

List of included papers focusing on naturalness in voices (alphabetical order):

1. Abdulrahman, A., & Richards, D. (2022). Is Natural Necessary? Human Voice versus Synthetic Voice for Intelligent Virtual Agents. *Multimodal Technologies and Interaction*, 6(7), 51. <https://doi.org/10.3390/mti6070051>
2. Abur, D., Subacut, A., Daliri, A., Lester-Smith, R. A., Lupiani, A. A., Cilento, D., Enos, N. M., Weerathunge, H. R., Tardif, M. C., & Stepp, C. E. (2021). Feedback and Feedforward Auditory-Motor Processes for Voice and Articulation in Parkinson's Disease. *J Speech Lang Hear Res*, 64(12), 4682–4694. https://doi.org/10.1044/2021_JSLHR-21-00153
3. Anand, S., & Stepp, C. E. (2015). Listener Perception of Monopitch, Naturalness, and Intelligibility for Speakers With Parkinson's Disease. *Journal of Speech, Language, and Hearing Research*, 58(4), 1134–1144. https://doi.org/10.1044/2015_JSLHR-S-14-0243
4. Assmann, P. F., Dembling, S., & Nearey, T. M. (2006). Effects of frequency shifts on perceived naturalness and gender information in speech. In *INTERSPEECH*. Symposium conducted at the meeting of Citeseer.
5. Aylett, M. P., Vinciarelli, A., & Wester, M. (2020). Speech Synthesis for the Generation of Artificial Personality. *IEEE Transactions on Affective Computing*, 11(2), 361–372. <https://doi.org/10.1109/TAFFC.2017.2763134>
6. Baird, A., Jørgensen, S. H., Parada-Cabaleiro, E., Cummings, N., Hantke, S., & Schüller, B. (2018). The Perception of Vocal Traits in Synthesized Voices: Age, Gender, and Human Likeness. *Journal of the Audio Engineering Society*, 66(4), 277–285. <https://doi.org/10.17743/jaes.2018.0023>
7. Baird, A., Jørgensen, S. H., Parada-Cabaleiro, E., Hantke, S., Cummins, N., & Schuller, B. (2017). Perception of Paralinguistic Traits in Synthesized Voices. In G. Fazekas, M. Barthet, & T. Stockman (Eds.), *Proceedings of the 12th International Audio Mostly Conference on Augmented and Participatory Sound and Music Experiences* (pp. 1–5). ACM. <https://doi.org/10.1145/3123514.3123528>
8. Baird, A., Parada-Cabaleiro, E., Hantke, S., Burkhardt, F., Cummings, N., & Schüller, B. (2018, September 2). The Perception and Analysis of the Likeability and Human Likeness of Synthesized Speech. In *Interspeech 2018* (pp. 2863–2867). ISCA. <https://doi.org/10.21437/Interspeech.2018-1093>
9. Birkholz, P., & Drechsel, S. (2021). Effects of the piriform fossae, transvelar acoustic coupling, and laryngeal wall vibration on the naturalness of articulatory speech synthesis. *Speech Communication*, 132, 96–105. <https://doi.org/10.1016/j.specom.2021.06.002>
10. Birkholz, P., Martin, L., Xu, Y., Scherbaum, S., & Neuschaefer-Rube, C. (2017). Manipulation of the prosodic features of vocal tract length, nasality and articulatory precision using articulatory synthesis. *Computer Speech & Language*, 41, 116–127. <https://doi.org/10.1016/j.csl.2016.06.004>
11. Cabral, J. P., Cowan, B. R., Zibrek, K., & McDonnell, R. (2017). The Influence of Synthetic Voice on the Evaluation of a Virtual Character. In *Interspeech 2017* (pp. 229–233). ISCA. <https://doi.org/10.21437/Interspeech.2017-325>
12. Coughlin-Woods, S., Lehman, M. E., & Cooke, P. A. (2005). Ratings of speech naturalness of children ages 8-16 years. *Perceptual and Motor Skills*, 100(2), 295–304. <https://doi.org/10.2466/pms.100.2.295-304>
13. Diel, A., & Lewis, M. (2024). Deviation from typical organic voices best explains a vocal uncanny valley. *Computers in Human Behavior Reports*, 14, 100430. <https://doi.org/10.1016/j.chbr.2024.100430>

14. Duville, M. M., Alonso-Valerdi, L. M., & Ibarra-Zarate, D. I. (2022). Neuronal and behavioral affective perceptions of human and naturalness-reduced emotional prosodies. *Frontiers in Computational Neuroscience*, 16, 1022787. <https://doi.org/10.3389/fncom.2022.1022787>
