

STUDIA PHONOLOGICA

音 声 科 学 研 究

V

INSTITUTION FOR PHONETIC SCIENCES
UNIVERSITY OF KYOTO

1969/1970

COMMITTEE OF STUDIA PHONOLOGICA

Editor Ken-ichi MAEDA, Professor of Electronical Engineering
Taro SONOHARA, Professor of Psychology
Masanori MORIMOTO, Professor of Oto-rhino-laryngology
Toshiyuki SAKAI, Professor of Information Science

Assistant Editor Tatsuo NISHIDA, Associate Professor of Linguistics
Sei NAKAZIMA, Professor of Psychology
Nobuhiko ISSHIKI, Instructor of Oto-rhino-laryngology
Yoshio TAKEUCHI, Assistant of Oto-rhino-laryngology
Kōichi TABATA, Assistant of Information Science

INSTITUTION FOR PHONETIC SCIENCES
University of Kyoto

Editorial Office
c/o Department of Linguistics
University of Kyoto
Kyoto, Japan

Business Office
c/o Department of Oto-rhino-laryngology
University of Kyoto
Kyoto, Japan

Please address all correspondence to the business office.

Contents

日本語母音の動態測定とアクセントの認識 (Measurements of Tone Movements of Vowels and Hearing Validity in Relation to Accent in Japanese)	.....	杉藤美代子 (M. SUGITŌ) ... 1
A Comparative Study of the Speech Developments of Japanese and American English in Childhood (Part Three) —The Re-organization Process of Babbling Articulation Mechanisms—	.....	Sei NAKAZIMA ...20
Factor Analysis of Hoarseness	.....	Nobuhiko ISSHIKI Yoshio TAKEUCHI ...37
Aerodynamic Examination of the Laryngeal Function	.....	Naoaki YANAGIHARA, M.D. ...45
三歳児の構音能力について (Articulatory Skills in Three-year-old Children)	.....	安田 章子(Akiko YASUDA) ...52
On Line Speech Synthesis through I/O Interface Unit	.....	Toshiyuki SAKAI Shūji DŌSHITA Makoto NAGAO Kenji ŌTANI ...72
Periodicals, Books and Papers received	.....	84

