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SPACE AND DEMONSTRATIVES: AN EXPERIMENT WITH ESTONIAN EXOPHORIC DEMONSTRATIVES

Maria Reile
University of Tartu

Abstract. In recent years, the study of exophoric demonstratives has increased in Indo-European languages, but has received fairly little research attention in Estonian. The aim of the study is to verify by the means of a production experiment whether distance has an effect on the choice of Estonian exophoric demonstratives. Binomial mixed effects logistic regression analysis suggests that distance is the best predictor for the choice between demonstrative adverbs, but it has no effect on the choice between the demonstrative pronoun *see* 'this' and other referential devices, which can be explained by the lack of usage of the demonstrative pronoun *too* 'that'. However, there also occurs unexpected usage of demonstrative adverbs that is best explained by other attributes of the referent and reference situation rather than simple spatial opposition. Thus, although the best predictor in demonstrative adverb choice proves to be distance, other attributes may play a fairly important role.

Keywords: Estonian, exophoric demonstratives, production experiment, spatial opposition, binomial mixed-effects logistic regression

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1. Introduction

Demonstratives are deictic expressions which help to identify and locate the referent for the addressee in place and time (cf. Bühler 1934/1982, Lyons 1977, Fillmore 1997). Demonstratives occur in all languages across the world and they belong to the set of the first few non-content words that children produce during the one-word stage (Clark 1978) which makes them universal and basic words in all languages. Demonstratives are also very often accompanied by deictic pointing gestures (Diessel 1999, Levinson 2004).

In every language there are at least two deictically contrastive demonstratives, such as *this* and *that* in English, but in some languages demonstratives can also be distance-neutral. In the case of distance-neutral demonstratives, the distance of the referent from the speaker

is expressed by adding demonstrative adverbs to the neutral form. For instance in German, demonstrative adverbs *hier* 'here' and *da* 'there' are added to the neutral forms *dieser* and stressed *der*, *das*, *die*. (For overview see Diessel 2005) The use of demonstratives can be divided into exophoric (situational) and endophoric (textual) use (Haliday and Hasan 1976). Demonstrative use is exophoric when a speaker refers directly to something that is physically evident in his surroundings and endophoric when the demonstrative refers to a referent that exists in the ongoing discourse (in written text or spoken language).

The distinction between exophoric demonstratives is generally based on the proximal-distal opposition, where proximal demonstratives (proximals), such as English *this* and *here*, are used to refer to referents within one's immediate (hand) reach, while distal demonstratives (distals), such as English *that* and *there*, are used to refer to referents that are situated out of one's immediate reach. In recent years, the simple traditional distance-based differentiation of demonstratives (cf Bühler 1934, Lyons 1977, Fillmore 1997) has been challenged and other possible explanations have been presented, such as the accessibility of the referent, alerting the attention of the addressee and creating joint focus of attention (for example Diessel 2006, Jarbou 2010, Piwek et al 2008). The study of exophoric demonstratives has increased in Indo-European languages but has received relatively low research attention in Estonian, thus study of exophoric demonstratives is needed. The aim of this paper is to present the results of a production experiment with Estonian exophoric demonstratives.

The paper is organised as follows. First, a brief overview is given of the theoretical background and the system of Estonian demonstratives, after which the experiment design and analysis methods are described. Then the results are presented, followed by discussion and conclusions.

2. Theoretical background

Traditionally, exophoric demonstratives are seen as egocentric – the speaker considers himself as a deictic spatiotemporal zero-point in the moment of utterance and relates everything to his viewpoint (Lyons 1977). It has been argued that simple proximal-distal egocentric use of demonstratives is not sufficient explanation for demonstrative choice. For example, it does not explain situations where the speaker switches from a distal to a proximal demonstrative (or vice versa) even though

the location of the referent and the speaker remains constant (Jarbou 2010).

While demonstratives are used to indicate the location of the referent relative to the speaker, Levinson (2004) argues that analysis of demonstratives according to their spatial features is not always adequate. According to recent findings, the function of demonstratives is not only to indicate the referent's distance from the speaker, but also used to create joint focus of attention. Many languages use demonstratives to direct the addressee's attention to the referent without indicating its location relative to the deictic centre. (Diessel 2006) Another possible function of demonstratives is to indicate the accessibility of the referent to the addressee. According to Jarbou (2010), accessibility of the referent can be based on whether the referent is, regardless of its proximity, visually easily recognizable for the addressee or not. Easily accessible referents are visually easily recognizable and referents which are not easily accessible are visually harder to recognize. Laury (1997) treats a referent as easily accessible if it is believed to belong to the sphere of the speaker or the addressee, and not easily accessible if it does not belong to either of those spheres. Another possibility is to determine a referent's accessibility based on whether or not it is in the focus of attention. According to Piwek et al (2008), a referent is easily accessible or has high accessibility if it belongs to the focus of attention and is not easily accessible if it is out of the focus of attention. All these approaches deal with creating the joint focus of attention between interlocutors.

While research on demonstratives on the basis of accessibility of the referents has produced contradictory results (see Piwek et al. 2008 and Jarbou 2010), the basic distance-based distinction of demonstratives seems to hold. For example, Coventry et al.'s (2008) experimental study on English and Spanish demonstratives confirms the use of distals for distant referents and proximals for proximate referents in English and Spanish. Tóth et al.'s (2014) experimental research on Hungarian and Dutch demonstratives shows similar results.

Overall, in recent years, there has been an increase in studies on exophoric demonstratives, seeking to determine the factors that influence the choice of demonstratives. The use of demonstratives is no longer seen as being dependent only on the static proximal-distal opposition, but also on other more dynamic factors such as joint attention, focus of interlocutors (Strauss 2001, Diessel 2006, Jarbou 2010) and the accessibility of the referent (Laury 1997, Piwek et al 2008, Jarbou 2010). At the same time, the effect of distance on demonstrative choice

should not be overlooked, as it still proves to be significant (Coventry et al. 2008, Tóth et al. 2014).

3. Estonian demonstratives

While there are an increasing number of studies on exophoric demonstratives in Indo-European languages, most of the research on Estonian demonstratives has focused on endophoric demonstratives (see Pajusalu 2009 for an overview). However, Estonian provides an interesting subject for research on exophoric demonstratives, as three different demonstrative pronoun systems can be found in a relatively small geographical territory with less than 1 million native speakers. According to Pajusalu (1998, 2009, 2015), only the demonstrative pronoun *see* 'this' is used in Northern Estonia. This means that *see* can be used to refer to referents that are situated near the speaker as well as to referents that are further away.

