

THE PERCEPTION OF COOLNESS: DIFFERENCES IN EVALUATING VOICE QUALITY IN MALE AND FEMALE SPEAKERS

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ABSTRACT

We investigated possible motivations for the perceived increase in the use of creaky voice by young speakers by having listeners evaluate pairs of stimuli produced by different speakers in three different voice qualities (modal, creaky, breathy), along four different dimensions (coolness, youthfulness, attractiveness and authoritativeness). Generally, modal voice was the most preferred voice quality in each dimension, and creaky voice was the least preferred. However, creaky voice did yield a greater number of "authoritative" judgments. Judgments also differed according to the sex of the speaker: creaky voice made men sound more "cool" and "attractive", while listeners were more likely to select breathy voice as the preferred voice quality for women for all four dimensions. These findings indicate that speakers may be tapping into creaky voice as a means of establishing "authority", although women may additionally be using it more to tap into the sociolinguistic status of men.

Keywords: Voice quality, creaky voice, gender perception, speaker evaluation.

1. INTRODUCTION

In recent years, the investigation of voice quality and its social role has attracted increasing attention not only in the academic community, but also in the media. Much recent work in sociophonetics has discussed the growing popularity of creaky voice among young English speakers, especially among young women. A few studies have also analyzed the perception of this and other voice qualities and the possible paralinguistic effects they may have [1,3,4,10,12,15].

In an attempt to address the growing suspicion that young women are, in fact, producing more creaky voice than previous generations, [10] investigated the use of different voice qualities across women of different generations. [10] examined the speech patterns of 5 mother-daughter pairs, quantifying the use of modal, breathy, and creaky voice across 2 discourse registers: formal and informal. This small-

scale study found a trend whereby daughters produced more creaky voice than their mothers, overall. A register difference was also found, in which creaky voice was produced more by mothers and daughters in an informal discourse context.

Although creaky voice is seeing increasing use among young speakers, the social evaluation of this voice quality has been largely negative. [1] found that using creaky voice may have negative effects on career prospects. They asked participants to listen to 200 pairs of the same sentence, "*Thank you for considering me for this opportunity*", as produced by either 7 men or 7 women speakers, and then determine "which speaker was...more educated, competent, trustworthy, attractive, and which speaker they would hire" [1]. Their 800 participants varied in age from 18-65 and were equally divided between sex and age group. They found that "young adult female voices exhibiting vocal fry are perceived as less competent, less educated, less trustworthy, less attractive, and less hireable" [1]. Interestingly enough, these perceptions were stronger when the listener was also female. [1] stated that though it would be more favorable for women to avoid using this voice quality when job searching so as to increase their career prospects, they also suggested that creaky voice may have social benefits despite its negative perception, such as social acceptance among peers. In support of this view, [15] found that 175 American undergraduate college students perceived creaky voice as educated and upwardly mobile. This seems to contradict [1]'s conclusion that women who use creaky voice will have more difficulty in the job market; but [15]'s findings do support [1]'s claim that voice quality may have some social benefits – since creaky voice is a feature of the speech of young women, it follows that those who use it would perceive it as favorable. In addition, other studies addressing the attractiveness of voice quality have shown that creaky voice is judged to be less attractive than other voice qualities [1,3,4].

Why are young speakers increasingly using this voice quality, if listeners regard it so negatively? What social factors might be motivating them? To address these questions, this study investigated the

perception of three voice qualities (modal, breathy, and creaky) with respect to four social characteristics (attractiveness, youthfulness, authoritativeness, and coolness). We investigated these four parameters in part because of the results of previous research [7,14], and also to investigate our intuitions about how speakers who use creaky voice are typically perceived.

2. METHODOLOGY

2.1. Materials

Participants completed a direct comparison task in which they heard two productions of the same word and were asked to determine which production sounded: (1) cooler, (2) younger, (3) more attractive, and (4) more authoritative.