Periodicals, Books and Papers received

Periodicals

- Acta Linguistica Hafniensia. Vol. IX, 1965~Vol. XI, 1968.
- Acta Universitatis Carolinae. Philologica 6, 1967.
- A Magyar Tudományos Akadémia Nyelv tudományi Intézetének Közleményei. Uj folyam III, 1963~Uj folyam V, 1965.
- Annual Report, Neurocommunications Laboratory, The Johns Hopkins University School of Medicine. 1967.
- Annual Report of the Institute of Phonetics, University of Copenhagen. No. 1, 1966; No. 2, 1967; Vol. 4, 1969.
- Audiology. Vol. 9, No. 4, 1966; Vol. 10, Nos. 1~3, 1967; Vol. 11, Nos. 1~3, 1968; Vol. 12, Nos. 1~2, 4, 1969; Vol. 13, Nos. 1~2, 1970.
- Beiträge zur deutschen Literatur, Sophia Universität. Nummer 3, 1966; Nummer 4, 1967.
- Bulletin of the Arts and Science Division, University of the Ryukyus. No. 10, 1966; No. 11, 1967.
- Bulletin of the Institute of History and Philology, Academia Sinica. Vol. XXX VI, 1965~Vol. XXXX, Part I, 1968.
- Bulletin of the Institute of Language Teaching, Waseda University. 5, 1966~8, 1969.
- Bulletin of the Kobayashi Institute of Physical Research. Vol. 14, 1964~Vol. 16, 1966.
- Bulletin of the Research Institute for the Education of Exceptional Children, Tokyo Gakugei University. No. 1, 1967; Supplement, 1968; No. 2, 1968.
- Cahiers de linguistique. V, 1968~VI, 1969.
- Cerebral Palsy Review. Vol. 25, Nos. 5~6, 1964; Vol. 26. No. 1, 1965.
- Die deutsche Literatur. 36, 1966~44, 1970.
- Driemaandelijkse Bladen. 18e Jaargang, Nos. 1~4, 1966.
- dsh Abstracts. Vol. VI, 1966~Vol. IX, Nos. 1~3, 1969; Vol. X, Nos. 1~2, 1970.
- ELEC Bulletin. No. 22, 1967; No. 24, 1968.
- Electrical Communication Laboratory Technical Journal. Vol. 15, Nos. 4~11, 1966~Vol. 19, Nos. 1~6, 1970.
- Filología. Año IX, 1963.
- IBM Journal of Research and Development. Vol. 10, Nos. 2~6, 1966; Vol. 11, Nos. 1~, 5, 1967; Vol. 12, 1968; Vol. 13, Nos. 1~4, 6, 1969; Vol. 14, Nos. 1~3, 1970.
- IMB Research Reports. Vol. 2, No. 1, 1966.
- IBM Systems Journal. Vol. 5, 1966; Vol. 6, Nos. 1~2, 4, 1967; Vol. 7, 1968; Vol. 8, 1969; Vol. 9, Nos. 1~2, 1970.
- ILT News. 30~31, 1966; 34, 35, 1967.
- Kratylos. Jahrgang VIII, Heft 1, 1963; Jahrgang X, Heft 1~2, 1965; Jahrgang XI, Heft 1/2, 1966; Jahrgang XII, Heft 1~2, 1967.
- Language and Language Behavior Abstracts. Vol. II, Nos. 1~3, 1968.
- Language Research in Progress. No. 7, 1969.
- Le maître phonétique. No. 126, 1966~No. 132, 1969.
- Lenguaje y Ciencias. 19, 1966~35, 1970.
- Linguistics in Documentation, No. 1, 1970.
- Mechanical Translation. Vol. 9, No. 2, 1966.
- NEC. No. 76, 1966~No. 97, 1969.
- NEC Research & Development. No. 8, 1966~No. 17, 1970.
- Neuropsychologia. Vol. 4, Nos. 2~4, 1966~Vol. 7, 1969.
- Philippine Social Sciences and Humanities Review. Vol. XXIX, 1964; Vol. XXX, Nos. 1~2, 1965; Vol. XXXI, 1966; Vol. XXXII, No. 1, 1967; Vol. XXXIII, No. 1/2, 1968.
- Phonetics Department Report, University of Leeds. No. 1, 1968; No. 2, 1969.
- Quarterly Progress and Status Report, Speech Transmission Laboratory. STL-QPSR 2, 1966~4, 1968; 2/3~4, 1969.
- RCA Review. Vol. XXVII, Nos. 1~3, 1966.
- Report on a Study of Tape Materials for Audio-Lingual Training, Tokyo University of Education. 1965~1966, 1967~1968.
- Research Department Periodic Progress Report, Central Institute for the Deaf. No. 9, 1966~No. 12, 1969.
- Review of the Radio Research Laboratories. Vol. 11, No. 57, 1965~Vol. 15, No. 81, 1969.
- Revue Langage et Comportement. Tome 1, Nos. 1~3, 1965.
- Revue Roumaine de Linguistique. Tome X, Nos. 5~6, 1965~Tome XV, Nos. 1~2, 1970.
- SICLASH (Special Interest Committee on