For example:

(1) See auto on punast värvi.
DEM.PRON car is red colour
"This car is red."

Example sentence (1) would be used exophorically while referring to a car that is near the speaker as well as referring to a car that is situated far from the speaker.

In South Estonian, there is a three-way system *sjoo-taa-tuu*. The demonstrative *sjoo* refers to an entity that is situated near the speaker or is in the shared space of the speaker and the addressee. *Taa* refers to an entity that is situated near the addressee or is in his possession. *Tuu* is used for indicating referents that are situated far from the speaker and the addressee. For an overview of the use of South Estonian demonstratives, see Pajusalu (2015).

In the area between the Northern Estonian dialect and South Estonian, there is a two-way demonstrative system consisting of *see* 'this' and *too* 'that'. The traditional view of Estonian demonstratives is that *see* refers to entities that are near in space or time and *too* to entities that are further away (EKG I 1995: 29) – the same classical spatial oppositional approach for explaining the choice between demonstratives as appears in Bühler (1934), Lyons (1977), Fillmore (1997) and Coventry et

al. (2008). However, it has been argued that the use of *too* in Common Estonian might be disappearing (Pajusalu 2006). The use of the demonstratives *see* 'this' and *too* 'that' can be illustrated as follows:

(2) See auto on punast värvi ja too on sinist värvi.
DEM.PRON car is red colour and DEM.PRON is blue colour
"**This** car is red and **that** one is blue."

While there are three demonstrative pronoun systems in Estonian, there is only one system for demonstrative adverbs. In Estonian there are six demonstrative adverbs, which are spatially oppositional: proximals *siia* 'to here', *siin* 'here', *siit* 'from here' and distals *sinna* 'to there', *seal* 'there', *sealt* 'from there'. The present article analyses the use of the demonstrative adverbs *siin* 'here', *siit* 'from here', *seal* 'there' and *sealt* 'from there'.

4. Method

Since demonstratives are inherently context-bound (Enfield 2003), an empirical approach was needed. Thus, to properly understand the mechanism that affects the choice of exophoric demonstratives, an experimental approach was selected, which enables one to minimize the stimuli that may affect demonstrative choice. The data on the usage of exophoric demonstratives in ongoing interactive situations was collected via an experimental method based on previously published literature. This approach adopted and merged the perspective of physical distance (Coventry et al. 2008) with the setting of naturally occurring role-play (Piwek et al. 2008).

4.1. Participants

In total, 20 participants, all native Estonian speakers aged 19–27, were enrolled in the study using a respondent-driven sampling technique. There were 10 instructors (4 males and 6 females) and 10 builders (all female). All the participants were students, with 8 instructors originating from a region where only one demonstrative pronoun is used and 2 from a region where two demonstrative pronouns are used.

4.2. Procedure and stimuli

The participants sat behind a big round table. On the table in front of the participants lay 45 Lego blocks in four colours (red, green, yellow and blue) and three sizes (small, medium and large). The blocks were numbered and were placed on the table seemingly randomly in varying distances from the participant, divided evenly before and after the 75 cm line (which was marked on the side of the table, being visible only to the experimenter). The 75 cm line was taken as an anchor point in the switch of the use of demonstratives (see Figure 1 in the Appendix).

In the experiment, subjects worked in pairs to rebuild a simple structure using Lego blocks following an example model. The participants' roles – builder and instructor – were left for the participants themselves to decide. The task of the "builder" was to select and place the blocks from the table (one by one) in a pre-defined order, following the instructions of the "instructor" to reconstruct the ready-built model (visible only to the "instructor").

The participants were informed about their tasks in pre-test briefing and were given oral instructions ensuring the possibility to ask questions from the experimenter if necessary. The given instructions were rather loose and did not specify the use of demonstratives in order not to prime the use of demonstratives for the participants.

The participants were given the following instructions: **instructors** were asked not to use place descriptive instructions such as "the last one", "the first one", "the left one", "the right one" or block numbers while referring to the blocks, but they were allowed to use block colours and sizes and indicative gestures as they saw fit. They were also asked to refer to one block at a time. The **builders** were asked not to take several blocks at once. They were allowed to specify the block if the instructions given were not clear enough.

To ensure the same sequence of block-taking in all the trials, the instructors were also asked to start the instructions with a specific block at the base of the construction and move from there counter-clockwise while building the 'foundation'.

After the experiment, participants were asked to fill in a short questionnaire about socio-demographic indicators (such as their age, education, origin and current place of stay) and their awareness of the use and distinction between distal and proximal demonstrative pronouns. The purpose of the questionnaire was firstly to gather data to compare the actual demonstrative usage with participants' own

assessments of the way they use demonstratives; secondly, to verify the connection between the origin of the participant and the use of Estonian demonstratives; and thirdly, to get possible stimuli for further research on Estonian demonstratives. Since the questionnaires were given after the experiment in order not to betray the purpose of the experiment, the experimenter had no knowledge of whether the instructors used the demonstrative pronoun *too* or not.

The experiment was conducted ten times, each with different participants, with an average duration of 10 minutes. All participants gave their consent to participate and have the experiment video-recorded.

The aim of the experiment was to verify whether distance really has an effect on demonstrative choice, i.e. whether the traditional distinction between demonstratives holds, and whether *too* is on the verge of disappearing as Pajusalu (2006) argues.

Hypothesis: The demonstrative pronoun *see* 'this' and the demonstrative adverbs *siin* 'here' and *siit* 'from here' are used referring to blocks that are placed in front of the 75 cm line, while the demonstrative pronoun *too* 'that' and the demonstrative adverbs *seal* 'there' and *sealt* 'from there' are used referring to blocks that are placed behind the 75 cm line.