Each listener heard the stimuli as produced by 3 different female and 3 different male speakers. These speakers were selected at random for each listener from a larger database in which 5 different speakers of each sex produced 360 different words in modal, creaky, and breathy voice qualities. All of the words in the database were selected from the CELEX database [2], and were of the form consonant-vowel-consonant. The speakers produced the words in this database with the same voice quality throughout the entire word.

In the listening experiment, each speaker produced 8 different stimuli words in each of the 3 different voice qualities. The 8 words were played in pairs with the same word produced by either a different speaker (of the same sex) in the same voice quality (2 comparisons), the same speaker in a different voice quality (2 comparisons), or a different speaker (of the same sex) in a different voice quality (4 comparisons—2 other speakers, with 2 different voice qualities each). Thus, each speaker produced 24 words (= 3 voice qualities x 8 words), and the speakers of each sex produced 72 words (= 3 speakers x 24 words). In total, participants heard 144 pairs of stimuli. There were three possible pairings of different voice qualities (breathy-creaky (BC), breathy-modal (BM), and creaky-modal (CM)), and the order of presentation of these voice qualities was counterbalanced across the entire set of stimuli.

2.2. Participants

There were twenty participants in the study, all of whom were recruited from an introductory linguistics class and were provided with partial course credit for their participation. All participants

were native speakers of English, and no participant reported having any hearing or vision impairments.

2.3. Procedure

In each trial, the listeners heard the initial stimulus word, followed by a half second inter-stimulus interval, and then the second stimulus word. All stimuli were played at a comfortable listening level, over high-quality, circumaural headphones, in a quiet testing room.

After hearing each stimulus pair, listeners were presented with four evaluation questions, one at a time, in the following order:

1. Which speaker sounds cooler?
2. Which speaker sounds younger?
3. Which speaker sounds more attractive?
4. Which speaker sounds more authoritative?

The order of these questions remained unchanged throughout the experiment. These questions were presented, in text, on the computer screen in front of the listener. Underneath each question were two buttons, labeled “the first one” and “the second one”; listeners registered their responses by clicking on the appropriate button. Underneath both of these buttons was another button labeled “Listen again”, which enabled the listeners to hear the same stimulus pair again. The listeners could click on this button as many times as they liked, prior to registering their response. This procedure was self-paced, and it took most listeners approximately 30-45 minutes to complete the experiment.

3. RESULTS

For each trial, the computer recorded which talker was selected as the answer to each question, and the number of times the listener had re-played the stimulus pair before answering the question. The data from one subject was removed from analysis due to a data collection error. The following analysis also only looked at the responses to stimulus pairs which differed in voice quality. The raw response data for the four tasks, summed over all participants, is shown in Figures 1 through 4 below. Positive scores indicate a greater number of responses for the second voice quality in each pairing, while negative scores indicate the opposite. For example, a score of 37% for "breathy-creaky" pairs would mean that the creaky voice token was selected for 37% of the pairs. Since the dependent measure for each task was therefore a proportion, Analyses of Deviance were run to investigate the effects of voice quality pairing and speaker sex on the proportion of responses given

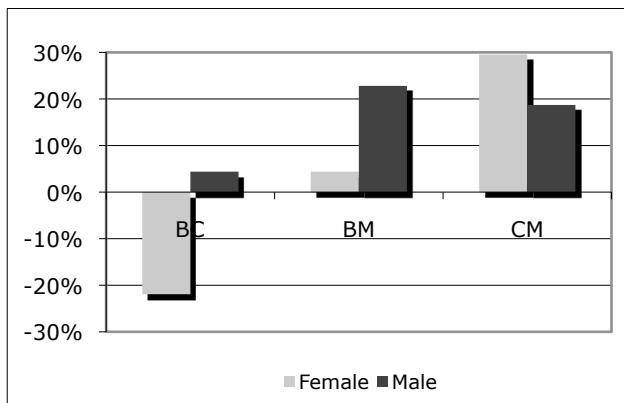
for each voice quality in the four evaluation tasks. In order to save space, the specific results of these statistical tests are not reported here, but in all cases $\alpha = .05$.

