

**Pärtel Lippus, The acoustic features and perception of the Estonian quantity system, Tartu (Dissertationes Philologiae Estonicae Universitatis Tartuensis 29). 146 pp.**

In his thesis Pärtel Lippus investigates a variety of topics related to the acoustic-phonetic realization of Estonian quantity differences, especially the interplay of pitch and duration. In addition, he also looks into quantity perception by both Estonian speakers and those of other languages and the development of Estonian quantity realization over a span of almost hundred years. This whole thematic area has a rich and interesting research history, and Lippus's work adds several interesting and welcome new findings and explanations to it.

The thesis consists of a forty-page summary and eight articles. In what follows I will first give a short characterization of the core of each of the journal articles and other published contributions and then proceed to an overall evaluation of the thesis.

"The Tonal Component in Perception of the Estonian Quantity" (2007; co-authors K. Pajusalu, J. Allik) looks into pitch cues for quantity perception using as stimuli systematically duration- and pitch-manipulated recordings of single bisyllabic word triplets exhibiting the quantity oppositions. Experimental results show that a pitch cue — falling on the first syllable — is essential for the identification of Estonian overlong (Q3) quantity.

"The tonal component of Estonian quantity in native and non-native perception" (2009; co-authors K. Pajusalu, J. Allik) was published in the "Journal of Phonetics" and uses the same material and experimental setup as the 2007 article, but on a larger number of subjects, including Estonian learners with Finnish, Russian and Latvian as their L1s. For native speakers, the study confirms the importance of the pitch cue, as a secondary cue in addition to the appropriate duration relations, in perceiving overlong quantity.

"Regional variation in the perception of Estonian quantity" (2009; co-author

K. Pajusalu) is the written version of a conference paper presented at Nordic Prosody X in Helsinki 2008 demonstrating that there is a certain amount of geographical variation in the perception of quantity within Estonia: speakers in east and south Estonia do not seem to use pitch as a secondary perceptual cue for discrimination of long and overlong quantity.

"The Role of Pitch Cue in the Perception of the Estonian Long Quantity" (co-authors K. Pajusalu, J. Allik) has appeared as a chapter in the 2011 book "Prosodic Categories. Production, Perception and Comprehension". It supplies further confirmation for the relevance of the pitch cue and a more detailed definition of the pitch contours involved in signaling Q3. They exhibit three main characteristics: is falling sharply, over a considerable range, from a long high to a long low plateau.

"The realization of Estonian quantity characteristics in spontaneous speech" (2009; co-authors E. L. Asu, P. Teras, T. Tuisk) is a contribution to Nordic Prosody X. It presents an acoustic study of spontaneously produced quantity contrasts, using the Tartu University phonetic corpus of Estonian spontaneous speech. As is to be expected, the authors encounter much wider variation than in laboratory speech. But pitch contour turning point placement apparently plays a role in Q3 marking, albeit only in accented words. Deaccented words in spontaneous speech do not display any quantity-related systematic tonal features.

"Variation in vowel quality as a feature of Estonian quantity" has been published in the proceedings of the Speech Prosody 2010 conference. Using the same corpus as the previous paper, Lippus now tests for a possible role of vowel quality as a quantity correlate. Results show that stressed Q1 vowels tend to be more central than stressed Q2 and Q3 vowels, whereas no such corre-

lation can be detected for unstressed vowels.

In "Has Estonian quantity system changed in a century? Comparison of historical and contemporary data" (2011) Lippus and his co-author J. Ross present a diachronic case study comparing the speech of eight contemporary Estonian male subjects with prisoner-of-war recordings from 1916–1918. They come to the conclusion that pitch contour was a less important quantity cue then, while the syllable duration ratios have not changed over time.

Finally, the article "Quantity-related variation of duration, pitch and vowel quality in spontaneous Estonian" (2011; co-authors E. L. Asu, P. Teras, T. Tuisk) summarizes Lippus's and his co-workers' earlier studies' findings on the relative relevance of duration, pitch and vowel quality in the realization of quantity in spontaneous speech. The study also introduces more data from the Tartu University phonetic corpus of Estonian spontaneous speech to provide additional empirical backing.

The thesis overview preceding the reproduced external publications provides a concise structured summary of the research presented in the included eight articles and thus helps the reader to form a complete and consistent picture of Lippus's work, its frame of reference and its implications. The diachronic and dialectological investigations interestingly expand the scope of his research questions, but they have the characteristics of pilot studies. This, however, does not jeopardize the validity of the thesis as a whole since it is built around the strong core of the production and perception studies in the other publications. In addition to their undeniable benefit for the progress of fundamental research, some of the results, especially from the investigations of Estonian L2 speakers' quantity perception, are also clearly relevant in a wider context, for example in the design of teaching curricula for Estonian as a second language.

There is an obvious need for deeper exploration of the intricacies of the Estonian quantity system and Lippus's

thesis presents several such explorations, each one of them carefully designed to concentrate on a meaningful and manageable subset of research questions.

Although the overview chapter's reference list only comprises 85 items, previous research in the field is adequately represented up to very recent publications. Lippus's work organically develops and expands Estonian quantity research, continuing traditional strands and at the same time adding fresh perspectives. He has made himself thoroughly familiar with the research tradition he is continuing and shows considerable skill in critically appraising earlier work as well as building methodologically upon it throughout his writings. Theoretical and technical terms are almost always used unambiguously and in an explicit context; in general, most of the published text is written in a lucid style, ensuring that also readers from outside the specific field of phonetic quantity research should have no problems in following the authors' reasoning.

The selection of methods employed — acoustic analysis, perception tests with resynthesized stimuli, corpus research, statistical analysis — is well-motivated and suitable to shed light on the research questions. Lippus demonstrates good command of signal analysis, test design and pertinent statistical evaluation.

He and his coauthors have made the effort to elicit and investigate an impressive body of listening test results from different speaker populations as well as to produce and analyze a large data set of acoustic measurements. As attested also by the fact that some of the work has been accepted for publication in a major journal or presented at an important international conference, the amount and the quality of the empirical material collected here is certainly sufficient to lend support to the conclusions presented.

Despite some probably unavoidable overlap between the publications which make up the core of Lippus's thesis, they mainly complement each other, contributing more evidence in support of his main conclusions. Pitch can play a significant role in the perception of the

Estonian overlong quantity category and this role and its constraints, as well as the acoustic realization of all three quantity degrees, are determined with unprecedented precision and empirical backing in the research work presented here. In addition, there are new insights into the variation of pitch perception, both regionally and also among non-native speakers. On the whole, this thesis thus offers a substantial amount of new results and interpretations that are bound to keep the

academic discourse on Estonian quantity as interesting and lively as ever.

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#### LINGUISTICA URALICA. SUPPLEMENTARY SERIES

Volume 1. Estonian Language, Tallinn 2003; Second Edition, Tallinn 2007

Volume 2. Ilse Lehiste, Pire Teras, Toomas Help, Pärtel Lippus, Einar Meister, Karl Pajusalu, Tiit-Rein Viits, Meadow Mari Prosody, Tallinn 2005

Volume 3. Eberhard Winkler, Karl Pajusalu, Salis-livisches Wörterbuch, Tallinn 2009

Volume 4. Heinike Heinsoo, *Mā ja pūd lēvād, meid eb lē*. The Subject and the Predicate in Votic, Tallinn 2010