4.3. Data coding

The collected data was transcribed and coded for demonstrative use, placement of the blocks, gesture use, block descriptions and location descriptions. Demonstrative use was divided into two dependent variables: demonstrative pronouns and demonstrative adverbs. *Demonstrative pronouns* were coded as proximal demonstratives or other referential devices. The *demonstrative adverbs siin* 'here' and *siit* 'from here' were coded as proximal demonstratives and other referential devices. The *demonstrative adverbs seal* 'there' and *sealt* 'from there' were coded as distal demonstratives and other referential devices. In this study, there were altogether three independent variables, *placement*, *gesture use* and *location description*, which were coded as follows: *Placement* was divided into two values: near the speaker (before 75 cm) and far from the speaker (after 75 cm). The *gesture use* was divided into two values: use of indicative gesture and no gesture. *Location descriptions* were divided into two values, description or no-description.

Block descriptions which stood alone, meaning that after the description no demonstrative pronoun use followed (thus falling under the category of other referential devices), were divided into two values: description and no-description. Also, descriptions which semantically marked location but modified the noun *klots* 'block' belonged to this group, for example: *Kõige tagumine klots* 'the block at the very back'. Block descriptions that were given without actually referring to the blocks on the table (the instructors were looking at the model, while describing the specific block) were not coded as reference to the blocks. They were taken as previous information given to the builders to make block finding easier.

Only the utterances of the instructors were analysed, since the builders' demonstrative usage depended on the nature of the given instructions. The more clear and straightforward the instructions were, the less the builders spoke (ultimately using no language at all, just carrying out the given orders). The final dataset, using references to the blocks as unit of analysis, consisted of 558 indications to the blocks to be analysed.

4.4. Method of data analysis

For data analysis, a binominal mixed effects logistic regression with odds ratios and 95% confidence intervals was used to determine statistically significant variables which predict the choice of demonstratives. The models were conducted, using statistical software R. The Binomial mixed effects logistic regression model was chosen as the data consisted of repeated measures of 10 subjects and the response variables were coded as a binary response. This analysis method was chosen because mixed effects models have a lower risk of capitalization of chance (Type I error) than compared to for example ANOVA (Quené et al. 2008). Mixed effects models take into account random effects and fixed effects. Random effects in the model are variables that are not repeatable (Baayen 2008: 241), in this case the subjects of the experiment. Fixed effects, on the other hand, are considered to be the factors that are repeatable (Baayen 2008: 241), in this study the aforementioned predictive variables, such as the use of gesture, placement of the blocks etc (see section 3.3). For binary response variables, *success* is used to denote the outcome of interest (in this study the use of a demonstrative) and *failure* for the other outcome (in this study the use of referential

devices excluding the use of the demonstrative in question). The ***odds*** of success are equal to the probability of success divided by the probability of failure. For example if the probability of success is 0.75, then the probability of failure equals 1 – 0.75 = 0.25 and the odds of success = 0.75/0.25 = 3.0. When odds = 3.0, success is 3 times as likely as failure. (Agresti and Finlay 2009: 235). The 95% confidence interval is used to estimate the precision of the odds ratio. A large confidence interval indicates a low level of precision and a small confidence interval indicates a high level of precision. If the confidence interval includes 1 (for example 0.96–2.80), the estimated odds are not statistically significant. (Szumilas 2010)

5. Results

5.1. The use of demonstratives and other referential devices in the experiment

Descriptive statistics of the referential devices used in the experiment are given in Table 1. In the majority of cases, *see* 'this' was used in referring to the blocks, either nominally or adnominally. The demonstrative *too* 'that' was not used by the participants. The second-largest group of block references were block descriptions, used either with or without additional place descriptions. The third most common usage of reference was the demonstrative pronoun *see* used either nominally or adnominally and combined with demonstrative adverbs. As expected, the use of only demonstrative adverbs without block description or/and a demonstrative pronoun is quite rare. The demonstrative *teine* 'other' occurred in 11 cases and the use of only a gesture without any linguistic devices 19 times. The smallest group of referential devices are single block location descriptions.

Table 1. Referential devices used in referring to the blocks

Referential device	N (%)
Demonstrative pronoun *too* 'that'	0 (0)
Demonstrative pronoun *see* 'this'	261 (46.8)
Demonstrative pronoun *see* 'this' + proximal or distal proadverb	80 (14.3)
Demonstrative proadverb	25 (4.5)
Demonstrative proadverb + block description	32 (5.7)
Demonstrative *teine* 'other'	11 (2)
Only block description	121 (21.7)
Only location description	9 (1.6)
Only gesture	19 (3.4)
Total	558 (100)

5.2. Results of binary mixed effects logistic regression

The use of only gestures with no linguistic devices was excluded from the model, since the focus of the study is on linguistic devices. Thus there were 19 observations left out from the data that was used to model the use of demonstratives, leaving a total of 539 observations.

For all independent variables, the binomial mixed effects logistic regression method was used to investigate the association between the use of demonstratives and three fixed effect variables referring to the block. *Placement* – whether the block was placed before the 75 cm line or after. *Gesture use* – whether or not the referring act was accompanied by a gesture. *Location description* – whether a location description was used or not. Also, the random effect of the subject was taken into account while constructing the model. The predictive variables for the model were chosen based on the hypothesis of the experiment and possible logical predictive variables (such as gesture, which is known to often accompany demonstratives). As the mixed effects model does not give odds ratios, the following numbers were calculated by exponentiating the estimates and confidence intervals, which were calculated through standard errors. The significant fixed effects values in predicting demonstratives are given in Tables 3, 5–9. In the results section, two models are presented for all demonstratives, an unadjusted and an adjusted model. The unadjusted models calculate the statistical

significance of the independent variables one by one, that is, the model takes into account only one predictive variable at a time. In the adjusted models, all statistically significant variables are taken into the model at the same time, and the model takes into account all the variables while calculating the statistical significance of individual variables. Differences between the significance of the variables in the adjusted and unadjusted models indicate a possible interaction. As there were significant interactions in all the models, the results of the adjusted models with interactions are presented.

5.2.1. Results of the analysis of see *'this'*

The relationship between the use of *see* 'this' and the predictive variables is given in Table 2. As can be seen, *see* was used for blocks placed both before and after the 75 cm line. In the majority of cases, an accompanying gesture was used and no location description was added.

Table 2. Distribution of the use of the demonstrative pronoun *see* 'this' across predictive variables[1]

		Demonstrative *see*		Other		
		N	%	N	%	100%
Placement of the blocks	After 75 cm	163	61.3%	103	38.7%	100%
	Before 75 cm	182	66,7%	91	33,3%	100%
Gesture use	Gesture	289	76.5%	89	23.5%	100%
	No gesture	56	34.8%	105	65.2%	100%
Use of location description	Location description	44	40.7%	64	59.3%	100%
	No location description	301	69.8%	130	30.2%	100%

[1] The demonstrative pronoun *too* was not used.