3.1. Perceived Coolness

In this task, there were significant main effects of both voice quality and gender. Male stimuli had a higher overall score than females; this seems to largely be due to the fact that breathy voice was considered relatively "cooler" for females in both the BC and BM pairings. CM pairings also had a higher score than both BM and BC pairs, indicating that modal voice was generally considered "cooler" than creaky voice for both genders.

There was also a significant interaction of speaker sex and voice quality pairing on perceived coolness. This largely manifested itself in a lack of a significant difference between BM and CM pairs for males. In addition, males had higher scores than females for both BM and BC pairs, while females had a higher overall score for the CM pairs. This combination of effects suggests that creaky voice is less "cool" for females, while breathy voice is less "cool" for males.

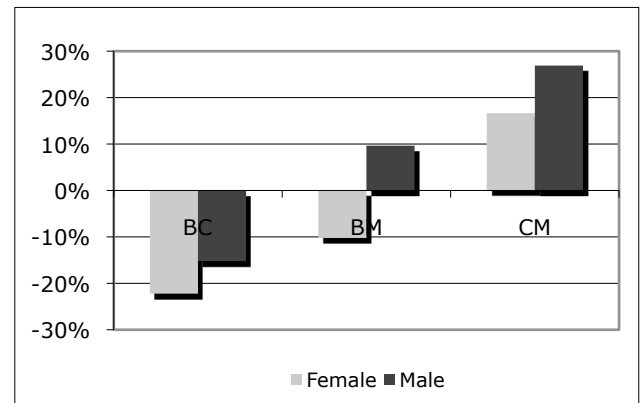
Figure 1: Perceived Coolness, by speaker sex and voice quality pairing



3.2. Perceived Youthfulness

In the youthfulness comparison task, there was a significant main effect of voice quality pair, reflecting the same hierarchy that was seen in the analysis of the coolness responses: CM > BM > BC. There was also a significant main effect of gender, such that scores were higher overall for men than women. There was no significant interaction between the two factors, however.

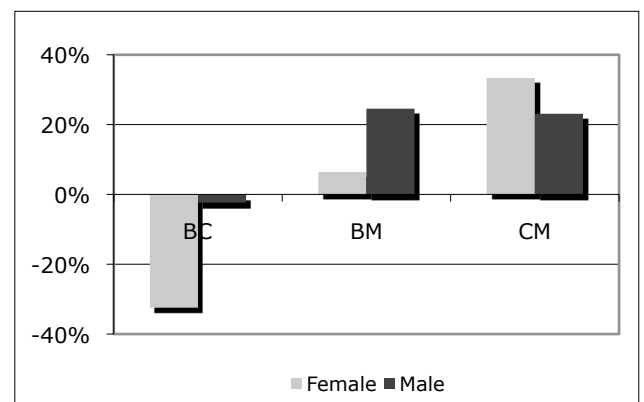
Figure 2: Perceived Youthfulness, by speaker sex and voice quality pairing



3.3. Perceived Attractiveness

The attractiveness evaluation task revealed the same general pattern as before in a significant effect of voice quality (CM > BM > BC). Scores were also significantly higher for males than females. In addition, there was a significant interaction between these two factors. For males, there was no significant difference between CM and BM pairs, indicating that creaky and breathy voice are effectively considered equally (un)attractive (and less attractive than modal voice) in male speakers. For female speakers, however, modal and breathy voice were both clearly more attractive than creaky voice, with modal marginally more attractive than breathy. The CM pairs also had a significantly higher score for women than men, indicating that creaky voice was more dispreferred for women.