- Language Analysis and Studies in the Humanities) Newsletter. Vol. 1, Nos. 1~2, 1968; Vol. 2, Nos. 3~5, 1969; Vol. 3, Nos. 1~2, 1970.
- Soundless World—The Japanese Journal of the Research of the Deaf—. Vol. VII, No. 3, 1965~Vol. XI, No. 4, 1970.
- Soviet Psychology, Vol. VI, No. 2, 1967~68.
- Studia Linguistica. XVIII, II, 1964; XIX, I/II, 1965; XX, I~II, 1966; XXI, I, 1967; XXII, I~II, 1968; XXIII, I~II, 1969.
- Studies in Linguistics. Vol. 18, 1964~6; Vol. 19, 1967; Vol. 20, 1968.
- Studies in Linguistics, Occasional Papers 11, 1967.
- The Cerebral Palsy Journal. Vol. 27, Nos. 2~6, 1966; Vol. 28, Nos. 1~6, 1967; Vol. 29, Nos. 1~4, 1968.
- The Finite String. Vol. 3, No. 10, 1966; Vol. 4, Nos. 3~5, 8, 1967; Vol. 5, Nos. 4, 6, 1968; Vol. 6, Nos. 4, 6~10, 1969; Vol. 7, Nos. 1~3, 5, 1970.
- The Journal of Audiology Research. Vol. 6, 1966~Vol. 8, Nos. 1~3, 1968.
- The Journal of Kokugakuin University. Vol. 69, No. 4, 1966~Vol. 73, No. 5, 1970.
- The Record of Electrical and Communication Engineering Conversazione, Tohoku University. Vol. 35, 1966~Vol. 39, No. 1, 1970.
- The Reports of the Research Institute of Electrical Communication, Tohoku University. Vol. 17, No. 3/4, 1965~Vol. 21, No. 3/4, 1970.
- The Research Bulletin of the Faculty of Education, Oita University. Vol. 3, No. 1, 1966~Vol. 3, No. 4, 1969.
- Zhongguo Yuwen. 1~2, 1966.
- 言語指導研究施設紀要, 東京学芸大学. 第1号, 1966; 第2号, 1967.
- 語文, 大阪大学. 第26輯, 1966; 第28輯, 1968.
- 研究紀要, 京都府立聾学校. No. 4, 1965.
- 研究年報, 学習院大学. 第12輯, 1965~第16輯, 1969.
- 国学院大学紀要, 第6卷, 1967; 第7卷, 1969.
- ろう教育科学 モノグラフ No. 7, 1966.
- シンポジウム論文集, 東北大学電気通信研究所, 第4, 5回, 1967; 第6回, 1968; 第7回, 1970.
- Books and Papers**
- Argumenta Lectionum. Congressus phoneticus, Praha, 1967.
- Beeler, M.S. (Ed.) The ventureño confesionario of José Señán, O.F.M.
- Békésy, G.v. Inhibition and the time and spatial patterns of neural activity in sensory perception.
- Békésy, G.v. The effect of adaptation on the taste threshold observed with a semiautomatic gustometer.
- Békésy, G.v. Temperature coefficients of the electrical thresholds of taste sensations.
- Békésy, G.v. Taste theories and the chemical stimulation of single papillae.
- Bordone-Sacerdote, C. Measurements of elastic parameters of paper for loudspeakers.
- Bordone-Sacerdote, C., Cervini, G.C., Righini, G.U. & Sacerdote, G.G. A particular case of binaural hearing.
- Bordone-Sacerdote, C., Jona, G. & Sacerdote, G.G. Rilievi di elettroencefalogrammi su soggetti il cui capo è sollecitato da vibrazioni meccaniche.
- Bordone-Sacerdote, C. & Righini, G. The glottal wave detected as a high frequency modulation.
- Bordone-Sacerdote, C. & Sacerdote, G. Investigations on the movement of the glottis by ultrasounds.
- Boudreau, J.F. Characterization of certain polyfunctional switching net structures.
- Brosio, E. Measurement of the sound insulation by raydom and by normal incidence of sound.
- Brosio, E. Potere fonoisolante di divisorì prefabbricati.
- Brosio, E. Effetti della ricopertura superficiale sull'assorbimento acustico di materiali porosi.
- Cervini, G.C. Rilievi statistici di rumorosità di trasformatori trifasi.
- Cervini, G.U. Generatore trifase ad uscita costante per frequenze acustiche.
- Chao, Y.R. & Yang, S.F. Dialect of Ling-Pei, Chi-Hsi, Anhui.
- Chase, E.N. An experimental display processor for the DX-1.
- Chase, R.A. Effect of delayed auditory feedback on the repetition of speech sounds.
- Chase, R.A. Information system analysis of the organization of motor activity.
- Chase, R.A. An information-flow model of the organization of motor activity. I: Transduction, transmission and central control of sensory information.
- Chase, R.A. An information-flow model of the organization of motor activity. II: Sampling, central processing, and utilization of sensory information.