The results of the unadjusted model (Table 3) show that the statistically significant explanatory variables are gesture use and location description. The placement variable has no statistically significant effect on the choice of the demonstrative pronoun *see* and other referential devices, but it does have statistically significant interactions with the use of gesture and location description. Gesture use predicts the

use of *see*, as it has a positive sign, and the use of location description predicts the use of other referential devices, as it has a negative sign. When the referent is near and location description is given, the use of *see* decreases. When the referent is near and an accompanying gesture is used, the use of *see* increases.

Table 3. Unadjusted model of independent variables predicting the use of the demonstrative pronoun *see*

Fixed effects	Estimate	Std. Error	z value	Pr(>|z|)	Odds ratio (CI 95%)
Placement before 75 cm	0.3323	0.2042	1.627	0.120	1.39 (0.93–2.08)
Gesture use	1.6239	0.3033	5.354	8.61e–08***	5.07 (2.78–9.19)
Use of location description	–0.5766	0.2635	–2.188	0.0287 *	0.56 (0.34–0.94)
Placement before 75 cm: Use of location description	–1.2849	0.5100	–2.519	0.0118 *	0.28 (0.10–0.75)
Placement before 75 cm: Gesture use	2.0336	0.4599	4.421	9.83–06 ***	7.64 (3.10–18.82)

Reference categories are placement after the 75 cm line, no gesture use, no location description. And for the interactions: placement after the 75 cm line and no use of location description, and placement after 75 cm and no use of gesture. The statistically significant variables are marked with *. p<0.1 ., p<0.05 *, p<0.01**, p<0.001 ***.

The best main effects predictor for *see* in the unadjusted model was gesture use; the odds of using *see* while referring to the blocks were 5 times higher (95% CI 2.77–9.11), when an accompanying gesture was used than without the use of gesture. The best predictor in the unadjusted model for the demonstrative pronoun *see* was the interaction between two variables: placement before 75 cm and gesture use. The odds of using *see* were 7 times higher (95% CI 2.98–17.97) when the block was positioned before the 75 cm line and an accompanying gesture was used compared to when the block was located beyond the 75 cm line and no accompanying gesture was used.

The results of the adjusted model with interactions show that the interaction between placement before 75 cm and the use of gesture is the best descriptive variable for predicting the use of the demonstrative pronoun *see*. When the block is situated before the 75 cm line and an

accompanying gesture is used while referring to the block, the odds of using *see* are 7 times higher (95% CI 2.96–18.00) than to when the block is located beyond the 75 cm line and no accompanying gesture is used. As can be seen in Table 4, the placement variable as a main effect also becomes statistically significant, but the sign changes, meaning that the odds of use of *see* decrease. This is to be expected, as most of the demonstrative usage is already explained by the interaction of the variables of placement before 75 cm and use of gesture. The interaction between the variables of placement before 75 cm and the use of location description became statistically insignificant when added into a model with main effects and interaction of placement before 75 cm and use of gesture, and was thus discarded from the model.

In addition, a model was built with no interaction terms. An ANOVA test showed that the difference between the model without the interaction and the model with the interaction was statistically significant (χ^2 19,046 and $p < 0.001$). The model with the interaction was better fitted to the data (Somers' C=0.83 and Dxy=0.66), thus the model with interaction terms was selected and the model without interaction is not presented.

Table 4. Adjusted model of independent variables with interaction predicting the use of the demonstrative pronoun *see*

Fixed effects	Estimate	Std. Error	z value	Pr(|z|)	Odds ratio (CI 95%)
Gesture use	0.7192	0.3641	1.975	0.0482*	2.05 (1.01–4.19)
Placement before 75 cm	–1.0038	0.3682	–2.726	0.0064 **	0.37 (0.18–0.75)
Use of location description	–0.5333	0.2776	–1.921	0.0547 .	0.59 (0.34–1.01)
Placement before 75 cm: Gesture use	2.0309	0.4625	4.392	1.13e–05 ***	7.62 (3.08–18.86)

The reference categories are no gesture use, placement after 75 cm and no use of location description and the interaction between placement after 75 cm and no gesture use. Statistically significant variables are marked with *. $p < 0.1$., $p < 0.05$ *, $p < 0.01$ **, $p < 0.001$ ***.

5.2.2. Results for the demonstrative adverbs siin, siit *and* seal, sealt

Since there were no occurrences of the demonstrative pronoun *too* in the data and thus no spatially oppositional demonstrative for the demonstrative pronoun *see*, explanatory variables were tested for demonstrative adverbs. The distribution of the usage of proximal and distal demonstrative adverbs across predictive variables is given in Table 5. As can be seen in Table 5, proximal demonstrative adverbs were mostly used for the blocks positioned before the 75 cm line, when gesture was added and no location description was used. The same applies for distal demonstrative adverbs, only the placement of the blocks was after the 75 cm line. The category "other" denotes here other referential devices, such as block descriptions and uses of *see* without the demonstrative adverbs.

Table 5. Distribution of the use of demonstrative adverbs across predictive variables

		Proximal		Distal		Other		
		N	%	N	%	N	%	100%
Placement of the blocks	After 75 cm	12	4.5%	75	28.2%	179	67.3%	100%
	Before 75 cm	45	16.5%	7	2.6%	221	80.9%	100%
Gesture use	Gesture	48	12.7%	61	16.1.%	269	71.2%	100%
	No gesture	9	5.6%	21	13.0%	131	81.4%	100%
Use of location description	Location description	15	13.9%	32	29.6%	61	56.5%	100%
	No location description	42	9.7%	50	11.6%	339	78.7%	100%

The results of the unadjusted model (Table 6) show the effect of descriptive variables on the choice of the demonstrative adverbs *siin*, *siit* with respect to other referential devices. As can be seen, the best predictive variable for proximal demonstrative adverb choice is placement. If the block was located before the 75 cm line, the odds of using the

demonstrative adverbs *siin*, *siit* were 4 times (95% CI 2.84–8.62) higher than when the block was located after the 75 cm line. The interaction between placement and use of location description is also statistically significant. When the block was situated before the 75 cm line and location description was added, the odds of using the demonstrative adverb *siin* or *siit* were 11 times (95% CI 1.25–101.65) higher than when the block was situated after the 75 cm line and no location description was used.

