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Tone and intonation processing: from ambiguous acoustic signal to linguistic representation

Liu, M.

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References

- Altmann, G. T. M., & Kamide, Y. (1999). Incremental interpretation at verbs: Restricting the domain of subsequent reference. *Cognition: International Journal of Cognitive Science*, 73(3), 247-264.
[doi:http://dx.doi.org/10.1016/S0010-0277\(99\)00059-1](http://dx.doi.org/10.1016/S0010-0277(99)00059-1)
- Azizian, A., Freitas, A. L., Watson, T. D., & Squires, N. K. (2006). Electrophysiological correlates of categorization: P300 amplitude as index of target similarity. *Biological Psychology*, 71(3), 278-288.
[doi:http://dx.doi.org/10.1016/j.biopsych.2005.05.002](http://dx.doi.org/10.1016/j.biopsych.2005.05.002)
- Bai D. (1954). *Guanzhong fangyan diaocha baogao* [A report on Guanzhong dialect]. Beijing: Chinese Academy of Sciences. (in Chinese)
- Bates, D., Mächler, M., Bolker, B. M., & Walker, S. C. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, 67(1), 1-48. Retrieved from <https://CRAN.R-project.org/package=lme4>
- Beckman, M. E. (1996). The parsing of prosody. *Language and Cognitive Processes*, 11(1-2), 17-68. doi:10.1080/016909696387213
- Bishop, J. (2012). Information structural expectations in the perception of prosodic prominence. In G. Elordieta & P. Prieto (Eds.), *Prosody and meaning* (pp. 239-270). Berlin: De Gruyter Mouton.
- Boersma, P., & Weenink, D. (2015). Praat: Doing phonetics by computer (Version 5.4.2) [Computer program]. Retrieved from <http://www.praat.org/>
- Bogacz, R., Brown, E., Moehlis, J., & D.Cohen, J. (2006). The physics of optimal decision making: A formal analysis of models of performance in two-alternative forced-choice tasks. *Psychological Review*, 113(4), 700-765.
- Braun, B., & Johnson, E. K. (2011). Question or tone 2? How language experience and linguistic function guide pitch processing. *Journal of Phonetics*, 39(4), 585-594.
[doi:http://dx.doi.org/10.1016/j.wocn.2011.06.002](http://dx.doi.org/10.1016/j.wocn.2011.06.002)
- Buxó-Lugo, A., & Watson, D. G. (2016). Evidence for the influence of syntax on prosodic parsing. *Journal of Memory and Language*, 90, 1-13.
[doi:http://dx.doi.org/10.1016/j.jml.2016.03.001](http://dx.doi.org/10.1016/j.jml.2016.03.001)

- Cai, Q., & Brysbaert, M. (2010). SUBTLEX-CH: Chinese word and character frequencies based on film subtitles. *PLoS ONE*, 5(6), e10729. doi:10.1371/journal.pone.0010729
- Cao, J. (2004). Intonation structure of spoken Chinese: Universality and specificity. *Report of Phonetic Research*, 31-38.
- Chao, Y. R. (1929). Beiping yudiao de yanjiu [On intonation in Beijing Mandarin]. In Z. Wu & X. Zhao (Eds.), *Proceedings of Chao Yuen-Ren's linguistic papers* (pp. 253-271). Beijing: The Commerical Press. (in Chinese)
- Chao, Y. R. (1930). A system of tone letters. *Le Maître Phonétique*, 45, 24-27.
- Chao, Y. R. (1933). Tone and intonation in Chinese. *Bulletin of the Institute of History and Philology*, 4, 121-134.
- Chao, Y. R. (1968). *A grammar of spoken Chinese*. Berkeley: University of California Press.
- Chappell, H. (2001). *Sinitic Languages of China. Typological Descriptions*. Berlin, Boston: De Gruyter Mouton.
- Chen, H.-C., Vaid, J., & Wu, J.-T. (2009). Homophone density and phonological frequency in Chinese word recognition. *Language and Cognitive Processes*, 24(7-8), 967-982. doi:10.1080/01690960902804515
- Ching, Y. C. (1985). Lipreading Cantonese with voice pitch. *Journal of the Acoustical Society of America*, 77, S39-40.
- Christensen, R. H. B. (2015). Ordinal — Regression models for ordinal data. R package version 2015.6.28. Retrieved from <http://www.cran.r-project.org/package=ordinal/>.
- Cole, J., Mo, Y., & Hasegawa-Johnson, M. (2010). Signal-based and expectation-based factors in the perception of prosodic prominence. *Laboratory Phonology*, 1(2), 425-452. doi:10.1515/labphon.2010.022
- Coltheart, V., Avons, S. E., Masterson, J., & Laxon, V. J. (1991). The role of assembled phonology in reading comprehension. *Memory & Cognition*, 19, 387-400.
- Connell, B. A., Hogan, J. T., & Rozsypal, A. J. (1983). Experimental evidence of interaction between tone and intonation in Mandarin Chinese. *Journal of Phonetics*, 11(4), 337-351.

