How Do Adolescent Students Perceive Aging Teachers' Voices?

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Summary: Objective. This study aims to analyze adolescent evaluations of aging teachers' perceived vocal age (PVA) and pleasantness, relative to actual vocal parameters.
Study Design. This is a cross-sectional study.
Methods. Digital speech samples of 23 teachers over 65 years in age were collected. Three speech-language pathologists and voice specialists evaluated and classified the vocal parameters on a seven-point scale according to a perceptual-auditory voice analysis protocol, developed especially for this study. Seven adolescent students (mean age 17 years; 3 males, 4 females) evaluated the samples for PVA and pleasantness. The pleasantness evaluations were classified according to three explanatory foci: instrument (related to an organic or functional laryngeal action, eg, a "rough" voice), expressivity (related to social or emotional aspects), or both.
Results. PVA results showed that all subjects underestimated the teachers' ages. PVAs were not significantly correlated with vocal parameters, pleasantness, or focus. Male adolescent evaluations of pleasantness were significantly correlated with the vocal parameters: loudness ($P = 0.017$), pitch variation ($P = 0.006$), and loudness variation ($P = 0.021$), and the main explanation focus was instrument. Female adolescent evaluations of pleasantness were significantly correlated with resonance ($P = 0.047$) and loudness variation ($P = 0.035$), and the main explanation focus was expressivity.
Conclusions. Although male and female adolescents judged voice qualities differently, both groups showed statistically significant correlations between pleasantness and vocal parameters associated with expressivity. Our results, combined with the high rate of vocal dysfunction in teachers, support the notion that specific voice care programs combined with expressivity resources training should be implemented for individuals in the teaching profession. This gender difference regarding pleasantness in vocal analyses should be investigated further.
Key Words: Voice–Teacher–Professional voice–Aging–Adolescents.

INTRODUCTION

The teacher's voice plays an important role in the teacher-student interaction, which comprises a significant part of performance in the teaching occupation.[1–3] Some teachers' voices are more effective than others in maintaining students' attention,[4] and this quality may be related to the teachers' use of appropriate adjustments in vocal parameters. However, the incidence of voice disorders among teachers is relatively high[5–7]; the prevalence of chronic voice disorders in this group ranges between 11.6% and 16%.[7] Voices with dysphonic characteristics might fail to capture students' attention[4] due to an inability to transmit verbal and emotional messages.[8] This limitation may negatively impact communications with students. The high occurrence of voice disorders among teachers, combined with age-related effects over the years, may represent an interesting issue regarding teaching performance. Research on this subject has become more relevant in modern times. Indeed, due to longer life expectancy and declining fertility rates,[9] the older population has grown faster than any other age group. Moreover, a large proportion of the older population is professionally active, including individuals in the teaching occupation. Although aging is a universal process, it occurs nonuniformly across individuals due to the interaction of biological, functional, psychological, and social aspects.[10,11] As part of the aging process, the voice undergoes changes, but we lack consensus definitions of the time of initiation and the types and levels of modifications.[12–19] Only a few studies have suggested that the aging voice might have an impact on communication capacity and quality of life[18,20–22]; furthermore, even fewer studies have considered these effects in specific professional categories.[23]

Analyses of voice impacts on listeners represent part of a broader approach for investigating the influence of the voice on almost every human interaction and cultural concept.[24] Part of this influence arises from perceptions of the speaker, based on voice-engendered personality traits, emotions, identity, and pleasantness.[13,25–27] Thus, voice impact analyses include the listener's perceptions of the speaker's perceived vocal age (PVA) and pleasantness, which are based on the listeners' daily experiences, combined with their cognitive and sociocultural aspects.[14,25] The accuracy of a PVA judgment[22,25,26] is partly determined by the listener's age: younger listeners tend to underestimate the speaker's age, but listeners of about the same age as the speaker provide more precise vocal age judgments. The pleasantness rating is also partly determined by the listener's age. Deal and Oyer[27] studied the pleasantness of speakers' voice, judged by university student listeners. Those students rated older speakers' voices nearer the unpleasant end of the scale. However, as suggested by those authors, voice pleasantness evaluations should be further investigated to determine which vocal characteristics may be associated with pleasantness.

Teachers spend a considerable amount of time in their professional capacity with adolescent students. Therefore, investigations on the impact of an aging teacher's voice on

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adolescent students might contribute to the development of more specific voice care programs for teachers. In addition to the benefit for teachers, these programs could facilitate communication with students and might contribute to enhancing the learning process.[3] A study on the impact of aging teachers' voices on adolescent students should consider the hypothesis that higher PVAs might be associated with higher chronological ages (CAs) and more alterations in vocal parameters. Another hypothesis should be that teachers with voices that convey higher CAs and PVAs might be considered less pleasant by students. Therefore, it is relevant to explore which vocal parameters are correlated with a pleasant voice or a lower PVA.