- Chase, R.A. Verbal behavior: Some points of reference.
- Chase, R.A. Evolutionary aspects of language development and function.
- Chase, R.A. Book review: Perception and motion, by K.U. Smith & W.M. Smith.
- Chase, R.A. Book review: Delayed sensory feedback and behavior, by K.U. Smith.
- Chase, R.A. & Cullen, J.K. Experimental studies on motor control systems in man.
- Chase, R.A. & Cullen, J.K. Delayed feedback audiometry.
- Chase, R.A. & Guilfoyle, G. Effect of simultaneous delayed and undelayed auditory feedback on speech.
- Chase, R.A., Cullen, J.K., Openshaw, J.W. & Sullivan, S.A. Studies on sensory feedback: III The effects of display gain on tracking performance.
- Chase R.A., Cullen, J.K., Sullivan, S.A. & Ommaya, A.K. Modification of intention tremor in man.
- Chase, R.A., Harvey, S., Standfast, S., Rapin, I. & Sutton, S. Studies on sensory feedback I: Effect of delayed auditory feedback on speech and keytapping.
- Chase, R.A., Harvey, S., Standfast, S., Rapin, I. & Sutton, S. Comparison of the effects of delayed auditory feedback on speech and key tapping.
- Chase, R.A., Rapin, I., Gilden, L., Sutton, S. & Guilfoyle, G. Studies on sensory feedback: II Sensory feedback influences on keytapping motor tasks.
- Chase, R.A., Sutton, S. & First, D. Bibliography: Delayed auditory feedback.
- Chase, R.A., Sutton, S., First, D. & Zubin, J. A developmental study of changes in behavior under delayed auditory feedback.
- Chase, R.A., Sutton, S., Fowler, E.P., Fay, T.H. & Ruhm, H.B. Low sensation level delayed clicks and keytapping.
- Chase, R.A., Sutton, S. & Rapin, I. Sensory feedback influences on motor performance.
- Craddock, J.R. Latin legacy versus substratum residue.
- Dagle, E.F., Hill, M.D. & Smith, W.R. Response times in decision-making tasks.
- Damst , P.H. Les vibrations des cordes vocales compar es aux vibrations des lèvres d'un tromboniste.
- Damst , P.H. X-ray study of phonation.
- Damst , P.H., Zwaan, E.J. & Schoenaker, T.J. Learning principles applied to the stuttering problem.
- Dewan, E.M. Communication by voluntary control of the electroencephalogram.
- Dewan, E.M. A note on asynchronous quenching.
- Dewan, E.M. Nonlinear cross-spectral analysis and pattern recognition.
- Dewan, E.M. Asynchronous excitation and the entrainment and periodic pulling effects from a second input.
- Dewan, E.M. The programming (P) hypothesis for REMS.
- Evans, T.G. & Darley, D.L. On-line debugging techniques: A survey.
- Fant, C.G.M. Acoustic specification of speech, 1 January 1965~31 December 1965.
- Fant, C.G.M. Acoustic specification of speech, 1 January 1967~31 December 1967.
- Favella, L.F., Reineri, M.T. & Righini, G.U. Results in vowel recognition by means of probabilistic analysis.
- Favella, L.F., Reineri, M.T. & Righini, G.U. The probabilistic classification of time sequences and its application to the recognition of human voice.
- Fischer-J rgensen, E. Perceptual dimensions of vowels.
- Fischer-J rgensen, E. Untersuchungen zum sogenannten festen und losen Anschluss.
- Fischer-J rgensen, E. A. Hans J rgen Uldall and his collaboration with Louis Hjelmslev.
- Fischer-J rgensen, E. Louis Hjelmslev.
- Fischer-J rgensen, E. Paul Didericksen.
- Glucksman, H.A. Classification of mixed font alphabets by characteristic loci.
- Griffiths, J.D. Improved analog voice communications.
- Griffiths, J.D. Optimum linear filter for speech transmission.
- Griffiths, J.D. Rhyming minimal contrasts: A simplified diagnostic articulation test.
- Griffiths, T.V. The unsolvability of the equivalence problem for *A*-free nondeterministic generalized machines.
- Haase, K.H. Categorizations and realizations of positive real and biquadratic immittance functions.
- Haase, K.H. Categorizations and realizations of positive real and biquadratic immittance functions. Part II: Programmed realizations.
- Haase, K.H. Brune's realization procedure