- Cooper, N., Cutler, A., & Wales, R. (2002). Constraints of lexical stress on lexical access in English: Evidence from native and non-native listeners. *Language and Speech*, 45(3), 207-228.
doi:10.1177/00238309020450030101
- Courchesne, E., Hillyard, S. A., & Courchesne, R. Y. (1977). P3 waves to the discrimination of targets in homogeneous and heterogeneous stimulus sequences. *Psychophysiology*, 14(6), 590-597.
- Cutler, A., & Chen, H.-C. (1995). *Phonological similarity effects in Cantonese word recognition*. Paper presented at the ICPhs, Stocklom, Sweden.
- Cutler, A., & Chen, H.-C. (1997). Lexical tone in Cantonese spoken-word processing. *Perception & Psychophysics*, 59(2), 165-179.
doi:10.3758/BF03211886
- Cutler, A., & Otake, T. (1999). Pitch accent in spoken-word recognition in Japanese. *Journal of the Acoustical Society of America*, 105, 1977-1988.
- Cutler, A., & Van Donselaar, W. (2001). Voornaam is not (really) a homophone: Lexical prosody and lexical access in Dutch. *Language and Speech*, 44(2), 171-195. doi:10.1177/00238309010440020301
- Cutler, A., Dahan, D., & van Donselaar, W. (1997). Prosody in the comprehension of spoken language: A literature review. *Language & Speech*, 40(2), 141-201. doi:10.1177/002383099704000203
- Czap, L., & Zhao, L. (2017). *Phonetic aspects of Chinese Shaanxi Xi'an dialect*. Paper presented at the 2017 8th IEEE International Conference on Cognitive Infocommunications (CogInfoCom).
- Da, J. (2004). A corpus-based study of character and bigram frequencies in Chinese e-texts and its implications for Chinese language instruction. In P. Zhang, T. Xie & J. Xu (Eds.), *Proceedings of 4th International Conference on New Technologies in Teaching and Learning Chinese* (pp. 501-511). Beijing: The Tsinghua University Press.
- Daneman, M., & Stainton, M. (1991). Phonological recoding in silent reading. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 17, 618-632.
- Daneman, M., Reingold, E. M., & Davidson, M. (1995). Time course of phonological activation during reading: Evidence from eye fixations.

- Journal of Experimental Psychology: Learning, Memory, and Cognition, 21(4),* 884-898. [doi:
http://dx.doi.org/10.1037/0278-7393.21.4.884](http://dx.doi.org/10.1037/0278-7393.21.4.884)
- DeLong, K. A., Urbach, T. P., & Kutas, M. (2005). Probabilistic word pre-activation during language comprehension inferred from electrical brain activity. *Nature Neuroscience, 8(8)*, 1117-1121.
[doi:
http://www.nature.com/neuro/journal/v8/n8/supplinfo/mn1504_S1.html](http://www.nature.com/neuro/journal/v8/n8/supplinfo/mn1504_S1.html)
- Dewaele, J.-M. (1999). Word order variation in interrogative structures of native and non-native French. *International Journal of Applied Linguistics, 123*, 161-180.
- Dijkstra, T., Grainger, J., & Van Heuven, W. J. B. (1999). Recognition of cognates and interlingual homographs: The neglected role of phonology. *Journal of Memory and Language, 41(4)*, 496-518.
[doi:
http://dx.doi.org/10.1006/jmla.1999.2654](http://dx.doi.org/10.1006/jmla.1999.2654)
- Doctor, E. A., & Klein, D. (1992). Phonological processing in bilingual word recognition. *Advances in Psychology, 83*, 237-252.
[doi:
http://dx.doi.org/10.1016/S0166-4115\(08\)61498-3](http://dx.doi.org/10.1016/S0166-4115(08)61498-3)
- Dornisch, E. (1998). *Multiple-wh-questions in Polish: The interactions between wh-phrases and clitics* (PhD dissertation). Cornell University.
- Dow, F. D. M. (1972). A discussion on tone sandhi problems in Chinese. *Journal of the International Phonetic Association, 2(1)*, 13-19.
[doi:
10.1017/S0025100300000396](https://doi.org/10.1017/S0025100300000396)
- Duanmu, S. (2007). *The phonology of Standard Chinese*. Oxford: OUP Oxford.
- Dufour, S., & Peereman, R. (2003). Lexical competition in phonological priming: Assessing the role of phonological match and mismatch lengths between primes and targets. *Memory & Cognition, 31(8)*, 1271-1283.
[doi:
10.3758/BF03195810](https://doi.org/10.3758/BF03195810)
- Durrell, M. (2011). *Hammer's German grammar and usage (5th Edition)*. Routledge, New York: McGraw-Hill.
- Ehrlich, S. F., & Rayner, K. (1981). Contextual effects on word perception and eye movements during reading. *Journal of Verbal Learning and Verbal Behavior, 20(6)*, 641-655. [doi:
https://doi.org/10.1016/S0022-5371\(81\)90220-6](https://doi.org/10.1016/S0022-5371(81)90220-6)

- Federmeier, K. D. (2007). Thinking ahead: The role and roots of prediction in language comprehension. *Psychophysiology*, 44(4), 491-505.
 doi:10.1111/j.1469-8986.2007.00531.x
- Federmeier, K. D., & Kutas, M. (1999). Right words and left words: Electrophysiological evidence for hemispheric differences in meaning processing. *Cognitive Brain Research*, 8(3), 373-392.
[doi:http://dx.doi.org/10.1016/S0926-6410\(99\)00036-1](http://dx.doi.org/10.1016/S0926-6410(99)00036-1)
- Ferrand, L., & Grainger, J. (2003). Homophone interference effects in visual word recognition. *The Quarterly Journal of Experimental Psychology*, 56(3), 403-419. doi:10.1080/02724980244000422
- Fok-Chan, Y.-Y. (1974). *A perceptual study of tones in Cantonese*. Hong Kong: University of Hong Kong Press.
- Fox, R. A., & Unkefer, J. (1985). The effect of lexical status on the perception of tone. *Journal of Chinese Linguistics*, 13, 69-90.
- Francis, A. L., Ciocca, V., Ma, L., & Fenn, K. (2008). Perceptual learning of Cantonese lexical tones by tone and non-tone language speakers. *Journal of Phonetics*, 36(2), 268-294.
[doi:http://dx.doi.org/10.1016/j.wocn.2007.06.005](http://dx.doi.org/10.1016/j.wocn.2007.06.005)
- Frank, S. L. (2013). Uncertainty reduction as a measure of cognitive load in sentence comprehension. *Topics in Cognitive Science*, 5(3), 475-494.
 doi:10.1111/tops.12025
- Frenck-Mestre, C., Meunier, C., Espesser, R., Daffner, K., & Holcomb, P. (2005). Perceiving nonnative vowels: The effect of context on perception as evidenced by event-related brain potentials. *Journal of Speech, Language and Hearing Research*, 48, 1496-1510.
- Friederici, A. D. (2002). Towards a neural basis of auditory sentence processing. *TRENDS in Cognitive Sciences*, 6(2), 78-84.
- Fritz, J. B., Elhilali, M., David, S. V., & Shamma, S. A. (2007). Auditory attention — Focusing the searchlight on sound. *Current Opinion in Neurobiology*, 17(4), 437-455.
[doi:http://dx.doi.org/10.1016/j.conb.2007.07.011](http://dx.doi.org/10.1016/j.conb.2007.07.011)
- Gandour, J. T. (1983). Tone perception in Far Eastern languages. *Journal of Phonetics*, 11, 149-175.