Table 6. Unadjusted model of predictive variables predicting the choice of the demonstrative adverbs *siin*, *siit*

Fixed effects	Estimate	Std. Error	z value	Pr(|z|)	Odds ratio (CI 95%)
Placement before 75 cm	1.4901	0.3388	4.398	1.09e–05 ***	4.44 (2.84–8.62)
Gesture use	1.2822	0.4368	2.936	0.0033 **	3.60 (1.53–8.48)
Use of location description	0.4656	0.3469	1.342	0.18	1.59 (0.81–3.14)
Placement before 75 cm: Use of location description	2.4243	1.1210	2.163	0.03058*	11.29 (1.25–101.65)

The reference categories are no gesture use, no location description, placement after 75 cm and placement after 75 cm in interaction with no location description. Statistically significant variables are marked with *. P < 0.01*, p < 0.01 **, p < 0.001 ***.

The adjusted model with interactions proved to be better than the model without interactions (Somers' C=0.81, Dxy=0.61) and the ANOVA test showed that the difference between the two models is statistically significant (χ^2 9.53 and p< 0.01). Thus the model with interaction was chosen. The best explanatory main effects variable in the adjusted model for predicting the choice of demonstrative adverbs *siin*, *siit* was gesture. When a gesture was used while referring to the block, it was 6 times (95% CI 2.24–16.45) more likely that the demonstrative *siin* or *siit* was used compared to when there was no accompanying gesture. The placement variable also has a statistically significant role

in predicting the choice of the demonstratives *siin* and *siit*. When the blocks were located before the 75 cm line, the use of *siin* or *siit* was more than twice as likely (95% 1.40–5.99) as when the blocks were positioned after the 75 cm line. The interaction between placement and use of location description increases the odds of using the demonstrative *siin* or *siit*. The odds of using the demonstrative *siin* or *siit* were more than 18 times (95% CI 1.95–179.71) higher when the block was situated before the 75 cm line and location description was used compared to when the block was situated after the 75 cm line and no location description was used.

Table 7. Adjusted model of independent variables predicting the choice of the demonstrative adverbs *siin*, *siit*

Fixed effects	Estimate	Std. Error	z value	Pr(|z|)	Odds ratio (CI 95%)
Placement before 75 cm	1.0775	0.3703	2.910	0.003616**	2.94 (1.40–5.99)
Gesture use	1.8033	0.5087	3.545	0.000392 ***	6.07 (2.24–16.45)
Use of location description	–1.1541	1.0566	–1.092	0.274711	0.32 (0.04–2.50)
Placement before 75 cm: Use of location description	2.9291	1.1542	2.538	0.011158*	18.71 (1.95–179.71)

The reference categories are placement after 75 cm, no gesture use, no use of location description and interaction between placement after 75 cm and no use of location description. Statistically significant variables are marked with *. $p < 0.05$ *, $p < 0.01$ **, $p < 0.001$ ***.

While gesture use was a statistically significant explanatory variable in predicting the choice between the demonstrative adverbs *siin*, *siit* and other referential devices, it was not so in predicting the choice of the demonstratives *seal*, *sealt*. In the unadjusted model, the best predictor in explaining the choice between the demonstrative adverbs *seal*, *sealt* and other referential devices was placement. The odds of choosing a demonstrative distal adverb were over 16 times higher when the block was located after the 75 cm line than when it was located before the 75 cm line (95% CI 7.25–35.99). The interaction between the use of location description and the use of gesture was also a statistically signifi-

cant explanatory predictor. The odds of choosing the demonstratives *seal*, *sealt* were over 7 times higher (95% CI 2.31–24.81) when location description and gesture were used than when no location description and no gesture were used.

Table 8. Unadjusted model of independent variables predicting the choice of the demonstratives *seal*, *sealt*

Fixed effects	Estimate	Std. Error	z value	Pr(|z|)	Odds ratio (CI 95%)
Placement after 75 cm	2.7819	0.4089	6.803	1.02e–11 ***	16.15 (7.25–35.99)
Gesture use	0.5428	0.3534	1.536	0.125	1.72 (0.86–3.44)
Use of location description	1.3514	0.2922	4.625	3.75e–06 ***	3.86 (2.18–6.85)
Use of location description: Gesture use	2.0234	0.6060	3.339	0.000841 ***	7.56 (2.31–24.81)

The reference categories are placement before 75 cm, no gesture use, no use of location description and the interaction between no use of location description and no gesture use. Statistically significant variables are marked with *. $p < 0.05$ *, $p < 0.01$**, $p < 0.001$ ***.

Gesture use as a main effect is not a statistically significant variable, in either the adjusted or unadjusted model, in explaining the choice between the demonstrative adverbs *seal*, *sealt* and other referential devices. As in the unadjusted model, the placement after the 75 cm line and the interaction gesture use and location description are statistically significant predictive variables in explaining the choice of the demonstratives *seal*, *sealt* in the adjusted model. A model without interaction terms was also built, but the model with interaction proved to be better fitted to the data (Somer's C=0.86, Dxy=0.72) and an ANOVA test showed that the differences between the models are statistically significant (χ^2 9.188, $p<0.01$).

Table 9. Adjusted model with interaction of independent variables predicting the choice of the demonstratives *seal*, *sealt*

Fixed effects	Estimate	Std. Error	z value	Pr(>|z|)	Odds ratio (95%)
Placement after 75 cm	2.7867	0.4238	6.576	4.84e–11 ***	16.22 (7.07–37.24)
Use of location description	0.0316	0.5452	0.058	0.95375	1.03 (0.35–3.00)
Gesture use	0.0927	0.4328	0.214	0.83043	1.10 (0.47–2.56)
Use of location description: Gesture use	2.0351	0.6768	3.007	0.00264 **	7.65 (2.03–28.83)

The reference categories are placement before 75 cm, no use of location description, no gesture use and the interaction between no use of location description and no gesture use. Statistically significant variables are marked with *. $p < 0.05$ *, $p < 0.01$ **, $p < 0.001$ ***.