- in a new and generalized aspect.
- Haase, K.H. A classification of PR biquadratic immittance functions and their realization using a perfectly coupled and center branch augmented two-port.
- Haase, K.H. A short-cut method of computing the Brune and Bott-Duffin circuit realizations of positive real bi-order immittance functions.
- Haase, K.H. Selected programs for manually operated electronic desk calculators. Part I: Theoretical background and applications.
- Haase, K.H. Selected programs for manually operated electronic desk calculators. Part II: Program manual.
- Haase, K.H. Single tee and pi two-ports, resistively terminated and having a prescribed driving-point immittance.
- Haase, K.H. Transformations applied to the positive real and biquadratic immittance function.
- Hasegawa, A. An experimental study of the identification of filtered Japanese vowels.
- Hecker, M.H.L., Stevens, K.N., Bismarck, G. v. & Williams, C.E. The effects of task-induced stress on speech.
- House, A.S. & Hughes, G.W. Speech analysis.
- Hughes, G.W., House, A.S. & Li, K.P. Research on word spotting.
- Irwin, O.C. Correct status of diphthongs in the speech of children with cerebral palsy.
- Isshiki, N. & Leden, H. v. Hoarseness: Aerodynamic studies.
- King, W.F. The synthesis of multipurpose logic devices.
- King, W.F. Analysis of iterative NOR autonomous sequential machines.
- King, W.F. & Giusti, A. The design of a more complex building block for digital systems.
- Konig, W.F. & Leden, H.v. The peripheral nervous system of the human larynx. Part I. The mucous membrane.
- Konig, W.F. & Leden, H.v. The peripheral nervous system of the human larynx. Part II: The thyroarytenoid muscle.
- Konig, W.F. & Leden, H.v. The peripheral nervous system of the human larynx. III. The development.
- Konig, W.F. & Leden, H.v. A three-dimensional reconstruction of a hemilarynx.
- Leden, H.v. Laryngeal physiology.
- Leden, H.v. Recent advances in laryngeal diagnosis.
- Lieberman, P. Direct comparison of subglottal and esophageal pressure during speech.
- Lieberman, P., Michaels, S.B., Preston, G.H. & Wathen-Dunn, W. An acoustic bullet detector.
- Linsalata, C.R. Smollett's Hoax: Don Quixote in English.
- Menyuk, P. The role of distinctive features in children's acquisition of phonology.
- Meo, A.R. & Righini, G. Riconoscitore istantaneo di suoni vocalici.
- Meritt, H.D. (Ed.) The old English prudential glosses at Boulogne-sur-Mer.
- Miller, W.R. Uto-Aztec cognate sets.
- Modern Language Institute, Tokyo University of Education. Lesson plans for audio-lingual training at the initial stage of English teaching.
- Morgan, B.Q. & Strothmann, F.W. Middle high German translation of the Summa Theologica by Thomas Aquinas.
- Myerson, M., Crelin, E.S., & Smith H.W. Bilateral duplication of the submandibular ducts.
- Ohman, S.E.G. Coarticulation in VCV utterances: Spectrographic measurements.
- Petrick, S.R. A program for transformational syntactic analysis.
- Philbrick, O. A study of shape recognition using the medial axis transformation.
- Philbrick, O. SCRIPT—An executive program for a research computer.
- Piazza, R. Assorbimento acustico superficiale in condotti rivestiti internamente.
- Pierce, J.N. Information content of list-detected fading M-ary transmissions.
- Pierce, J.N. Average digit error probability after decoding random linear codes.
- Pless, V. On the invariants of a vector subspace of a vector space over a field of characteristic two.
- Pubblicazioni dell'Istituto Elettrotecnico Nazionale Galileo Ferraris 1935–1960.
- Rand, E. The syntax of Mandarin interrogatives.
- Righini, G.U. A pitch extractor of the voice.
- Righini, G.U. Misura della frequenza istantanea della voce.
- Riguet, J. On the extension of binary set computation to the computation of matrices with elements in a complete Boolean algebra.