- Gandour, J. T. (1984). Tone dissimilarity judgments by Chinese listeners. *Journal of Chinese Linguistics, 12*(2), 235-261.
- Gandour, J. T., & Harshman, R. A. (1978). Crosslanguage differences in tone perception: A multidimensional scaling investigation. *Language and Speech, 21*(1), 1-33. doi:10.1177/002383097802100101
- Gandour, J., Ponglarpisit, S., Khunadorn, F., Dechongkit, S., Boongird, P., Boonklam, R., & Potisuk, S. (1992). Lexical tones in Thai after unilateral brain damage. *Brain and Language, 43*(2), 275-307.
doi:[http://dx.doi.org/10.1016/0093-934X\(92\)90131-W](http://dx.doi.org/10.1016/0093-934X(92)90131-W)
- Gårding, E. (1987). Speech act and tonal pattern in Standard Chinese: Constancy and variation. *Phonetica: International Journal of Speech Science, 44*(1), 13-29. Retrieved from
<http://www.karger.com/DOI/10.1159/000261776>
- Garellek, M., Keating, P., Esposito, C. M., & Kreiman, J. (2013). Voice quality and tone identification in White Hmong. *The Journal of the Acoustical Society of America, 133*(2), 1078-1089. doi:<http://dx.doi.org/10.1121/1.4773259>
- Grosjean, F. (1988). Exploring the recognition of guest words in bilingual speech. *Language and Cognitive Processes, 3*(3), 233-274.
doi:10.1080/01690968808402089
- Grosjean, F. (1997). Processing mixed language: Issues, findings and models. In A. M. B. d. Groot & J. F. Kroll (Eds.), *Tutorials in bilingualism: Psycholinguistic perspectives*. Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.
- Gussenhoven, C. (2004). *The phonology of tone and intonation*. Cambridge: Cambridge University Press.
- Gussenhoven, C., & Chen, A. (2000). Universal and language-specific effects in the perception of question intonation. In: *Proceedings of the 6th International Conference on Spoken Language Processing (ICSLP 2000)*, 91-94.
- Haigh, C. A., & Jared, D. (2007). The activation of phonological representations by bilinguals while reading silently: Evidence from interlingual homophones. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 33*(4), 623-644.

- Hale, J. (2001). *A probabilistic earley parser as a psycholinguistic model*. Paper presented at the NAACL, Pittsburgh, Pennsylvania.
- Hao, Y.-C. (2012). Second language acquisition of Mandarin Chinese tones by tonal and non-tonal language speakers. *Journal of Phonetics*, 40(2), 269-279. doi:10.1016/j.wocn.2011.11.001
- Hashimoto, A. O.-k. Y. (1972). *Phonology of Cantonese*. Cambridge: Cambridge University Press.
- Hillyard, S. A., Hink, R. F., Schwent, V. L., & Picton, T. W. (1973). Electrical signs of selective attention in the human brain. *Science*, 182, 177-180.
- Ho, A. T. (1977). Intonation variation in a Mandarin sentence for three expressions: Interrogative, exclamatory and declarative. *Phonetica*, 34(6), 446-457. Retrieved from <http://www.karger.com/DOI/10.1159/000259916>
- Howie, J. M. (1976). *Acoustical studies of Mandarin vowels and tones*. Cambridge: Cambridge University Press.
- Hu, M. (1987). *Guanyu Beijinghua de yudiao wenti* [On the intonation of Beijing Mandarin]. Beijing: The Commerical Press. (in Chinese)
- Huang, T. (2007). *Perception of Mandarin tones by Chinese- and English-speaking listeners*. Paper presented at the the 16th International Congress of Phonetic Sciences, Saarbrücken, Germany.
- Isel, F., Alter, K., & Friederici, A. D. (2005). Influence of prosodic information on the processing of split particles: ERP evidence from spoken German. *Journal of Cognitive Neuroscience*, 17(1), 154-167.
- Isreal, J. B., Chesney, G. L., Wickens, C. D., & Donchin, E. (1980). P300 and tracking difficulty: Evidence for multiple resources in dual-task performance. *Psychophysiology*, 17(3), 259-273. doi:10.1111/j.1469-8986.1980.tb00146.x
- Jared, D., & Kroll, J. F. (2001). Do bilinguals activate phonological representations in one or both of their languages when naming words? *Journal of Memory and Language*, 44(1), 2-31. doi:<http://dx.doi.org/10.1006/jmla.2000.2747>
- Jared, D., Levy, B. A., & Rayner, K. (1999). The role of phonology in the activation of word meanings during reading: Evidence from

