



INFLUENCE OF ONLINE STUDY ENVIRONMENT ON COLLEGE PROFESSORS' OCCUPATIONAL VOICE USE PERCEPTION: ASSESSING NOISE AND ACOUSTICS RECALL

A. Carrillo-González^{1*}

L.C. Cantor-Cutiva²

¹ Department of Psychology, Fundación Universitaria del Área Andina, Colombia

² Department of Communicative Sciences and Disorders, Michigan State University, United States

ABSTRACT

Noise and acoustic conditions are associated with voice disorders among teachers, which can cause damage to the vocal folds and lead to a range of voice symptoms such as hoarseness and vocal fatigue. Aim: To identify the effect of classrooms' noise and acoustic conditions on occupational voice use perception among college professors. Method: A cross-sectional study was conducted with the participation of 221 teachers. Participants filled out an online survey. Generalized linear models were used to assess the association between the independent and dependent variables. The associations were expressed by the beta regression coefficient and the standard error. Results: Teachers who reported a higher perception of noise inside the classroom were less likely of reporting using loud voices during teaching and more likely of using a microphone during teaching. Teachers who reported a higher perception of bad acoustics inside the classroom were less likely of reporting using vocal rest voice and projected voice during teaching. Conclusion: Noise and poor acoustics can negatively impact teachers' occupational voice use, and therefore, increase the likelihood of voice disorders.

Keywords: *noise, acoustics, occupational voice users, classroom environment.*

*Corresponding author: acarrillog@unal.edu.co.

Copyright: ©2023 First author et al. This is an open-access article distributed under the terms of the Creative Commons Attribution 3.0 Unported License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

1. INTRODUCTION

The voice is an essential tool for effective communication, particularly in professions that heavily rely on verbal interactions, such as teaching. Voice disorders are particularly prevalent among teachers, with a reported prevalence of 19% to 61% [1]. Voice disorders can significantly impact teachers' quality of life, job performance, and career trajectory. Although multiple factors contribute to voice disorders, noise and poor acoustics in the classroom environment have been identified as major risk factors [2-3]. Excessive noise levels in classrooms can result in raised vocal effort, leading to vocal fatigue, hoarseness, and even vocal fold damage [4]. Moreover, inadequate acoustic conditions, characterized by poor reverberation time and speech intelligibility, further exacerbate the strain on teachers' voices [5].

Recent research has shown that teachers' perception of noise inside the classroom directly influences their vocal behavior. Teachers who reported a higher perception of noise were less likely to use loud voices during teaching and more inclined to rely on microphone amplification [6]. Similarly, teachers who perceived poor acoustics in their classrooms were less likely to utilize vocal rest voice and projected voice techniques.

Understanding the detrimental impact of noise and poor acoustics on teachers' occupational voice use is vital for mitigating the risk of voice disorders. Therefore, this study aims to identify the effect of classrooms' noise and acoustic conditions on occupational voice use perception among college professors. By identifying the specific effects between these environmental factors and vocal behavior, appropriate interventions and strategies can be developed to create healthier teaching environments.



2. METHOD

This cross-sectional study was performed with the participation of 221 college professors (113 females and 88 men; mean age 43 y/o - SD=8.2). After approval of the Institutional IRB, participants were invited to take part in this research via email. Professors who accepted to participate were informed about the objective of the research, risks, and the duration of the study. Then, participants gave written informed consent to participate in the research and fill out an online survey. The survey was designed based on previously standardized instruments applied in investigations about voice disorders among teachers, working conditions, stress, sleep, depression, and anxiety. Teachers provided their own perspective regarding the effect of classrooms' noise and acoustic conditions on their voice use. The normality of the distribution of the dependent variables was assessed by applying the Shapiro-Wilk test. Generalized linear models (GLM) were used to assess the association between the independent and dependent variables. The associations were expressed by the beta regression coefficient and the standard error. All statistical analyses were performed using SPSS 22 (IBM Corporation).

3. RESULTS

Teachers who reported a higher perception of noise inside the classroom were less likely of reporting using loud voices during teaching and more likely of using a microphone during teaching. Teachers who reported a higher perception of bad acoustics inside the classroom were less likely of reporting using vocal rest voice and projected voice during teaching.

4. CONCLUSIONS

Teachers who reported a heightened perception of noise within the classroom tended to use their loud voices less frequently during teaching but were more inclined to utilize microphones. This suggests that excessive noise levels may prompt instructors to modify their vocal behavior to compensate for the disruptive auditory environment. Additionally, our findings indicate that teachers who perceived poor acoustics within the classroom were less likely to engage in vocal rest voice and projected voice during teaching. This suggests that how teachers modify their voice use tactics depends on the acoustics of the

classroom. When taken as a whole, our research emphasizes how critical it is to establish supportive learning settings in order to encourage college teachers to utilize their voices in a healthy manner at work. Educational institutions can help their staff maintain optimal vocal health and, as a result, improve the overall teaching and learning experience by addressing noise and acoustic difficulties.

5. FUNDING

The research reported in this publication was supported by The Research Office of Fundación Universitaria del Área Andina under Award Number CV2022-PA-P-12643.

6. REFERENCES

- [1] Roy, N., Merrill, R.M., Thibeault, S., Parsa, R.A., Gray, S.D., & Smith, E.M. (2004). Prevalence of voice disorders in teachers and the general population. *Journal of Speech, Language, and Hearing Research*, 63(2), 632-643
- [2] Rantala L., Sala E. (2015). Effects of Classroom Acoustics on Teachers' Voices. *Building Acoustics*. 22(3-4): 243-258. doi:10.1260/1351-010X.22.3-4.243.
- [3] Faham, M., Jalilevand, N., Torabinezhad, F., Silverman, E. P., Ahmadi, A., Anaraki, Z. G., & Jafari, N. (2017). Relationship between Voice Complaints and Subjective and Objective Measures of Vocal Function in Iranian Female Teachers. *Journal of Voice*, 31(4), 507.e1-507.e6. <https://doi.org/10.1016/j.jvoice.2016.10.011>
- [4] Roy, N., Weinrich, B., Gray, S. D., Tanner, K., & Toledo, S. W. (2002). Voice amplification versus vocal hygiene instruction for teachers with voice disorders: A treatment outcomes study. *Journal of Speech, Language, and Hearing Research*, 61(8), 2076-2090.
- [5] Cutiva, L. C., & Burdorf, A. (2015). Effects of noise and acoustics in schools on vocal health in teachers. *Noise & health*, 17(74), 17-22. <https://doi.org/10.4103/1463-1741.149569>
- [6] Bottalico, P. (2022). Work-Related Communicative Profile of Voice Teachers: Effects of Classroom Noise on Voice and Hearing Abilities. *Journal of Voice*, 36(2), 291.e17-291.e31. <https://doi.org/10.1016/j.jvoice.2020.05.021>.