- Sacerdote, G. Reparto di elettroacustica dell'Istituto Elettrotecnico Nazionale di Torino.
- Sacerdote, G.G. Die Nachahmung von Stimmen.
- Samarin, W.J. The Gbeaya language.
- Sapir, E. & Hoijer, H. The phonology and morphology of the Navaho language.
- Sethares, G. Closed sets of Boolean functions and the reliability problem for polyfunctional nets.
- Shapiro, M. Russian phonetic variants and phonostylistics.
- Smith, C.P. Characterization of speech sources in terms of genetic operating characteristics.
- Sonninen, A. The external frame function in the control of pitch in the human voice.
- Sonninen, A. On the fundamental pre-requisites of language development.
- Sonninen, A. The significance of "tracheal bending" and "oesophageal opening" in high-pitched singing.
- Stevens, K.N. Speech communication research.
- Strong, W.J. Machine-aided formant determination for speech synthesis.
- Tyler, S.A. Koya: An outline Grammar. Gommu dialect.
- Uldall, H.J. & Shipley, W. Nisenan texts and dictionary.
- Urbano, R.H. Matrix criteria for arbitrary reliability in iterated neural nets.
- Urbano, R.H. Some new results on the convergence, oscillation, and reliability of polyfunctional nets.
- Vanderslice, R. Synthetic elocution.
- Vennard, W. & Irwin, J.W. Speech and song compared in sonograms.
- Wathen-Dunn, W. Limitations of speech at high pressures in a helium environment.
- Wilson, G.D. Modular computer programs for image-processing and manipulation.
- Yanagihara, N., Leden, H.v. & Werner-Kukuk, E. The physical parameters of cough: The larynx in a normal single cough.
- Zierer, E. La logica formal en la linguistica.
- Zierer, E. La problematica del estudio de lenguas extranjeras en el Peru.
- 日本音声学会 音声の研究12
- 日本音声学会 創立四十周年記念録
- 大橋博司 失語症

ERRATA, STUDIA PHONOLOGICA Vol. IV

Page	Line	instead of	read
44	41	sonds	sounds
84	Fig. 4, 21	Decy	Decay
93	22	output the filter	output of the filter

京都大学音声科学総合研究部会 (1970)

委 員

部 長	前田憲一	顧問	文学部長	幹事	柿崎祐一	田畠孝一
副部長	園原太郎		教育学部長		西田龍雄	大橋保夫
"	森本正紀		医学部長		芋阪良二	中島誠
"	坂井利之		工学部長		一色信彦	文学部事務長
			教養部長		竹内義夫	医学部事務長

部員および研究員

名 誉 部 員	後藤光治, 泉井久之助
言 語 学	西田龍雄, 塚本 黙, 秦 隆昌, 鹿島 純, 北島 静江, 岩本 忠, 近藤達夫, 杉藤美代子
国 語 学	浜田 敦, 阪倉篤義, 遠藤邦基
中国語学	小川環樹, 清水 茂, 尾崎雄二郎
英 語 学	大浦幸男, 松木 泉
フランス語学	大橋保夫
心 理 学	園原太郎, 倉石精一, 柿崎祐一, 芋阪良二, 本吉良治, 梅本堯夫, 中島誠, 岡本夏木, 田中昌人, 村井潤一, 坂野登, 清水民子, 大沢春吉, 千原孝司, 清水秀美, 塩見邦雄, 須田洋行, 岩田純一
耳 鼻 科	森本正紀, 浅井良三, 広戸幾一郎, 服部 浩, 太田文彦, 釜本安敏, 高橋宏明, 一色信彦, 柳原尚明, 平野 実, 竹内義夫, 東文生, 小池靖夫, 本庄巖, 大橋佳子, 安田章子, 丘村熙, 田辺正博, 北嶋和知, 柴正紀, 前田秀夫
口腔外 科	美濃口玄, 小野克己, 大矢信夫, 金谷章太郎,
精 神 科	大橋博司, 岡田幸夫, 斎藤正己, 河合逸雄, 浜中涉彦, 池村義明, 小沢 黙, 守田嘉男, 山口俊郎
電 子 工 学	前田憲一
情 報 工 学	坂井利之, 杉田繁治, 田畠孝一
電 気 工 学	長尾 真, 新見康永, 大谷謙治, 富田真治, 桑元英夫, 阿部重夫

MAEDA SHINKODÔ PRINTING Co., Ltd., KYOTO