- proofreading and eye movements. *Journal of Experimental Psychology: General*, 128(3), 219-264. doi:10.1037/0096-3445.128.3.219
- Johnson, R. (1984). P300: A model of the variables controlling its amplitude. *Annals of the New York Academy of Sciences*, 425, 223-229.
doi:10.1111/j.1749-6632.1984.tb23538.x
- Johnson, R. (1986). A triarchic model of P300 amplitude. *Psychophysiology*, 23(4), 367-384. doi:10.1111/j.1469-8986.1986.tb00649.x
- Johnson, R., & Donchin, E. (1980). P300 and stimulus categorization: Two plus one is not so different from one plus one. *Psychophysiology*, 17(2), 167-178.
- Klein, D., Zatorre, R. J., Milner, B., & Zhao, V. (2001). A cross-linguistic PET study of tone perception in Mandarin Chinese and English speakers. *NeuroImage*, 13(4), 646-653.
doi:<http://dx.doi.org/10.1006/nimg.2000.0738>
- Kok, A. (2001). On the utility of P3 amplitude as a measure of processing capacity. *Psychophysiology*, 38(3), 557-577.
doi:10.1017/S0048577201990559
- Kotchoubey, B., & Lang, S. (2001). Event-related potentials in an auditory semantic oddball task in humans. *Neuroscience Letters*, 310, 93-96.
- Koutsoudas, A. (1968). On wh-words in English. *Journal of Linguistics*, 4(2), 267-273. [doi:<https://doi.org/10.1017/S002226700001912>](https://doi.org/10.1017/S002226700001912)
- Kratochvil, P. (1998). Intonation in Beijing Chinese. In D. Hirst & A. D. Cristo (Eds.), *Intonation systems: A survey of twenty languages* (pp. 417-431). Cambridge: Cambridge University Press.
- Kung, C., Chwilla, D. J., & Schriefers, H. (2014). The interaction of lexical tone, intonation and semantic context in on-line spoken word recognition: An ERP study on Cantonese Chinese. *Neuropsychologia*, 53, 293-309.
doi:<http://dx.doi.org/10.1016/j.neuropsychologia.2013.11.020>
- Kuong, I.-K. J. (2008). *Yes/no question particles revisited: The grammatical functions of mo4, me1, and maa3*. Paper presented at the Proceedings of the 20th North American Conference on Chinese Linguistics (NACCL-20), Ohio.
- Kuperberg, G. R., & Jaeger, T. F. (2016). What do we mean by prediction in language comprehension? *Language, Cognition and Neuroscience*, 31(1), 32-59.
doi:10.1080/23273798.2015.1102299

- Kutas, M., & Hillyard, S. A. (1984). Brain potentials during reading reflect word expectancy and semantic association. *Nature*, 307, 161. doi:10.1038/307161a0
- Kutas, M., DeLong, K. A., & Smith, N. J. (2011). A look around at what lies ahead: Prediction and predictability in language processing. In M. Bar (Ed.), *Predictions in the brain: Using our past to generate a future* (pp. 190-207): Oxford Scholarship Online.
- Kutas, M., McCarthy, G., & Donchin, E. (1977). Augmenting mental chronometry: The P300 as a measure of stimulus evaluation time. *Science*, 197, 792-795.
- Ladd, D. R. (2008). *Intonational phonology*. Cambridge: Cambridge University Press.
- Lagrou, E., Hartsuiker, R. J., & Duyck, W. (2011). Knowledge of a second language influences auditory word recognition in the native language. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 37(4), 952-965. doi:10.1037/a0023217
- Lam, A. (2005). Language learning in China: The experience of four learners. *Reflections on English Language Teaching*, 4, 1-14.
- Lee, C.-Y. (2007). Does horse activate mother? Processing lexical tone in form priming. *Language & Speech*, 50(1), 101-123. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=ufh&AN=24655341&site=ehost-live>
- Lemhöfer, K., & Dijkstra, T. (2004). Recognizing cognates and interlingual homographs: Effects of code similarity in language-specific and generalized lexical decision. *Memory & Cognition*, 32(4), 533-550. doi:10.3758/BF03195845
- Lenth, R. V. (2016). Least-squares means: The R package lsmeans. *Journal of Statistical Software*, 69(1), 33. doi:10.18637/jss.v069.i01
- Levy, R. (2008). Expectation-based syntactic comprehension. *Cognition: International Journal of Cognitive Science*, 106(3), 1126-1177. doi:<https://doi.org/10.1016/j.cognition.2007.05.006>
- Li, C. N., & Thompson, S. A. (1981). *Mandarin Chinese: A functional reference grammar*. Berkeley: University of California Press.

- Li, D. C. S., & Lee, S. (2005). Bilingualism in East Asia. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism* (pp. 742-779). Malden, MA: Blackwell.
- Li, P. (2001). Xi'anhua yu Putonghua de yuyin duiyin guilv [The correspondence pattern between Xi'an dialect and Putonghua in production]. *Journal of Xi'an Educational College*, 16(2), 57-61. (in Chinese)
- Li, R., & Stephen, W. (1987). *Language atlas of China*. Hong Kong: Longman.
- Li, X., Chen, Y., & Yang, Y. (2011). Immediate integration of different types of prosodic information during on-line spoken language comprehension: An ERP study. *Brain Research*, 1386, 139-152.
doi:<http://dx.doi.org/10.1016/j.brainres.2011.02.051>
- Liang, J., & Van Heuven, V. J. (2007). Chinese tone and intonation perceived by L1 and L2 listeners. In C. Gussenhoven & T. Riad (Eds.), *Tones and tunes: Experimental studies in word and sentence prosody* (Vol. 12-2, pp. 27-61). Berlin/New York: Mouton de Gruyter.
- Liu, F., & Xu, Y. (2005). Parallel encoding of focus and interrogative meaning in Mandarin intonation. *Phonetica*, 62(2-4), 70-87. Retrieved from <http://www.karger.com/DOI/10.1159/000090090>
- Liu, M., Chen, Y., & Schiller, N. O. (2016a). Context effects on tone and intonation processing in Mandarin. In: *Proceedings of Speech Prosody 2016*, 1056-1060. doi:10.21437/SpeechProsody.2016-217
- Liu, M., Chen, Y., & Schiller, N. O. (2016b). Online processing of tone and intonation in Mandarin: Evidence from ERPs. *Neuropsychologia*, 91, 307-317. doi:<http://dx.doi.org/10.1016/j.neuropsychologia.2016.08.025>
- Liu, S., & Samuel, A. G. (2004). Perception of Mandarin lexical tones when F0 information is neutralized. *Language and Speech*, 47(2), 109-138.
doi:10.1177/00238309040470020101
- Luce, P. A., & Pisoni, D. B. (1998). Recognizing spoken words: The neighborhood activation model. *Ear and hearing*, 19(1), 1-36.
- Luck, S. J. (2005). *An introduction to the event-related potential technique*. Cambridge, MA: MIT Press.
- Luo C., & Wang J. (1981). *Putong yu yanxue gangyao* [An introduction to general linguistics]. Beijing: The Commercial Press. (in Chinese)

