

C O N T E N T S

| | |
|---|-----|
| <u>Introduction</u> | iii |
| <u>Personnel</u> | iv |
| An Interactive Display Terminal for Image Measurement Using an X-Ray Microbeam Scan System | 1 |
| S. Kiritani, K. Itoh, E. Takenaka, S. Sekimoto, H. Imagawa, H. Fujisaki, and M. Sawashima | |
| Simultaneous Recording of EMG with Pellet Tracking by Use of X-Ray Microbeam | 13 |
| S. Kiritani, S. Sekimoto, H. Imagawa, K. Itoh, T. Ushijima, and H. Hirose | |
| Principal Component Analysis of Tongue Pellet Movement | 15 |
| S. Kiritani and H. Imagawa | |
| Tongue Pellet Movement for the Japanese CV Syllables - Observations Using the X-Ray Microbeam System - | 19 |
| S. Kiritani, K. Itoh, H. Imagawa, H. Fujisaki, and M. Sawashima | |
| Analysis of Tongue Point Movements by a Linear Second- Order System Model | 29 |
| Y. Sonoda and S. Kiritani | |
| A Preliminary Report on the Electromyographic Study of the Production of the Japanese Semivowel /j/ | 37 |
| K. Kakita, H. Hirose, T. Ushijima and M. Sawashima | |
| Fiberoptic Acoustic Studies of Mandarin Stops and Affricates | 47 |
| R. Iwata and H. Hirose | |
| Devoiced and Whispered Vowels in Japanese | 61 |
| R. S. Weitzman, M. Sawashima, H. Hirose and T. Ushijima | |
| Laryngeal Control in French Stops: A Fiberoptic, Acoustic and Electromyographic Study | 81 |
| A-P. Benguerel, H. Hirose, M. Sawashima and T. Ushijima | |
| More on Laryngeal Control for Voicing Distinction in Japanese Consonant Production | 101 |
| H. Hirose and T. Ushijima | |
| Pitch Accent and Vowel Devoicing in Japanese: A Preliminary Study | 113 |
| J. B. Lovins | |

| | |
|--|-----|
| A Phonetic Description of Tibetan with a review of the literature . . . | 127 |
| O. Kjellin | |
| Analysis, Recognition, and Perception of Voiceless Fricative Consonants in Japanese | 145 |
| H. Fujisaki and O. Kunisaki | |
| Acoustic and Perceptual Analysis of Two-Mora Word Accent Types in the <u>Osaka</u> Dialect | 157 |
| H. Fujisaki and M. Sugito | |
| Analysis, Synthesis, and Perception of Word Accent Types in Japanese | 173 |
| H. Fujisaki, H. Hirose and M. Sugito | |
| Temporal Organization of Articulatory and Phonatory Controls in Realization of Japanese Word Accent | 177 |
| H. Fujisaki, H. Morikawa, and M. Sugito | |
| Acoustic Analysis and Subjective Evaluation of Sung Vowels . . . | 191 |
| M. Tatsumi, O. Kunisaki, and H. Fujisaki | |
| On the Development of Perceptual Strategies in Children: A Case Study on the Japanese Child's Comprehension of the Relative Clause Constructions | 199 |
| S. I. Harada, T. Uyeno, H. Hayashibe, and H. Yamada | |
| A Kinesiological Aspect of Myasthenia Gravis - An Electro- myographic Study of Velar Movements During Speech - | 225 |
| T. Ushijima, M. Sawashima H. Hirose, M. Abe and T. Harada | |
| Construction of a Short Test of Aphasia on the Basis of Factor Analysis | 233 |
| Y. Fukusako and S. Sasanuma | |
| A Computational Model of the Tongue | 243 |
| S. Kiritani, K. Miyawaki, O. Fujimura, and J. E. Miller | |
| Recent Publications | 253 |

INTRODUCTION

This is the tenth issue of the annual reports from the Research Institute of Logopedics and Phoniatics. The Institute was established in 1965 in the Faculty of Medicine, University of Tokyo, starting with one research section for speech science. The second section, for speech physiology, was begun in 1971. We are proposing two more research sections to complete this organization: one for research in speech and language pathology, another for perceptual and psycholinguistic studies.

Our research results are reported here in preliminary form for exchange of information and cooperative technical discussions with other research groups all over the world. Most of the projects reported on here will appear in more formal publications later, but quotations are welcome strictly for research purposes, with the understanding of the preliminary nature of these reports. It is advisable, therefore, to contact the author(s) beforehand, since more recent or corrective information may be available, perhaps as a more formal publication in preparation.

Copies are not for sale and our distribution policy is to send one to each of the active research groups with common research interests for exchange of similar interim reports and/or reprints of publications. For individual investigators who may wish personal copies, reprints from issue No. 3 onwards are available on request, as well as some other publications from our group. We hope we can continue this policy in the future with the kind cooperation of international peers, and also by appropriate funding.