15. Duville, M. M., Alonso-Valerdi, L. M., & Ibarra-Zarate, D. I. (2024). Improved emotion differentiation under reduced acoustic variability of speech in autism. *BMC Medicine*, 22(1), 121. <https://doi.org/10.1186/s12916-024-03341-y>
16. Eadie, T. L., & Doyle, P. C. (2002). Direct Magnitude Estimation and Interval Scaling of Naturalness and Severity in Tracheoesophageal (TE) Speakers. *J Speech Lang Hear Res*, 45(6), 1088–1096. [https://doi.org/10.1044/1092-4388\(2002/087\)](https://doi.org/10.1044/1092-4388(2002/087))
17. Eadie, T. L., Doyle, P. C., Hansen, K., & Beaudin, P. G. (2008). Influence of speaker gender on listener judgments of tracheoesophageal speech. *Journal of Voice*, 22(1), 43–57. <https://doi.org/10.1016/j.jvoice.2006.08.008>
18. Ehret, J., Bönsch, A., Aspöck, L., Röhr, C. T., Baumann, S., Grice, M., Fels, J., & Kuhlen, T. W. (2021). Do Prosody and Embodiment Influence the Perceived Naturalness of Conversational Agents' Speech? *ACM Transactions on Applied Perception*, 18(4), 1–15. <https://doi.org/10.1145/3486580>
19. Euler, H. A., Merkel, A., Hente, K., Neef, N., Wolff von Gudenberg, A., & Neumann, K. (2021). Speech restructuring group treatment for 6-to-9-year-old children who stutter: A therapeutic trial. *Journal of Communication Disorders*, 89, 106073. <https://doi.org/10.1016/j.jcomdis.2020.106073>
20. Eyssel, F., Kuchenbrandt, D., Bobinger, S., Ruiter, L. de, & Hegel, F. (2012). 'If you sound like me, you must be more human'. In H. Yanco, A. Steinfeld, V. Evers, & O. C. Jenkins (Eds.), *HRI' 12: Proceedings of the seventh annual ACM/IEEE Conference on Human-Robot Interaction : March 5-8, 2012 Boston, Massachusetts, USA* (pp. 125–126). Association for Computing Machinery. <https://doi.org/10.1145/2157689.2157717>
21. Ferstl, Y., Thomas, S., Guiard, C., Ennis, C., & McDonnell, R. (2021). Human or Robot? Investigating voice, appearance and gesture motion realism of conversational social agents. In *Proceedings of the 21th ACM International Conference on Intelligent Virtual Agents* (pp. 76–83). ACM. <https://doi.org/10.1145/3472306.3478338>
22. Gong, L., & Nass, C. (2007). When a Talking-Face Computer Agent is Half-Human and Half-Humanoid: Human Identity and Consistency Preference. *Human Communication Research*, 33(2), 163–193. <https://doi.org/10.1111/j.1468-2958.2007.00295.x>
23. Goy, H., Kathleen Pichora-Fuller, M., & van Lieshout, P. (2016). Effects of age on speech and voice quality ratings. *The Journal of the Acoustical Society of America*, 139(4), 1648. <https://doi.org/10.1121/1.4945094>
24. Hardy, T. L. D., Rieger, J. M., Wells, K., & Boliek, C. A. (2020). Acoustic Predictors of Gender Attribution, Masculinity-Femininity, and Vocal Naturalness Ratings Amongst Transgender and Cisgender Speakers. *Journal of Voice*, 34(2), 300.e11-300.e26. <https://doi.org/10.1016/j.jvoice.2018.10.002>
25. Higgins, D., Zibrek, K., Cabral, J., Egan, D., & McDonnell, R. (2022). Sympathy for the digital: Influence of synthetic voice on affinity, social presence and empathy for photorealistic virtual humans. *Computers & Graphics*, 104, 116–128. <https://doi.org/10.1016/j.cag.2022.03.009>
26. Hu, P., Lu, Y., & Gong, Y. (2021). Dual humanness and trust in conversational AI: A person-centered approach. *Computers in Human Behavior*, 119, 106727. <https://doi.org/10.1016/j.chb.2021.106727>
27. Hyppa-Martin, J., Lilley, J., Chen, M., Friese, J., Schmidt, C., & Bunnell, H. T. (2024). A large-scale comparison of two voice synthesis techniques on intelligibility, naturalness, preferences, and attitudes toward voices banked by individuals with amyotrophic lateral

- sclerosis. *Augmentative and Alternative Communication*, 40(1), 31–45.