- Luo, C. R., Johnson, R. A., & Gallo, D. A. (1998). Automatic activation of phonological information in reading: Evidence from the semantic relatedness decision task. *Memory & Cognition*, 26(4), 833-843.
doi:10.3758/BF03211402
- Ma, J. K.-Y., Ciocca, V., & Whitehill, T. L. (2006). Effect of intonation on Cantonese lexical tones. *The Journal of the Acoustical Society of America*, 120(6), 3978-3987. doi:<http://dx.doi.org/10.1121/1.2363927>
- Ma, J. K., Ciocca, V., & Whitehill, T. L. (2011). The perception of intonation questions and statements in Cantonese. *Journal of the Acoustical Society of America*, 129(2), 1012-1023. doi:10.1121/1.3531840
- Ma, M. (2005). Shaanxi Xi'an fangyan danziyin shengdiao shengxue shiyan yanjiu [Acoustic study of the tones of Xi'an dialect]. *Journal of Yan'an University (Social Science)*, 27(4), 110-112. (in Chinese)
- Malins, J. G., & Joanisse, M. F. (2010). The roles of tonal and segmental information in Mandarin spoken word recognition: An eyetracking study. *Journal of Memory and Language*, 62(4), 407-420.
doi:10.1016/j.jml.2010.02.004
- Marian, V., & Spivey, M. (2003). Competing activation in bilingual language processing: Within- and between-language competition. *Bilingualism: Language and Cognition*, 6(2), 97-115. doi:10.1017/S1366728903001068
- Marian, V., Blumenfeld, H. K., & Boukrina, O. V. (2008). Sensitivity to phonological similarity within and across Languages. *Journal of Psycholinguistic Research*, 37(3), 141-170. doi:10.1007/s10936-007-9064-9
- Marian, V., Blumenfeld, H. K., & Kaushanskaya, M. (2007). The Language Experience and Proficiency Questionnaire (LEAP-Q): Assessing language profiles in bilinguals and multilinguals. *Journal of Speech, Language, and Hearing Research*, 50, 940-967. doi:10.1044/1092-4388(2007/067)
- Marslen-Wilson, W. D. (1987). Functional parallelism in spoken word-recognition. *Cognition: International Journal of Cognitive Science*, 25(1), 71-102.
[doi:\[https://doi.org/10.1016/0010-0277\\(87\\)90005-9\]\(https://doi.org/10.1016/0010-0277\(87\)90005-9\)](https://doi.org/10.1016/0010-0277(87)90005-9)
- McClelland, J. L., & Elman, J. L. (1986). The TRACE model of speech perception. *Cognitive Psychology*, 18(1), 1-86.
doi:[http://dx.doi.org/10.1016/0010-0285\(86\)90015-0](http://dx.doi.org/10.1016/0010-0285(86)90015-0)

- Mirman, D. (2008). Mechanisms of semantic ambiguity resolution: Insights from speech perception. *Research on Language and Computation*, 6(3), 293-309. doi:10.1007/s11168-008-9055-5
- Mirman, D. (2016). *Growth curve analysis and visualization using R*. Boca Raton: CRC.
- Morton, E. S. (1994). Sound symbolism and its role in non-human vertebrate communication. In L. Hinton, J. Nichols, & J. J. Ohala (Eds.), *Sound symbolism* (pp. 348–365). Cambridge: Cambridge University Press.
- Näätänen, R. (2001). The perception of speech sounds by the human brain as reflected by the mismatch negativity (MMN) and its magnetic equivalent (MMNm). *Psychophysiology*, 38(1), 1-21.
- Nas, G. (1983). Visual word recognition in bilinguals: Evidence for a cooperation between visual and sound based codes during access to a common lexical store. *Journal of Verbal Learning and Verbal Behavior*, 22(5), 526-534. doi:[https://doi.org/10.1016/S0022-5371\(83\)90319-5](https://doi.org/10.1016/S0022-5371(83)90319-5)
- Newman, S. D. (2012). The homophone effect during visual word recognition in children: An fMRI study. *Psychological Research*, 76(3), 280-291. doi:10.1007/s00426-011-0347-2
- Nieuwenhuis, S., Aston-Jones, G., & Cohen, J. D. (2005). Decision making, the P3, and the locus coeruleus-norepinephrine system. *Psychological Bulletin*, 131(4), 510-532. doi:10.1037/0033-2909.131.4.510
- Nolan, F. (2006). Intonation. In B. Aarts & A. McMahon (Eds.), *The handbook of English linguistics* (pp. 433-457). Malden, USA: Blackwell Publishing.
- Norris, D. (1994). Shortlist: A connectionist model of continuous speech recognition. *Cognition: International Journal of Cognitive Science*, 52(3), 189-234. doi:[http://dx.doi.org/10.1016/0010-0277\(94\)90043-4](http://dx.doi.org/10.1016/0010-0277(94)90043-4)
- Ohala, J. J. (1983). Cross-language use of pitch: An ethological view. *Phonetica*, 40(1), 1-18. Retrieved from <http://www.karger.com/DOI/10.1159/000261678>
- Ota, M., Hartsuiker, R. J., & Haywood, S. L. (2009). The KEY to the ROCK: Near-homophony in nonnative visual word recognition. *Cognition: International Journal of Cognitive Science*, 111(2), 263-269. doi:<https://doi.org/10.1016/j.cognition.2008.12.007>

