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PARTITIVE OR ILLATIVE?

1. Introduction

The question of the existence of a fourth degree of quantity has been debated by Estonian linguists for some time (cf. Hint 1983 and literature quoted there). In particular, it has been claimed that certain words that are segmentally identical in the partitive and illative case differ with regard to their prosodic structure, the words being in the overlong quantity (Q3) in the partitive and in a super-overlong quantity (Q4) in the illative case. The present paper is part of a larger study devoted to experimental testing of the existence of such distinctions. In that larger study, six word forms are examined: the *-da* infinitive, the 2. pers. singular imperative, the abessive, the partitive, the short illative, and formations with the particle *-ki/-gi*. The part of the study reported here deals with the manifestation of the partitive and illative.

2. Materials and method

The total set of materials consists of 190 test words, occurring in 125 test sentences. The sentences had the form *Ma ütlesin...., mitte....* (e.g. *Ma ütlesin pakku, mitte aita,* and *Ma ütlesin aita, mitte pakku*). The test words thus occurred both in medial and in final position. There were 20 sentences containing words in the partitive, and 20 sentences containing the short illative. Each set started with sentences containing unambiguous words: *Ma ütlesin poisse, mitte tüdrukuid* for the partitive set, and *Ma ütlesin tuppa, mitte sappa* for the illative set. The medial and final positions were chosen for the purpose of testing whether sentence intonation has any influence on the manifestation of the prosodic structure of the words.

The sentences were read by seven speakers, one of whom produced the text twice. The total corpus thus consists of $8 \times 190 = 1520$ test words, half of which occurred in medial position, and the other half in final position. The recordings were made in Tartu, and were analyzed acoustically in the laboratory of the Department of Linguistics of the Ohio State University.

A listening test tape was prepared, containing the words *aita, paati, pakku,* and *kappi*, produced under four conditions: as partitive singular in medial and final position, and as illative singular in medial and final position. (The test also contained *-da* infinitives, abessives and imperatives.) Three of the seven speakers were chosen for the listening test on the basis of the technical quality of their recordings. There

were thus 16 items to identify for each of three speakers, or a total of 48 items. The test words were isolated from the original recordings and placed in random order.

The test was self-administered. Fifty subjects took the text in Tartu and in other locations in Estonia. The instructions to the test-takers were as follows (in translation):

"The listening test consists of words taken from texts produced by three speakers. It is your task to indicate whether the word would answer one of two given questions, or whether it would fit into one of two possible positions. Please stop the tape after hearing the word, place a check mark in the appropriate column, and then listen to the next word, repeating the procedure until the end of the tape."

The partitive-illative part of the test had the following caption: "Please check whether the word would answer the question *mida*? or *kuhu*?" (*mida* expecting the partitive, *kuhu* expecting the illative). Fifty subjects took the test. Sixteen occurrences of test words, produced by three speakers and judged by 50 listeners, yield 2400 responses.

3. Acoustic structure of the test words

The following measurements were made: duration of the first syllable vocalic nucleus (V1), the duration of the intervocalic consonant (C), the duration of the vowel of the second syllable (V2), the fundamental frequency of the first syllable at the beginning, the peak of the fundamental frequency curve, and at the end of the syllable nucleus, and the position of the peak measured from the beginning of the first syllable nucleus. A summary of duration measurements is presented in Table 1.

Table 1

Average duration (in milliseconds) of the vowel of the first syllable, the intervocalic consonant, and the vowel of the second syllable in test words produced by three speakers

	Partitive case, medial position			Partitive case, final position		
Test word	**V1 duration**	**C duration**	**V2 duration**	**V1 duration**	**C duration**	**V2 duration**
aita	228	242	89	188	276	77
paati	250	296	87	206	265	87
kappi	84	298	75	83	317	72
pakku	83	354	81	76	351	91
Average	**161**	**298**	**83**	**138**	**302**	**82**
	Illative case, medial position			**Illative case, final position**		
Test word	**V1 duration**	**C duration**	**V2 duration**	**V1 duration**	**C duration**	**V2 duration**
aita	202	304	74	199	319	74
paati	226	259	74	257	261	75
kappi	88	362	62	75	357	79
pakku	94	373	69	75	353	92
Average	**153**	**325**	**70**	**152**	**323**	**80**

As may be seen from the table, there is practically no difference in the duration of intervocalic plosives in medial and final position. Likewise, there is no obvious difference between the durations of the first syllable nuclei. There is one exception: the vowel of the test word *paati* is longer in the partitive case in medial position than in other positions. This is due to a single exceptional production by one of the speakers, and will not be considered part of a pattern.

The average duration of the intervocalic consonant is greater by approximately 24 msec in the illative, as compared to the partitive. This might have some effect on

the perception of the items; however, there is overlap between all duration ranges, so that the difference is not categorical. Duration ranges of the intervocalic consonants are given in Table 2.

Table 2

Duration ranges (in milliseconds) of intervocalic consonants in test words produced by three speakers

Test words	Case	Range	Case	Range
aita, paati	partitive	193—344	illative	198—344
kappi, pakku	partitive	206—438	illative	274—423

The extensiveness of the ranges is partly due to the fact that Speaker 2 used a faster tempo than Speakers 1 and 3. At the same time, it shows that most durations of the intervocalic consonant might have occurred in either of the two cases.