<https://doi.org/10.1080/07434618.2023.2262032>
28. Ilves, M., & Surakka, V. (2013). Subjective responses to synthesised speech with lexical emotional content: the effect of the naturalness of the synthetic voice. *Behaviour & Information Technology*, 32(2), 117–131. <https://doi.org/10.1080/0144929X.2012.702285>
 29. Ilves, M., Surakka, V., & Vanhala, T. (2011). The Effects of Emotionally Worded Synthesized Speech on the Ratings of Emotions and Voice Quality. In (pp. 588–598). Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-24600-5_62
 30. Im, H., Sung, B., Lee, G., & Xian Kok, K. Q. (2023). Let voice assistants sound like a machine: Voice and task type effects on perceived fluency, competence, and consumer attitude. *Computers in Human Behavior*, 145, 107791. <https://doi.org/10.1016/j.chb.2023.107791>
 31. Jones, H. N., Crisp, K. D., Kuchibhatla, M., Mahler, L., Risoli, T., Jones, C. W., & Kishnani, P. (2019). Auditory-Perceptual Speech Features in Children With Down Syndrome. *American Journal on Intellectual and Developmental Disabilities*, 124(4), 324–338.
<https://doi.org/10.1352/1944-7558-124.4.324>
 32. Kapolowicz, M. R., Guest, D. R., Montazeri, V., Baese-Berk, M. M., & Assmann, P. F. (2022). Effects of Spectral Envelope and Fundamental Frequency Shifts on the Perception of Foreign-Accented Speech. *Language and Speech*, 65(2), 418–443.
<https://doi.org/10.1177/00238309211029679>
 33. Klopfenstein, M. (2015). Relationship between acoustic measures and speech naturalness ratings in Parkinson's disease: A within-speaker approach. *Clinical Linguistics & Phonetics*, 29(12), 938–954. <https://doi.org/10.3109/02699206.2015.1081293>
 34. Klopfenstein, M. (2016). Speech naturalness ratings and perceptual correlates of highly natural and unnatural speech in hypokinetic dysarthria secondary to Parkinson's disease. *Journal of Interactional Research in Communication Disorders*, 7(1), 123–146.
<https://doi.org/10.1558/jircd.v7i1.27932>
 35. Klopfenstein, M., Bernard, K., & Heyman, C. (2020). The study of speech naturalness in communication disorders: A systematic review of the literature. *Clinical Linguistics & Phonetics*, 34(4), 327–338. <https://doi.org/10.1080/02699206.2019.1652692>
 36. Ko, S., Barnes, J., Dong, J., Park, C. H., Howard, A., & Jeon, M. (2023). The Effects of Robot Voices and Appearances on Users' Emotion Recognition and Subjective Perception. *International Journal of Humanoid Robotics*, 20(01), Article 2350001.
<https://doi.org/10.1142/S0219843623500019>
 37. Kühne, K., Fischer, M. H., & Zhou, Y. (2020). The Human Takes It All: Humanlike Synthesized Voices Are Perceived as Less Eerie and More Likable. Evidence From a Subjective Ratings Study. *Frontiers in Neurobotics*, 14, 593732. <https://doi.org/10.3389/fnbot.2020.593732>
 38. Lee, E.-J. (2010). The more humanlike, the better? How speech type and users' cognitive style affect social responses to computers. *Computers in Human Behavior*, 26(4), 665–672.
<https://doi.org/10.1016/j.chb.2010.01.003>
 39. Lehner, K., & Ziegler, W. (2022). Clinical measures of communication limitations in dysarthria assessed through crowdsourcing: Specificity, sensitivity, and retest-reliability. *Clinical Linguistics & Phonetics*, 36(11), 988–1009. <https://doi.org/10.1080/02699206.2021.1979658>
 40. Li, M., Guo, F., Wang, X., Chen, J., & Ham, J. (2023). Effects of robot gaze and voice human-likeness on users' subjective perception, visual attention, and cerebral activity in voice conversations. *Computers in Human Behavior*, 141, 107645.
<https://doi.org/10.1016/j.chb.2022.107645>
 41. Lu, L., Zhang, P., & Zhang, T. (2021). Leveraging “human-likeness” of robotic service at restaurants. *International Journal of Hospitality Management*, 94, 102823.