The overall results of the quantitative analyses show that in predicting the choice of *see* 'this', distance was not statistically significant as a main effect, suggesting that the independent variable alone does not have enough power to distinguish between *see* and other referential devices. The variable became statistically significant only by the influence of the interaction between placement before 75 cm and gesture use. As can be seen, gesture use is tightly connected to the choice of *see*, as it was the best predictive variable for this demonstrative. The best predictor for explaining the choice between demonstrative adverbs is distance; proximal demonstrative adverbs are used for nearby referents and distal adverbs for far-away referents. While the use of gesture is statistically significant in differentiating the use of the demonstrative adverbs *siin*, *siit* from other referential devices as a main effect, it did not prove to be significant in explaining the choice between the demonstrative adverbs *seal*, *sealt* and other referential devices. The use of gesture is statistically significant in explaining the choice between the demonstrative adverbs *seal*, *sealt* and other referential devices only in interaction with the use of location description.

5.3. Questionnaires

An open-answer survey questionnaire was used to determine the factors that differentiate the distal demonstrative pronoun *too* 'that' and the proximal demonstrative pronoun *see* 'this' for the participants. Although only the data of the instructors is analysed, the results of the questionnaires from both instructors and builders are presented, to give a broader overview of the assessed understanding of Estonian demonstratives. Results from the questionnaires indicate that participants tend to associate the two demonstrative pronouns with spatial opposition, where *see* 'this' refers to referents that are near and *too* 'that' refers to referents that are further away. Only four participants claimed not to use *too*, all of whom were instructors and originated from North Estonia. The participants (3 instructors and 3 builders) who claimed to use both demonstrative pronouns originated from South Estonia or had been living in South Estonia for several years. 9 participants (3 instructors and 6 builders) claimed to use *too* rarely or very rarely; one of the builders failed to give sufficient information in this regard. In two cases, the influence of other speakers on the use of *too* was mentioned (this by participants originally from North Estonia). They use *too* only with people who themselves use *too*.

Although the participants tend to associate the use of *too* with spatially distant referents, other properties of the referent were also mentioned, such as visibility (for using *see*) or non-visibility (for using *too*) of the referent (which is one of the features that is encoded in demonstratives according to Diessel (1999)), as well as the size of the referent (using *too* for larger referents). While referring to time, *too* marks something in the past. The use of *see* was associated with exophoric reference, as was the use of *too*, but also with concreteness of the reference and, interestingly, with neutrality. Participants who claimed not to use *too* claimed to use *see* for both nearby and distant referents.

Overall, the results of the questionnaires suggest that participants tend to associate the use of *see* and *too* with spatial opposition, even if they do not themselves use *too*, but there are also other properties that are associated with demonstrative choice.

6. Discussion

Overall results (see Table 1) show that the main demonstrative used for indicating the blocks was *see* 'this', used either nominally or adnominally and frequently in combination with demonstrative adverbs. The second-largest group of referential devices used to indicate the blocks were single block descriptions. Since the participants were given relatively loose instructions (see the method section), this was to be expected, as according to Lyons (1977) one way of identifying a referent for the hearer is to describe it. The third most common referential device used in the data set to identify the blocks were the proximal and distal demonstrative adverbs *siin* 'here', *siit* 'from here' and *seal* 'there', *sealt* 'from there'. The data also revealed the use of the pronoun *teine* 'other', which is used for contrastive distinction between referents with the same attributes.

The absence of the demonstrative *too* 'that' in the experiment gives reason to believe that *too* is not commonly used. This assumption is supported by the results of the questionnaires, where only one of the instructors claimed to use *too* frequently and half of them claimed not to use it at all. As the majority of the instructors originated from regions other than South Estonia (over half of them from North Estonia), the lack of use of *too* could be explained by the origin of the participants. Although the regional variance of demonstrative systems in Estonian (Pajusalu 2009) is a likely explanation for the lack of use of *too*, it is possible that the absence of *too* is due to the design of the experiment, mainly the placement of the blocks on the table. As can be seen in Figure 1, there are a lot of possible referents close together in a relatively small space. Thus it is plausible that the instructors want to at first guide the builders' attention to the block, using *see* and a gesture, and then mark the location of the block by using a demonstrative adverb and/or a location description in addition. Thus, as is suggested by Diessel (2006), the instructor first creates joint focus of attention and then marks the location of the referent. However, since the majority of the instructors came from Northern Estonia (the region with only one demonstrative pronoun) and marked in the questionnaire that they use *too* rarely or not at all, the former explanation for the absence of *too* seems more likely.

The quantitative analysis of the experimental results suggests that for the demonstrative *see*, distance has a statistically significant effect only on the influence of gesture use. The best predictive variable for explaining the choice between *see* and other referential devices was

the interaction between the two variables: gesture use and placement. If a gesture was used while indicating the referent and the referent was near, that is, it was positioned before the 75 cm line, it was 7 times more likely that *see* would be used (see Table 4). It would be tempting to say that this proves that the choice between demonstratives is based on the distance of the referent, but the fact that the placement variable had no effect on predicting the choice of *see* as a main effect (without the interaction) indicates that more complex mechanisms are at work. One could still argue that Estonian *see* could be taken as a distance-neutral demonstrative, as it can be combined with both spatially oppositional adverbs *siin* and *seal*, which is according to Diessel (2005) a characteristic of a distance-neutral demonstrative. The distance neutrality of the Estonian demonstrative pronoun *see* is also supported by Larjavaara's (1986) study of demonstratives. Thus it could be said that *see* is used to alert the hearer and it functions as a focusing element rather than indicating spatial contrast.

The results for demonstrative adverbs show that the best predictor for differentiating between proximals and distals was placement. The distal demonstrative adverbs *seal*, *sealt* were used for blocks situated beyond the 75 cm line, while the proximal demonstrative adverbs *siin*, *siit* were used for the blocks situated before the 75 cm line. These results corroborate the experiment with English and Spanish demonstrative pronouns by Coventry et al (2008) where the stimulus of distance was tested. While in previous studies the focus has been on demonstrative pronouns, the current study shows that in the absence of a contrastive demonstrative pronoun, the distance effect on demonstrative choice begins approximately from the same distance (75 cm) for demonstrative adverbs as well as for spatially contrastive demonstrative pronouns. These results suggest that Estonian proximal demonstrative adverbs are used to refer to referents that are situated in one's immediate reach and distal demonstrative adverbs are used for the referents that are situated outside one's immediate reach, as is suggested in various classical explanations of demonstratives. This is also supported by Levinson (2004), who states that English *here* denotes a region which includes the speaker, while *there* stands for a region which is further away from the speaker. Interestingly enough, the use of demonstrative adverbs has not yet (to the best of the author's knowledge) been experimentally studied. It might seem trivial to study demonstrative adverbs, since they seem to be inherently spatially contrastive, yet the results of this study suggest that they function similarly to demonstrative pronouns.