4. Results of the listening test

Fifty subjects took the test. Sixteen occurrences of test words, produced by three speakers and judged by 50 listeners, yield 2400 responses. The overall success of listeners in identifying the case of a test word is displayed in Figure 1. Identifications of partitive as partitive and illative as illative are both considered correct.

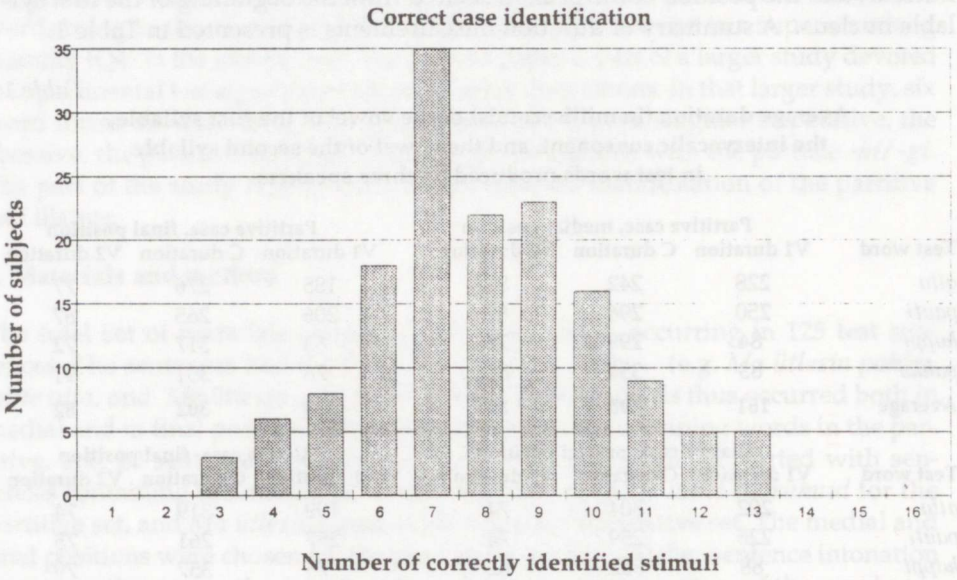

Figure 1. Distribution of correct case identifications.

The figure is to be read as follows. Each listener judged the productions of three speakers; the sixteen-word sequence was thus judged 50 × 3 = 150 times. Each of these sequences is treated as a separate "run". If a listener had been successful in identifying all stimuli in one "run", his/her score would have been 16. As the figure shows, no subjects were either completely right or completely wrong: the slots for 1, 2, 14, 15, and 16 correct responses are empty. Neither did the same subjects achieve relative success (11—13 "correct" identifications) in judging all three speakers; a listener scoring 13 for one speaker might score 8 and 5 on the other two speakers.

In 35 "runs", 7 out of 16 test items were identified correctly. This is 23.3% of the total. The range from 6 to 11 contains 123 of 150 possible responses, constituting 82% of the total. The distribution may be considered normal, centering around an average of 7.95, or 49.9%.

5. Interpretation of the results of the listening test

The results are interpreted within the framework of signal detection theory (MacMillan and Creelman, 1991). The responses of the listeners are organized into a matrix, which in the present case looks like the matrix shown in Table 3.

Table 3

Responses of 50 listeners to 48 test items produced by three speakers

Produced as	Perceived as	
	Partitive	Illative
Partitive	583	617
Illative	590	610

In the terminology of detection theory, the case of partitive heard as partitive is called a hit, partitive heard as illative is a miss, illative heard as partitive is a false alarm, and illative heard as illative is correct rejection. Each of 50 listeners made 48 judgments, for a total of 2400 responses. Chance distribution would yield 600 judgments in each position of the matrix. Just by examining the data by eye, the subjects are slightly less successful than chance in identifying the partitive, and only slightly above chance (not significantly so) in identifying the illative. The pattern suggests that there may be a slight bias in terms of responding "illative".

Subjecting these data to d-prime analysis (the measure of sensitivity in detection theory), d-prime = –.10. This demonstrates that d-prime is practically zero, which means that the subjects show no sensitivity to the intended difference between the stimuli.

The results for each of the speakers will now be presented separately.

Table 4

Responses of 50 listeners to test items produced by Speaker 1

Produced as	Perceived as	
	Partitive	Illative
Partitive	186	214
Illative	201	199

There is again a bias to answer "illative", and no indication of being able to make the identification. D-prime here is also negative (–.075), which will always be the case if the proportion of false alarms is greater than the proportion of hits.

Table 5

Responses of 50 listeners to test items produced by Speaker 2

Produced as	Perceived as	
	Partitive	Illative
Partitive	185	215
Illative	200	200

There is again no indication of the subjects being able to perceive the distinction. D-prime is also negative (–.10), showing lack of sensitivity to the difference.

Table 6

Responses of 50 listeners to test items produced by Speaker 3

Produced as	Perceived as	
	Partitive	Illative
Partitive	212	188
Illative	189	211

It is interesting that listening to this speaker, the subjects showed some preference for the correct response. D-prime is equal to .15, but calculating the confidence interval at the .05 level for these data, the confidence interval includes zero. Thus these data, too, do not show a d-prime greater than zero at an alpha level of .05, which means that this is not a significant result.

6. Conclusions

The results of the listening test indicate that the listeners do not distinguish between the partitive and short illative forms. Whatever phonetic differences were present in the test words, they were part of normal variability and did not constitute distinguishing characteristics of the two forms under study. More generally, these results cast doubt on the possible existence of a fourth degree of quantity.

Acknowledgments

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