<https://doi.org/10.1016/j.ijhm.2020.102823>

42. Mackey, L. S., Finn, P., & Ingham, R. J. (1997). Effect of speech dialect on speech naturalness ratings: A systematic replication of Martin, Haroldson, and Triden (1984). *Journal of Speech, Language, and Hearing Research*, 40(2), 349–360. <https://doi.org/10.1044/jslhr.4002.349>
43. Malisz, Z., Henter, G. E., Valentini-Botinhao, C., Watts, O., Beskow, J., & Gustafson, J. (2020). Modern speech synthesis for phonetic sciences: a discussion and an evaluation. Center for Open Science. <https://doi.org/10.31234/osf.io/dxvhc>
44. Martin, R. R., Haroldson, S. K., & Triden, K. A. (1984). Stuttering and speech naturalness. *The Journal of Speech and Hearing Disorders*, 49(1), 53–58. <https://doi.org/10.1044/jshd.4901.53>
45. Mawalim, C. O., Galajit, K., Karnjana, J., Kidani, S., & Unoki, M. (2022). Speaker anonymization by modifying fundamental frequency and x-vector singular value. *Computer Speech & Language*, 73, 101326. <https://doi.org/10.1016/j.csl.2021.101326>
46. Mayo, C., Clark, R. A. J., & King, S. (2011). Listeners' weighting of acoustic cues to synthetic speech naturalness: A multidimensional scaling analysis. *Speech Communication*, 53(3), 311–326. <https://doi.org/10.1016/j.specom.2010.10.003>
47. McGinn, C., & Torre, I. (2019, March 11–14). Can you Tell the Robot by the Voice? An Exploratory Study on the Role of Voice in the Perception of Robots. In 2019 14th ACM/IEEE International Conference on Human-Robot Interaction (HRI) (pp. 211–221). IEEE. <https://doi.org/10.1109/HRI.2019.8673305>
48. Meltzner, G. S., & Hillman, R. E. (2005). Impact of Aberrant Acoustic Properties on the Perception of Sound Quality in Electrolarynx Speech. *J Speech Lang Hear Res*, 48(4), 766–779. [https://doi.org/10.1044/1092-4388\(2005/053\)](https://doi.org/10.1044/1092-4388(2005/053))
49. Merritt, B., & Bent, T. (2020). Perceptual Evaluation of Speech Naturalness in Speakers of Varying Gender Identities. *J Speech Lang Hear Res*, 63(7), 2054–2069. https://doi.org/10.1044/2020_JSLHR-19-00337
50. Mitchell, W. J., Szerszen, K. A., Lu, A. S., Schermerhorn, P. W., Scheutz, M., & Macdorman, K. F. (2011). A mismatch in the human realism of face and voice produces an uncanny valley. *I-Perception*, 2(1), 10–12. <https://doi.org/10.1068/i0415>
51. Moore, B. C. J., & Tan, C.-T. (2003). Perceived naturalness of spectrally distorted speech and music. *The Journal of the Acoustical Society of America*, 114(1), 408–419. <https://doi.org/10.1121/1.1577552>
52. Moya-Galé, G., Pagano, G., & Walsh, S. J. (2024). Perceptual consequences of online group speech treatment for individuals with Parkinson's disease: A pilot study case series. *International Journal of Speech-Language Pathology*, 1–16. <https://doi.org/10.1080/17549507.2024.2330538>
53. Nusbaum, H. C., Francis, A. L., & Henly, A. S. (1997). Measuring the naturalness of synthetic speech. *International Journal of Speech Technology*, 2(1), 7–19.
54. Nussbaum, C., Pöhlmann, M., Kreysa, H., & Schweinberger, S. R. (2023). Perceived naturalness of emotional voice morphs. *Cognition & Emotion*, 1–17. <https://doi.org/10.1080/02699931.2023.2200920>
55. Parmar, D., Olafsson, S., Utami, D., Murali, P., & Bickmore, T. (2022). Designing Empathic Virtual Agents: Manipulating Animation, Voice, Rendering, and Empathy to Create Persuasive Agents. *Autonomous Agents and Multi-Agent Systems*, 36(1). <https://doi.org/10.1007/s10458-021-09539-1>
56. Rao M V, A., Victory J, S., & Ghosh, P. K. (2018). Effect of source filter interaction on isolated vowel-consonant-vowel perception. *The Journal of the Acoustical Society of America*, 144(2), EL95. <https://doi.org/10.1121/1.5049510>
57. Ratcliff, A., Coughlin, S., & Lehman, M. (2002). Factors influencing ratings of speech naturalness in augmentative and alternative communication. *Augmentative and Alternative Communication*, 18(1), 11–19. <https://doi.org/10.1080/aac.18.1.11.19>