- Patel, S. H., & Azzam, P. N. (2005). Characterization of N200 and P300: Selected studies of the event-related potential. *International Journal of Medical Sciences*, 2(4), 147-154. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1252727/>
- Patro, C., & Mendel, L. L. (2016). Role of contextual cues on the perception of spectrally reduced interrupted speech. *The Journal of the Acoustical Society of America*, 140(2), 1336-1345.
[doi:doi:<http://dx.doi.org/10.1121/1.4961450>](doi:doi:http://dx.doi.org/10.1121/1.4961450)
- Peking University (1989). *Hanyu fangyin zihui (second version)* [A dictionary of pronunciations of characters in Chinese dialects]. Beijing: Wenzi Gaige Chubanshe. (in Chinese)
- Peng , S.-h., Chan , M. K. M., Tseng , C.-y., Huang , T., Lee , O. J., & Beckman , M. E. (2005). Towards a pan-Mandarin system for prosodic transcription. In S.-A. Jun (Ed.), *Prosodic typology: The phonology of intonation and phrasing* (pp. 230-270). Oxford: Oxford University Press.
- Peters, B., & Pfitzinger, H. R. (2008). Duration and F0 interval of utterance-final intonation contours in the perception of German sentence modality. In: *Proceedings of INTERSPEECH 2008*, 65-68.
- Pexman, P. M., Lupker, S. J., & Jared, D. (2001). Homophone effects in lexical decision. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 27(1), 139-156. doi:10.1037/0278-7393.27.1.139
- Pfefferbaum, A., Ford, J., Johnson, R., Wenegrat, B., & Kopell, B. S. (1983). Manipulation of P3 latency: Speed vs. accuracy instructions. *Electroencephalography and Clinical Neurophysiology*, 55, 188-197.
- Polich, J. (2007). Updating P300: An integrative theory of P3a and P3b. *Clinical Neurophysiology*, 18(10), 2128-2148.
[doi:<http://dx.doi.org/10.1016/j.clinph.2007.04.019>](doi:doi:http://dx.doi.org/10.1016/j.clinph.2007.04.019)
- Pulvermüller, F., & Shtyrov, Y. (2006). Language outside the focus of attention: The mismatch negativity as a tool for studying higher cognitive processes. *Progress in Neurobiology*, 79(1), 49-71.
[doi:<http://dx.doi.org/10.1016/j.pneurobio.2006.04.004>](doi:10.1016/j.pneurobio.2006.04.004)
- Quirk, R., Greenbaum, S., & Leech, G. (1972). *A grammar of contemporary English*. London UK: Longman.

- R Core Team (2015). R: A language and environment for statistical computing. In R *Foundation for Statistical Computing*. Vienna, Austria. Retrieved from <http://www.R-project.org/>
- Radeau, M., Morais, J., & Dewier, A. (1989). Phonological priming in spoken word recognition: Task effects. *Memory & Cognition*, 17(5), 525-535. doi:10.3758/BF03197074
- Ren, G., Tang, Y., Li, X., & Sui, X. (2013). Pre-attentive processing of Mandarin tone and intonation: Evidence from event-related potentials. In F. Signorelli & D. Chirchiglia (Eds.), *Functional brain mapping and the endeavor to understand the working brain* (pp. 95-108): InTech.
- Ren, G., Yang, Y., & Li, X. (2009). Early cortical processing of linguistic pitch patterns as revealed by the mismatch negativity. *Neuroscience*, 162(1), 87-95. doi:10.1016/j.neuroscience.2009.04.021
- Ren, J. (2012). *Jiyu EGG de Guangzhou/Jixi/Xi'an fangyan shengdiao shixian yanjiu* [Investigations of Guangzhou, Jixi and Xi'an tones based on EGG] (M.A thesis). Nanjing Normal University. (in Chinese)
- Rohrbaugh, J., Donchin, E., & Eriksen, C. (1974). Decision making and the P300 component of the cortical evoked response. *Perception & Psychophysics*, 15, 368-374.
- Rojina, N. (2004). The acquisition of wh-questions in Russian. *Nordlyd: Tromsø University Working Papers on Language & Linguistics*, 32(1), 68-87. doi:<http://dx.doi.org/10.7557/12.59>
- Rose, P. (1987). Considerations in the normalisation of the fundamental frequency of linguistic tone. *Speech Communication*, 6(4), 343-352. doi:[http://dx.doi.org/10.1016/0167-6393\(87\)90009-4](http://dx.doi.org/10.1016/0167-6393(87)90009-4)
- Salisbury, D. F., Rutherford, B., Shenton, M. E., & McCarley, R. W. (2001). Button-pressing affects P300 amplitude and scalp topography. *Clinical Neurophysiology*, 112(9), 1676-1684.
- Schirmer, A., Tang, S.-L., Penney, T. B., Gunter, T. C., & Chen, H.-C. (2005). Brain responses to segmentally and tonally induced semantic violations in Cantonese. *Journal of Cognitive Neuroscience*, 17(1), 1-12. doi:10.1162/0898929052880057

- Schneider, K., Dogil, G., & Möbius, B. (2011). *Reaction time and decision difficulty in the perception of intonation*. Paper presented at the Proceedings of Interspeech 2011, Florence, Italy.
- Schulpen, B., Dijkstra, T., Schriefers, H. J., & Hasper, M. (2003). Recognition of interlingual homophones in bilingual auditory word recognition. *Journal of Experimental Psychology: Human Perception and Performance*, 29(6), 1155-1178. doi:10.1037/0096-1523.29.6.1155
- Sereno, J. A., & Lee, H. (2015). The contribution of segmental and tonal information in Mandarin spoken word processing. *Language & Speech*, 58(2), 131-151. doi:10.1177/0023830914522956
- Shannon, C. E. (1948). A mathematical theory of communication. *Bell System Technical Journal*, 27(4), 623-656. doi:10.1002/j.1538-7305.1948.tb00917.x
- Sheldon, S., Pichora-Fuller, M. K., & Schneider, B. A. (2008). Priming and sentence context support listening to noise-vocoded speech by younger and older adults. *The Journal of the Acoustical Society of America*, 123(1), 489-499. [doi:doi:<http://dx.doi.org/10.1121/1.2783762>](http://dx.doi.org/10.1121/1.2783762)
- Shen, J. (1985). Beijinghua shengdiao de yinyu he yudiao [The tonal range and intonation in Mandarin]. In T. Lin & L. Wang (Eds.), *Experimental analyses on Beijing Mandarin* (pp. 73-125). Beijing: Peking University Press. (in Chinese)
- Shen, X. S. (1989). *The prosody of Mandarin Chinese* (Vol. 118). Berkeley, Los Angeles and California: University of California Press.
- Shi, P. (1980). Sizhong juzi de yudiao bianhua [Intonation variations in four sentence types]. *Language Teaching and Linguistic Studies*(2), 71-81. (in Chinese)
- Shih, C. (2000). A declination model of Mandarin Chinese. In A. Botinis (Ed.), *Intonation: Analysis, modelling and technology* (pp. 243-268). Dordrecht: Springer.
- Simpson, G. B. (1984). Lexical ambiguity and its role in models of word recognition. *Psychological Bulletin*, 96(2), 316-340.
[doi:<http://dx.doi.org/10.1037/0033-2909.96.2.316>](http://dx.doi.org/10.1037/0033-2909.96.2.316)