Another interesting result of the experiment was that gesture use proved to be statistically significant only in differentiating the choice between proximal adverbs and other referential devices, but not so in the case of distal adverbs, which is unexpected, as gestures are known to accompany demonstratives (Diessel 1999, Levinson 2004). This unexpected result can be explained by the use of location description. As was found by Louwerse et al (2005) in a study of the effect of referring expressions and pointing gestures on the attention of the addressee, the use of location description can substitute for deictic pointing. As can be seen in Table 6, in differentiating between demonstrative adverbs *siin*, *siit* and other referential devices, gesture use is statistically significant as a main effect, but location description is not. The opposite is true in differentiating between the demonstrative adverbs *seal*, *sealt* and other referential devices (Table 8). Although, according to Louwerse et al (2005), while using referring expressions (leaving out demonstratives) the combination of both location description and indexical pointing does not make it easier for the hearer to locate the object, in the use of demonstratives, the combination of location description and gesture seems to add value, as the interaction between the variables of use of location description and use of gesture proved to be statistically significant. Thus, in the cases where the blocks were situated far away, the instructors used all the referential devices possible in referring to the block, that is, a demonstrative, a gesture and a location description.

Unexpectedly, there also occurred special cases of uses of demonstrative adverbs (use of distals for nearby and proximals for distant referents). In the case of distal adverbs, there were no characteristics to help to pinpoint the possible reasons for the unexpected use and the occurrence was low (7 times out of 81, see Table 3). It cannot be said with confidence whether this kind of demonstrative use is random or not. In the case of unexpected usage of proximal adverbs, there were similarities in attributes of the blocks. In half of the cases where a proximal adverb was used, the blocks were situated well out of reach of the participants and were aligned lengthwise with the table, so that only a small part of the block was seen. These instances in this experiment can be best explained by accessibility of the referent. According to Jarbou (2010), a referent has high accessibility in the perceptual domain if the speaker believes that the hearer can easily recognize the referent regardless of its spatial distance. It is safe to assume that in the cases where the referents have low accessibility in the perceptual domain, the speaker believes that the hearer cannot recognize the referent easily and

therefore the interlocutors need to use more effort to locate the referent. Relying on this assumption, it could be said that blocks that were visually harder to see in the current experiment, that is the blocks that were aligned lengthwise with the table, had low accessibility. The findings in Jarbou's (2010) study on exophoric demonstratives in Jordanian Arabic suggests that high accessibility referents are referred to with proximals and low accessibility referents with distals. Contrary to Jarbou's findings are the results from the study of Dutch and English demonstratives by Piwek et al (2008), where referents that were considered to have high accessibility were referred to with distal demonstratives and low accessibility referents with proximals. Although in the case of Estonian the unexpected usages of proximal demonstrative adverbs differ from published study by Jarbou (2010), they are consistent with Piwek et al.'s (2008) experiment, where proximal demonstratives were used for low accessibility referents. However, the findings in Piwek et al (2008) concerned demonstrative pronouns, not demonstrative adverbs. Since in languages with distance-neutral demonstrative pronouns (as can be argued for Estonian *see*) the spatial contrast is expressed by demonstrative adverbs (Diessel 1999), the use of demonstrative adverbs in Estonian could be interpreted analogously to that of demonstrative pronouns in other languages. In the absence of contrastive demonstrative pronouns, demonstrative adverbs may also function as guiders of the attention of the addressee, similarly to demonstrative pronouns in Dutch (Piwek et al. 2008) and Jordanian Arabic (Jarbou 2010). In Estonian, this function might be characteristic of the proximal demonstrative adverbs *siin* and *siit*. However, since there were only a few cases of this unexpected usage of proximal demonstratives, this conjecture requires further research.

Another interesting element was the occurrence of the pronoun *teine* 'other', which was used solely for contrasting between two blocks with the same attributes. This suggests that in order to contrast two referents of the same kind, *teine* can be used together with the demonstrative pronoun *see*. Further research is needed to ascertain whether or not this kind of usage is due to the absence of the distal demonstrative *too*.

The overall results suggest that in differentiating the choice between *see* and other referential devices, distance is not statistically significant as a main effect, reaching statistical significance only when combined with gesture use. Thus it could be argued that in the absence of *too*, that is, when the speaker is using only one demonstrative pronoun, *see* is used distance neutrally, as it is combined with the spatially contrastive

demonstrative adverbs *siin*, *siit* and *seal*, *sealt* to mark the location of the referents, which is, according to Diessel (2006) one characteristic of a distance-neutral demonstrative. The occurrence of unexpected use of proximal demonstrative adverbs gives reason to believe that demonstrative adverbs may function similarly to demonstrative pronouns as guiders of interlocutors' joint focus of attention, not merely locating the referent.

7. Conclusions

This study aimed to fill a gap in Estonian exophoric demonstrative research by experimental means. The objective of the experiment was to determine whether distance has an effect on the choice between Estonian exophoric demonstratives. The quantitative analysis of the effect of distance on demonstrative choice has shown that the effect of distance is more complex than was expected. Due to the lack of usage of the distal demonstrative pronoun *too*, distance has no statistically significant effect as a main effect on the choice between *see* and other referential devices (e.g. object descriptions), but it does reach a statistically significant level when combined with gesture use. However, distance best predicts the choice between the demonstrative adverbs *siin* 'here', *siit* 'from here' and *seal* 'there', *sealt* 'from there'. Since distance had no effect as a main effect on the choice of the demonstrative pronoun *see*, it could be argued that *see* is used distance neutrally and rather than marking spatial opposition, it is used to draw the hearer's attention and guide the focus of attention. To mark spatial opposition of referents, demonstrative adverbs are used. Since most of the instructors marked their origin as North Estonia, it is possible that the absence of the use of the distal demonstrative *too* 'that' is dependent on the speakers' origin. To verify whether the lack of use of *too* is caused by participants' origin or other factors (such as possible changes in the two-way demonstrative system of Estonian (Pajusalu 2006)), the experiment should be enhanced and carried out with participants of South Estonian origin. In order to eliminate the effect of gestures, an experiment should be constructed which uses only linguistic means to indicate the referents.