58. Rodero, E. (2017). Effectiveness, attention, and recall of human and artificial voices in an advertising story. Prosody influence and functions of voices. *Computers in Human Behavior*, 77, 336–346. <https://doi.org/10.1016/j.chb.2017.08.044>
59. Rodero, E., & Lucas, I. (2023). Synthetic versus human voices in audiobooks: The human emotional intimacy effect. *New Media & Society*, 25(7), 1746–1764. <https://doi.org/10.1177/14614448211024142>
60. Romportl, J. (2014). Speech Synthesis and Uncanny Valley. In A. Horák, P. Sojka, I. Kopeček, & K. Pala (Eds.), *Lecture Notes in Computer Science: Vol. 8655, Text, speech and dialogue* (pp. 595–602). Springer International Publishing. https://doi.org/10.1007/978-3-319-10816-2_72
61. Sarigul, B., & Urgan, B. A. (2023). Audio–Visual Predictive Processing in the Perception of Humans and Robots. *International Journal of Social Robotics*, 15(5), 855–865. <https://doi.org/10.1007/s12369-023-00990-6>
62. Schölderle, T., Haas, E., & Ziegler, W. (2023). Speech Naturalness in the Assessment of Childhood Dysarthria. *American Journal of Speech-Language Pathology*, 32(4), 1633–1643. https://doi.org/10.1044/2023_AJSLP-23-00023
63. Schreibelmayer, S., & Mara, M. (2022). Robot Voices in Daily Life: Vocal Human-Likeness and Application Context as Determinants of User Acceptance. *Frontiers in Psychology*, 13, 787499. <https://doi.org/10.3389/fpsyg.2022.787499>
64. Seaborn, K., Miyake, N. P., Pennefather, P., & Otake-Matsuura, M. (2021). Voice in Human–Agent Interaction. *ACM Computing Surveys*, 54(4), 1–43. <https://doi.org/10.1145/3386867>
65. Tamagawa, R., Watson, C. I., Kuo, I. H., MacDonald, B. A., & Broadbent, E. (2011). The Effects of Synthesized Voice Accents on User Perceptions of Robots. *International Journal of Social Robotics*, 3(3), 253–262. <https://doi.org/10.1007/s12369-011-0100-4>
66. Urakami, J., Sutthithatip, S., & Moore, B. A. (2020). The Effect of Naturalness of Voice and Empathic Responses on Enjoyment, Attitudes and Motivation for Interacting with a Voice User Interface. In M. Kurosu (Ed.), *Lecture Notes in Computer Science. Human-Computer Interaction. Multimodal and Natural Interaction* (Vol. 12182, pp. 244–259). Springer International Publishing. https://doi.org/10.1007/978-3-030-49062-1_17
67. van Prooije, T., Knuijt, S., Oostveen, J., Kapteijns, K., Vogel, A. P., & van de Warrenburg, B. (2023). Perceptual and Acoustic Analysis of Speech in Spinocerebellar ataxia Type 1. *Cerebellum* (London, England). Advance online publication. <https://doi.org/10.1007/s12311-023-01513-9>
68. Velner, E., Boersma, P. P., & Graaf, M. M. de (2020). Intonation in Robot Speech. In T. Belpaeme, J. Young, H. Gunes, & L. Riek (Eds.), *Proceedings of the 2020 ACM/IEEE International Conference on Human-Robot Interaction* (pp. 569–578). ACM. <https://doi.org/10.1145/3319502.3374801>
69. Venkatraman, A., & Sivasankar, M. P. (2018). Continuous Vocal Fry Simulated in Laboratory Subjects: A Preliminary Report on Voice Production and Listener Ratings. *American Journal of Speech-Language Pathology*, 27(4), 1539–1545. https://doi.org/10.1044/2018_AJSLP-17-0212
70. Vogel, A. P., Stoll, L. H., Oettinger, A., Rommel, N., Kraus, E.-M., Timmann, D., Scott, D., Atay, C., Storey, E., Schöls, L., & Synofzik, M. (2019). Speech treatment improves dysarthria in multisystemic ataxia: A rater-blinded, controlled pilot-study in ARSACS. *Journal of Neurology*, 266(5), 1260–1266. <https://doi.org/10.1007/s00415-019-09258-4>
71. Yamasaki, R., Montagnoli, A., Murano, E. Z., Gebirim, E., Hachiya, A., Lopes da Silva, J. V., Behlau, M., & Tsuji, D. (2017). Perturbation Measurements on the Degree of Naturalness of Synthesized Vowels. *Journal of Voice*, 31(3), 389.e1–389.e8. <https://doi.org/10.1016/j.jvoice.2016.09.020>

72. Yorkston, K. M., Hammen, V. L., Beukelman, D. R., & Traynor, C. D. (1990). The effect of rate control on the intelligibility and naturalness of dysarthric speech. *The Journal of Speech and Hearing Disorders*, 55(3), 550–560. <https://doi.org/10.1044/jshd.5503.550>