Figure 3: Perceived Attractiveness, by speaker sex and voice quality pairing



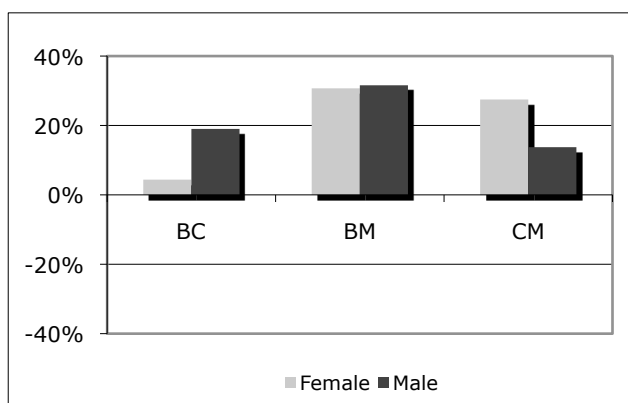
3.4. Perceived Authoritativeness

There was a significant main effect of voice quality in this task, but not of gender. Post-hoc analysis of the main effect of voice quality pair also revealed a different hierarchy than for the other three

evaluation parameters: BM pairs had the highest overall score (indicating that modal was considered to be much more authoritative than breathy voice), followed by CM pairs, and finally by BC pairs. The general pattern here (which has not been observed before) is that creaky is considered more authoritative than breathy voice.

This analysis also revealed a significant interaction between the voice quality and gender factors. This manifested itself in BC pairs scoring significantly higher for men than women, and CM pairs scoring significantly higher for women than men. Both of these patterns may be attributed to creaky voice being perceived as even more authoritative for men than for women. There was no difference between the two sexes in the evaluation of the BM pairs.

Figure 4: Perceived Authoritativeness, by speaker sex and voice quality pairing



4. DISCUSSION

These results clearly show that there are strong differences in how voice quality is perceived between the two sexes. They also indicate that, of the four parameters tested here, if anything is motivating the increased use of creaky voice, it is the desire of speakers to appear more authoritative.

The fact that young people are using creaky voice more often than in the past might indicate a desire to sound more authoritative, given their relatively modest status in society. Females might also be more inclined to use it, if they feel that they have an even lower status in society than men [6,13]. In other words, it might provide a way for them to attain the linguistic status of men, in the hopes of being taken more seriously. But females do not seem to be using it to appear "cooler" or "more attractive", even though these options are available to men.

In addition, it is possible that an increased use in creaky voice might be the result of adaptive dispersion in contrast to uptalk, since creaky voice generally appears phrase-finally [7,14]. If phrase-final uptalk is perceived as "unconfident", or "unauthoritative" [9,12], then the use of creaky voice might be a way to project the mirror opposite of those attitudes in a speaker.

Differences between the sexes in production are also important: creaky voice seems to be considered a "male" voice quality overall, even though previous research has shown that women use this voice quality more often than men [14]. It is also interesting that breathy voice appears to be the voice quality that listeners prefer to hear for women on a variety of dimensions, in spite of the increased use of creaky voice by young women [10]. It is not clear at this point whether the stereotypical notions of what female voices sound like will change in the future, in order to align better with the different voice qualities that women actually produce.

It is worth noting that the recent excitement about the use of creaky voice in young women may in part be due to the fact that it is easier to notice in female voices, since there is a more drastic drop into creaky voice from the regular female F0 range. Correspondingly, it might simply be harder to notice creaky voice in male voices, overall. Natural speech often contains a variety of voice qualities along a continuum [11], and it is unknown at this point whether mixtures of different voice qualities would be perceived in the same fashion as the three "pure" voice qualities we attempted to investigate in this study.

Lastly, it is also possible that speakers might be motivated to use creaky voice by factors which are not necessarily regarded as positive by their listeners: creaky voice may provide speakers with a linguistic means of indicating that they want to be seen as not conforming to the normal social standards of "coolness" or "attractiveness".

5. CONCLUSION

The possible motivations for the increased use of creaky voice by young women are complicated. While it generally confers a sense of "authoritativeness", the evaluation of voice quality also depends on gender: listeners prefer creaky voice for male voices, while preferring breathy voice more for female voices. Female speakers' use of creaky voice may thus indicate an attempt to tap into the perceived status of men in speech.

6. REFERENCES

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