1980) demonstrating that general perceptions of smiling are correlated to more positive emotions and associations like trustworthiness and friendliness, while creaky voice is perceived more negatively. When comparing listeners with musical education versus listeners who do not play an instrument (see figure 2) our results show minimal differences in voice quality ratings across personality traits, suggesting musical ability and musical background do not play a major role in how listeners perceive varying vocal quality modifications. This is interesting as listeners with musical background have been shown to have greater acuity for more fine-tuned differences for both music and speech. These results suggest that fine-tuned speech details do not influence listener's perceptions of voice quality when it comes to personality attribution. Finally, figure 3 shows the differences in ratings comparing male and female *speakers* and their voice quality. These results show consistent differences for both creaky voice and smiling voice, but not for the other vocal qualities. Listeners rated female speakers more negatively in creaky voice than males for the personality traits of agreeableness, extroversion, and neuroticism. Our results here confirm previous research (Chao & Bursten, 2021; Anderson et al., 2014) that demonstrated that creaky voice is frequently perceived negatively in women in a variety of environments. Additionally, both smiling variants are consistently rated higher for female speakers than their male counterparts.



**Figure 1:** Voice quality ratings for all listeners aggregated over all 6 speakers' productions. The y-axis displays the slider position percentage (0% corresponding to the left extreme value of the slider and 100% to the opposite extreme). The x-axis shows the aggregation of the 10 questions into the 4 personality traits of interest: agreeableness, conscientiousness, extroversion, and neuroticism. The colours represent the various examined voice qualities. Shown are means  $\pm 1$  standard error.



**Figure 2:** Mean ratings comparing listeners with musical experience (right) versus those without it (left), aggregated over all speakers. See figure 1 for description of the axes and colours.



**Figure 3:** Mean ratings over all listeners comparing female speakers (left) versus male speaker (right) productions. See figure 1 for description of the axes and colours.

### References

- Anderson, R. C., Klofstad, C. A., Mayew, W. J., & Venkatachalam, M. (2014). Vocal fry may undermine the success of young women in the labor market. *PloS one*, 9(5), e97506.
- Chao, M., & Bursten, J. R. (2021). Girl Talk: Understanding Negative Reactions to Female Vocal Fry. *Hypatia*, 36(1), 42-59.
- Tartter, V. C. (1980). Happy talk: Perceptual and acoustic effects of smiling on speech. *Perception & psychophysics*, 27(1), 24-27.