The experiment has shown that spatial opposition does have an effect on the choice of Estonian demonstrative adverbs and, similarly to English, the switch from proximal to distal demonstratives is near 75 cm. At the same time, distance might not be the only aspect that

affects the choice of Estonian demonstrative adverbs. There were cases where instructors used proximal demonstrative adverbs for distant referents that were visually difficult to differentiate (i.e. they were placed alongside the table, which made them smaller and thus harder to spot among the others, or they were among the first blocks that were referred to, being in the middle of many possible referents). Also, the results from the questionnaires suggest that the choice of the demonstrative could be related to the attributes of the referent and is not solely based on the simple distance-based distinction. Thus, further research on the accessibility of the referents and other possible attributes (e.g. the visibility or non-visibility of the referent) should be conducted. The occurrence of the pronoun *teine* 'other' suggests that the need for contrast also has an effect on demonstrative choice. However, since this was not part of the design of the current experiment, a more detailed study should be carried out. Therefore, upon closer inspection of the referents and reference situation, it could be said that although spatial opposition is the most distinctive feature in a spatial reference situation, other attributes of referents and reference situations should be taken into consideration while explaining the choice between Estonian demonstratives.

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Address:
Maria Reile
Institute of Estonian and General Linguistics
University of Tartu
Jakobi 2
51014 Tartu
Estonia
E-mail: maria.reile@ut.ee

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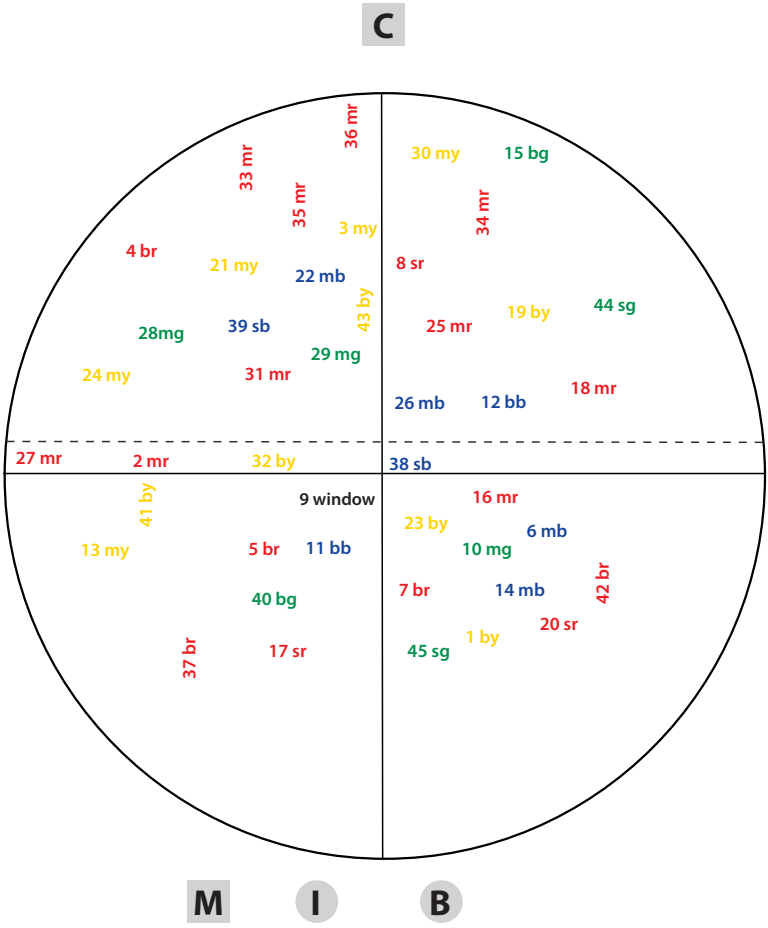
Appendix



M – model I – instructor B – builder C – camera

b – big
m – medium
s – small

r – red
y – yellow
b – blue
g – green

(the first letter marks the size of the block, the second one the colour)

- - - - - - 75 cm line

Figure 1. The initial placement of the blocks on the table.

Kokkuvõte. Maria Reile: Demonstratiivid ruumis: katse eesti keele eksofoorsete demonstratiividega. Viimastel aastatel on Indo-Euroopa keeltes hakatud üha enam tähelepanu pöörama eksfoorsete demonstratiivide uurimisele, kuid eesti keeles on neid siiani uuritud üsna vähe. Käesoleva uurimuse eesmärgiks on teha katselise meetodi abil kindlaks, kas kaugusel on mõju eesti keele demonstratiivide valikul. Andmeanalüüs binomiaalse logistilise segamudeli abil näitas, et kaugus selgitab hästi demonstratiivsete proadverbide valikut. Demonstratiivi *too* mittekasutusest tulenevalt võrreldi demonstratiivi *see* kasutust teiste viitevahenditega, millest ilmnes, et kaugusel üksinda ei ole mõju demonstratiivi *see* valikul. Kuigi kaugusel oli statistiliselt oluline mõju demonstratiivsete proadverbide kasutusele, ilmnes tulemustes ka proadverbide vastupidist kasutust. Kaugele viitavaid proadverbe kasutati lähedal olevatele referentidele viitamiseks ja lähedale viitavaid proadverbe kaugel olevatele referentidele viitamiseks. Seesugust kasutust pole võimalik selgitada lihtsa kaugusopositsiooniga. Tulemustes esines ka pronoomeni *teine* kasutust, mis annab tunnistust kontrasti mõjust demonstratiivide valikul. Seega, kuigi kaugusel on suur mõju demonstratiivsete proadverbide valikul, on referendi omadustel (näiteks ligipääsetavusel) ja suhtlussituatsioonis toimuval (näiteks vajadus kontrastiks) oma roll, mida tuleks lähemalt uurida.

Märksõnad: eesti keel, eksofoorsed demonstratiivid, produktsioonikatse, kaugusopositsioon, binomiaalsed logistilised segamudelid