- Slowiaczek, L. M., & Hamburger, M. (1992). Prelexical facilitation and lexical interference in auditory word recognition. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 18*(6), 1239-1250.
- Smith, D. B. D., Donchin, E., Cohen, L., & Starr, A. (1970). Auditory averaged evoked potentials in man during selective binaural listening. *Electroencephalography and Clinical Neurophysiology, 28*(2), 146-152.
[doi:http://dx.doi.org/10.1016/0013-4694\(70\)90182-3](http://dx.doi.org/10.1016/0013-4694(70)90182-3)
- So, C. K., & Best, C. T. (2010). Cross-language perception of non-native tonal contrasts: Effects of native phonological and phonetic influences. *Language & Speech, 53*(2), 273-293. doi:10.1177/0023830909357156
- Speer, S., & Blodgett, A. (2006). Prosody. In M. J. Traxler & M. A. Gernsbacher (Eds.), *Handbook of psycholinguistics (2nd Edition)* (pp. 505-537): Academic Press.
- Spivey, M. J., & Marian, V. (1999). Cross talk between native and second languages: Partial activation of an irrelevant lexicon. *Psychological Science, 10*(3), 281-284. doi:10.1111/1467-9280.00151
- Sun L. (2007). *Xi'an fangyan yanjiu* [A study on Xi'an dialect]. Xi'an: Xi'an Publishing House. (in Chinese)
- Taft, M., & Chen, H.-C. (1992). Judging homophony in Chinese: The influence of tones. In H.-C. Chen & O. J. L. Tzeng (Eds.), *Advances in Psychology* (Vol. 90, pp. 151-172): North-Holland.
- Tseng, C.-y., & Su, C.-y. (2014). From ripples to waves, tides and beyond. In C.-T. J. Huang & F.-h. Liu (Eds.), *Peaches and plums* (pp. 257-278). Taipei, Taiwan: Institute of Linguistics, Academia Sinica.
- Tsuchihashi, M. (1983). The speech act continuum: An investigation of Japanese sentence final particles. *Journal of Pragmatics, 7*(4), 361-387.
[doi:http://dx.doi.org/10.1016/0378-2166\(83\)90024-3](http://dx.doi.org/10.1016/0378-2166(83)90024-3)
- Ultan, R. (1978). Interrogative systems. In J. H. Greenberg (Ed.), *Universals of human language* (Vol. 4, pp. 211-248). Stanford: Stanford University Press.
- Unsworth, S. J., & Pexman, P. M. (2003). The impact of reader skill on phonological processing in visual word recognition. *The Quarterly Journal of Experimental Psychology Section A, 56*(1), 63-81.
[doi:10.1080/02724980244000206](http://dx.doi.org/10.1080/02724980244000206)

- Vaissière, J. (2008). Perception of intonation. In D. B. Pisoni & R. E. Remez (Eds.), *The handbook of speech perception* (pp. 236-263). Oxford, UK: Blackwell Publishing Ltd.
- Van Berkum, J. J. A., Brown, C. M., Zwitserlood, P., Kooijman, V., & Hagoort, P. (2005). Anticipating upcoming words in discourse: Evidence from ERPs and reading times. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 31*(3), 443-467. [doi:http://dx.doi.org/10.1037/0278-7393.31.3.443](http://dx.doi.org/10.1037/0278-7393.31.3.443)
- Van Lancker, D., & Fromkin, V. A. (1973). Hemispheric specialization for pitch and "tone": Evidence from Thai. *Journal of Phonetics, 1*, 101-109.
- Van Orden, G. C. (1987). A ROWS is a ROSE: Spelling, sound, and reading. *Memory & Cognition, 15*(3), 181-198. doi:10.3758/BF03197716
- Van Petten, C., & Luka, B. J. (2012). Prediction during language comprehension: Benefits, costs, and ERP components. *International Journal of Psychophysiology, 83*(2), 176-190. [doi:http://dx.doi.org/10.1016/j.ijpsycho.2011.09.015](http://dx.doi.org/10.1016/j.ijpsycho.2011.09.015)
- Van Petten, C., Coulson, S., Rubin, S., Plante, E., & Parks, M. (1999). Time course of word identification and semantic integration in spoken language. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 25*(2), 394-417. [doi:http://dx.doi.org/10.1037/0278-7393.25.2.394](http://dx.doi.org/10.1037/0278-7393.25.2.394)
- Verleger, R., Gasser, T., & Möcks, J. (1985). Short term changes of event related potentials during concept learning. *Biological Psychology, 20*(1), 1-16. doi:http://dx.doi.org/10.1016/0301-0511(85)90036-5
- Verleger, R., Jaśkowski, P., & Wascher, E. (2005). Evidence for an integrative role of P3b in linking reaction to perception. *Journal of Psychophysiology, 19*(3), 165-181. doi:10.1027/0269-8803.19.3.165
- Wagner, M., & Watson, D. G. (2010). Experimental and theoretical advances in prosody: A review. *Language and Cognitive Processes, 25*(7-9), 905-945. doi:10.1080/01690961003589492
- Wang J. (1996). *Xi'an fangyan cidian* [A dictionary of Xi'an dialect]. Nanjing: Phoenix Publishing & Media Network. (in Chinese)
- Wang, Y., Sereno, J. A., Jongman, A., & Hirsch, J. (2003). fMRI evidence for cortical modification during learning of Mandarin lexical tone. *Journal of*