Masayuki Sawashima
Director

PERSONNEL

(April 1975 - March 1976)

Professor Emeritus: Ichiro Kirikae (D. M. Sc.)*

Director: Masayuki Sawashima

Research Staff:

Masayuki Sawashima (D. M. Sc.) Professor of Speech Physiology

Hiroya Fujisaki (D. Eng.)** Professor of Speech Science

Hajime Hirose (D. M. Sc.) Associate Professor of Speech Physiology

Shigeru Kiritani (D. M. Sc.) Associate Professor of Speech Science

Mrs. Tazuko Uyeno (Ph. D.) Lecturer

Miss Sumiko Sasanuma (Ph. D.)*** Lecturer (part time)

Sin Iti Harada (M. A.)**** Lecturer (part time)

Tatsujiro Ushijima (D. M. Sc.) Research Associate (on leave for research work at the Haskins Laboratories, Connecticut, U. S. A. - Feb. 1975).

Kenji Itoh (D. Eng.) Research Associate

Seiji Niimi (M. D.) Research Assistant (on leave for research work at the Haskins Laboratories, Connecticut, U. S. A.)

Sotaro Sekimoto (B. Eng.) Research Assistant

Graduate Students (Division of Medical Science):

Miss Emiko Tagami (M. A.)

Seishi Hibi (M. S.)

Olle Kjellin (M. A.)

Mrs. Kuniko Kakita (M. A.)

Special Students:

Mrs. Mariko Tatsumi (M. A.)

Guest Researchers:

Miss Julie B. Lovins (Ph. D.) Lecturer, English Department, Tsuda College

John V. Hinds (Ph. D.) Lecturer, Department of Foreign Language and Foreign Literature, Sacred Heart University (-Aug. 1975)

André-Pierre Benguerel (Ph. D.) Assistant Professor, Department of Pediatrics, Division of Audiology and Speech Sciences, University of British Columbia (Apr. - July 1975)

Yorinobu Sonoda (D. Eng.) Associate Professor, Department of Electronics, Faculty of Engineering, Kumamoto University (Apr. 1975 - March 1976)

Mark P. Haggard (Ph. D.) Professor of Psychology and Chairman of Department of Psychology. The Queen's University of Belfast (Oct. - Nov. 1975)

*Also Professor at the Department of Otolaryngology, Jichi Medical School

**Also Professor at the Department of Electrical Engineering, Faculty of Engineering, University of Tokyo

***Also Head of the Section of Communication Research, Tokyo Metropolitan Institute of Gerontology

****Also Lecturer, Department of English Literature, Faculty of Social Sciences and Humanities, Tokyo Metropolitan University.

Thomas Gay (Ph. D.) Associate Professor, Department of Oral
Biology, University of Connecticut, Medical Center
(- Dec. 1975)

Raymond S. Weitzman (Ph. D.) Associate Professor of Linguistics,
California State University, Fresno, (Dec. 1975 -)

Osamu Fujimura (D. S.) Head, Linguistics and Speech Analysis
Department, Bell Laboratories (March 1976)

Technical Staff:

Hiroshi Imagawa
Toyozo Okazaki (part time)

Secretaries:

Miss Kikuko Yamakoshi
Miss Akemi Maeda (- Feb. 1976)
Miss Nobuko Uchida (Feb. 1976 -)
Miss Tokiko Sugano (part time)
Miss Ruiko Inoue (part time)
Mrs. Diane Duffett (part time)

Cooperative Groups:

University of Tokyo, Faculty of Medicine, Department of Oto-
laryngology: Voice and Speech Group

The University of Tokyo Hospital, Radiological Center:
Eiichi Takenaka (D. M. Sc.) Associate Professor.

Kitazato University, School of Medicine:

Zyun'ici Simada (M. D.), Assistant Professor, Department of
Physiology

University of Electro-Communications:

Kiyoshi Hasimoto (D. Eng.) Associate Professor, Research
Laboratory of Communication Science

Makoto Yasuhara (D. M. Sc.), Associate Professor, Research
Laboratory of Communication Science

Tokyo University of Foreign Studies, Institute for the Study of
Languages and Cultures of Asia and Africa:

Ryohei Kagaya (B. Eng.), Research Assistant

Tokyo Metropolitan Institute of Gerontology, Section of Commu-
nication Research:

Miss Sumiko Sasanuma (Ph. D.) Head

Itaru Fujii Tatsumi (M. Eng.)

Yo Kobayashi (B. Eng.)

The National Center of Speech and Hearing Disorders:

Sadao Shibata (M. D., M. A.)

Tokyo Metropolitan Geriatric Hospital (Yoikuin), Department of
Speech Pathology:

Miss Yoko Fukusako (D. M. Sc.)

Note: The position "jokyoju" is translated here as "associate professor" when the person has a doctoral degree, and as "assistant professor" otherwise. Likewise, "josyu" is either research associate or research assistant depending on whether the person has a doctoral degree. The distinction is merely conventional to make the words appear in a better correspondence to some English equivalents.