The present study aimed to analyze aging teachers' vocal parameters and their relationships to PVA and pleasantness.

METHODS

Subjects and corresponding tasks

Two groups of subjects participated in this research: the teachers group, which comprised 23 teachers older than 65 years old (7 men and 16 women), and the adolescents group, which comprised 7 adolescents between 13 and 18 years old (3 males and 4 females). Both groups were from São Paulo, Brazil.

The teachers produced digitally recorded speech samples. Speech was recorded with a microcomputer (*Windows XP*, Itautec Infoway, Brazil), in a quiet environment. Teachers wore a unidirectional headset microphone (Plantronics DSP 500, Plantronics Inc, USA), with a flat intensity response, located at a 45° angle and a 5-cm distance from the speaker's mouth. After the recording, 20% of the samples were repeated and randomly distributed for an intrarater agreement test. All samples were used for the perceptual-auditory voice analysis and evaluations of PVA and pleasantness.

The speech samples consisted of a short story that the teacher reproduced from a narrative told by the examiner. According to the analyses proposed for the present study, speech samples were required to be as similar as possible to a natural communication situation. Therefore, reading or repeated utterances were avoided.

For the present study, the teachers' speech samples were retrieved from a data set previously used in another study.[19,23] Participants had been recruited through verbal announcements made in schools and universities. For eligibility, all teachers completed a printed questionnaire and an interview with the researcher. Inclusion criteria were as follows: age older than 65 years, living independently, participating in occupational and social activities, and showing sufficient competence to come to the interview at the designated time and date. Appropriately completing the interview, the questionnaire and the proposed task we considered as one indication of the absence of severe mental or physical disease in addition to the participant history.[28]

Exclusion criteria were as follows: residence in any geriatric institution or the presence of any severe systemic disease, untreated gastroesophageal reflux, smoking habits, history of alcoholism, speech accent from birthplace, or previous voice therapy.

The adolescents group evaluated the recorded speech samples for PVA and pleasantness. These participants were recruited for the present study through verbal announcements made in schools, gymnasiums, and supermarkets, within a short distance from the researcher's office. Inclusion criteria were ages between 12 and 18 years. Exclusion criteria were adolescents before or during the voice-change period, hearing disorders, previous or current voice therapy, and singing training. Subjects were selected through an interview and a questionnaire specifically developed for the present study.

Participating teachers and adolescents freely signed consent forms. The parents of adolescents also freely signed a specific consent form. Participating teachers were informed that the study concerned only the voice. Adolescents and parents were not aware of the teachers' ages, genders, or occupation before the study and were informed of these data immediately after they completed the evaluations. Individuals in both groups were free to cease participation at any time. The present study was approved by the Ethics Committee of the Department of Speech-Language Pathology at Pontificia Universidade Catholica, in São Paulo, Brazil, and by Platform Brasil (CEP 616.953).

Instruments

Two protocols that had been specifically developed for previous studies[19,23] were used in the present study. The first protocol was the perceptual-auditory voice analysis protocol, adapted from previous literature search.[29] This protocol contained seven vocal parameters that might be affected in an older population: pitch, loudness, resonance, pitch variation, loudness variation, speech rate, and voice quality. Each vocal parameter, except voice quality, was evaluated with a visual analog scale of seven points, where 1 represented the lowest and 7 the highest level of pitch, loudness, and speech rate. For pitch and loudness variations, the low scores represented infrequent use of these variations; ie, variations were mostly related to intonation and sentence stress. In contrast, the highest score was associated with excessive pitch or loudness variation. For resonance, the lowest and highest scores characterized excessive focus in a predetermined area: the lowest score indicated an extreme laryngopharyngeal focus; the highest score described a predominantly nasal focus; both scores indicated an imbalanced resonance focus. Voice quality was evaluated and described in the abovementioned protocol.

The second protocol was the evaluation of PVA and pleasantness, with a corresponding explanation. (Appendix 1). Although the teachers comprised 23 subjects, adolescents evaluated 27 voice samples, including the repeated samples included for the intrasubject agreement (test and retest statistical analysis). Listeners were not aware that some voice samples were repetitions. They were instructed to listen three times to each voice sample, and afterwards, complete the specific protocol regarding the age of the speaker, whether the voice sample was pleasant, and a corresponding explanation for the pleasantness rating. Adolescents were instructed that there were no right or wrong answers. The instruction provided to the raters was the following: You will listen to many subjects telling a short story. After listening three times to each subject, please complete this protocol regarding the age of the speaker, whether the voice sample is pleasant or not, and give a corresponding explanation,