- Cognitive Neuroscience*, 15(7), 1019-1027.
doi:10.1162/089892903770007407
- Weber, A., & Cutler, A. (2004). Lexical competition in non-native spoken-word recognition. *Journal of Memory and Language*, 50(1), 1-25.
doi:[https://doi.org/10.1016/S0749-596X\(03\)00105-0](https://doi.org/10.1016/S0749-596X(03)00105-0)
- Whalen, D. H., & Xu, Y. (1992). Information for Mandarin tones in the amplitude contour and in brief segments. *Phonetica: International Journal of Speech Science*, 49, 25-47.
- White, C. M. (1980). *Mandarin tone and English intonation: A contrastive analysis* (M.A thesis). University of Arizona. Retrieved from
<http://hdl.handle.net/10150/557400>
- Wicha, N. Y. Y., Bates, E. A., Moreno, E. M., & Kutas, M. (2003). Potato not Pope: Human brain potentials to gender expectation and agreement in Spanish spoken sentences. *Neuroscience Letters*, 346(3), 165-168.
- Wiener, S., & Ito, K. (2014). Do syllable-specific tonal probabilities guide lexical access? Evidence from Mandarin, Shanghai and Cantonese speakers. *Language, Cognition and Neuroscience*, 1-13.
doi:10.1080/23273798.2014.946934
- Wong, K. F., & Xiao, Y. (2010). Diversity and difference: Identity issues of Chinese heritage language learners from dialect backgrounds. *Heritage Language Journal*, 7(2), 152-187.
- Wu, J. (2015). *Tonal bilingualism: The case of two closely related Chinese dialects* (PhD dissertation). Leiden University.
- Wu, Z. (1982). Putonghua yuju zhong de shengdiao bianhua [Tonal changes in Mandarin discourses]. *Zhongguo Yuwen*, 171(6), 439-449. (in Chinese)
- Wu, Z. (1996). A new method of intonation analysis for Standard Chinese: Frequency transposition processing of phrasal contours in a sentence. In F. G. e. al. (Ed.), *Analysis, perception and processing of spoken language*. Amsterdam: Elsevier Science B.V.
- Xu, B., & Mok, P. (2012a). *Cross-linguistic perception of intonation by Mandarin and Cantonese listeners*. Paper presented at the Speech Prosody 2012, Shanghai, China.

- Xu, B., & Mok, P. (2012b). *Intonation perception of low-pass filtered speech in Mandarin and Cantonese*. Paper presented at the The Third International Symposium on Tonal Aspect of Languages, Nanjing, China.
- Xu, B., & Mok, P. (2014). Cross-linguistic perception of Mandarin intonation. In: *Proceedings of Speech Prosody 2014*, 638-642.
- Xu, Y. (2004). Separation of functional components of tone and intonation from observed F0 patterns. In G. Fant, H. Fujisaki, J. Cao, & Y. Xu. (Eds.), *From traditional phonology to modern speech processing: Festschrift for Professor Wu Zongji's 95th birthday*. (pp. 483-505). Beijing: Foreign Language Teaching and Research Press.
- Xu, Y. (2005). Speech melody as articulatorily implemented communicative functions. *Speech Communication*, 46(3-4), 220-251.
[doi:http://dx.doi.org/10.1016/j.specom.2005.02.014](http://dx.doi.org/10.1016/j.specom.2005.02.014)
- Xu, Y. (2009). Timing and coordination in tone and intonation — An articulatory-functional perspective. *Lingua: International Review of General Linguistics*, 119(6), 906-927.
[doi:http://dx.doi.org/10.1016/j.lingua.2007.09.015](http://dx.doi.org/10.1016/j.lingua.2007.09.015)
- Xu, Y., & Wang, Q. E. (2001). Pitch targets and their realization: Evidence from Mandarin Chinese. *Speech Communication*, 33(4), 319-337.
doi:10.1016/s0167-6393(00)00063-7
- Yang, R.-X. (2011). *The phonation factor in the categorical perception of Mandarin tones*. Paper presented at the ICPHS XVII, Hong Kong, China.
- Ye, Y., & Connine, C. M. (1999). Processing spoken Chinese: The role of tone information. *Language and Cognitive Processes*, 14(5-6), 609-630.
doi:10.1080/016909699386202
- Yip, M. (2001). Phonological priming in Cantonese spoken-word processing. *Psychologia*, 44, 223-229.
- Yip, M. (2002). *Tone*. Cambridge: Cambridge University Press.
- Yu, K. M., & Lam, H. W. (2014). The role of creaky voice in Cantonese tonal perception. *The Journal of the Acoustical Society of America*, 136(3), 1320-1333.
doi:http://dx.doi.org/10.1121/1.4887462
- Yuan J. et al. (1989). *Hanyu fangyan gaiyao* [An introduction to Chinese dialects]. Beijing: Wenzi Gaige Chubanshe. (in Chinese)

- Yuan, J. (2006). Mechanisms of question intonation in Mandarin. In Q. Huo, B. Ma, E.-S. Chng & H. Li (Eds.), *Chinese Spoken Language Processing 5th International Symposium* (pp. 19-30). Singapore: Springer Berlin Heidelberg.
- Yuan, J. (2011). Perception of intonation in Mandarin Chinese. *The Journal of the Acoustical Society of America*, 130(6), 4063-4069.
doi:<http://dx.doi.org/10.1121/1.3651818>
- Zhang, J. (2009). Xi'anhua yu Beijinhua danzidiao de bijiao [The comparative analysis of the monosyllabic tone between Xi'an and Beijing]. *Journal of Shaanxi Institute of Education*, 25(2), 71-75. (in Chinese)
- Zhang, J. & Shi, F. (2009). Xi'anhua danziyin shengdiao de tongji fenxi [The statistical analysis on monosyllabic tone of Xi'an dialect]. *Journal of Xianyang Normal University*, 24(5), 38-42. (in Chinese)
- Ziegler, J. C., Tan, L. H., Perry, C., & Montant, M. (2000). Phonology matters: The phonological frequency effect in written Chinese. *Psychological Science*, 11(3), 234-248.