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Contents

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Existential sentences in Flemish Sign Language and Finnish Sign Language

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Abstract

This paper presents a descriptive and comparative study of existential sentences in Flemish Sign Language and Finnish Sign Language. Existential sentences are used to express the existence or presence of something or someone. This study investigates how expressions of existence or presence are constructed and what the order of Figure and Ground is in existential sentences in both languages. Existential sentences can be formed around the lexical signs HEEFT ('have') in Flemish Sign Language and OLLA ('have') in Finnish Sign Language or the lexical signs can be omitted from the construction. The number of existential sentences with an overt HEEFT/OLLA is higher in Finnish Sign Language than Flemish Sign Language, while the omission of such lexical signs appears more in Flemish Sign Language than Finnish Sign Language. This sentence type exhibits the specific order of Ground preceding Figure in both languages. The Ground is often omitted from the construction when it can be retrieved from the context. Adposition signs, depicting signs and localized lexical signs are used in both sign languages to mark the spatial relationship between Figure and Ground. Flemish Sign Language uses adposition signs more often than does Finnish Sign Language.

Keywords: existential sentence, syntax, discourse, functionalism, Flemish Sign Language, Finnish Sign Language

1 Introduction

This paper presents a descriptive and comparative study of *existential sentences* (e.g. *There is a book on the table)* in two different sign languages: Flemish Sign Language (VGT, or Vlaamse Gebarentaal) and

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Finnish Sign Language (FinSL, or suomalainen viittomakieli)[1]. The term existential sentence refers to a specialized or non-canonical construction which expresses a proposition about the existence or the presence of something or someone (McNally 2011: 1830). In terms of its composition, this sentence type is specialized in that it does not have the canonical subject-predicate structure (McNally 2011: 1830). Existential sentences not only indicate the location of an entity but can also be used to identify an entity present at a certain location (Creissels 2014). In terms of their function, existential sentences act primarily to introduce a novel referent within the discourse (Givón 2001b; McNally 2011: 1832).

Research on existential sentences in spoken languages around the world has been conducted in many in-depth or typological studies and within different theoretical frameworks. One of the earliest studies was Lyons (1967; 1968), who proposed that existential sentences are semantically related to locative sentences and possessive sentences. This locative approach was followed by Clark (1978), who showed that in many languages the word order in existential sentences resembles the word order in possessive sentences but is often reversed in locative sentences. Clark (1978) also showed that most languages use one verb to express these three sentence types and that in most languages the locative phrase precedes the nominal. Overall, to date, existential sentences have been discussed both as an independent sentence type (e.g. Francez 2007; McNally 2011) and as a type of sentence that is semantically and structurally connected with locative and possessive sentences (e.g. Freeze 1992; Kristoffersen 2003).

The notions of Figure and Ground have been used to analyse existential sentences and to distinguish them from other sentence types, especially from locative sentences. The Figure entity is a concrete entity conceived as movable (Talmy 2000; Creissels 2014) and should be interpreted as having an unknown spatial property (Talmy 2000). The Ground entity is a concrete entity which is less easily movable and occupies a fixed position in space (Talmy 2000; Creissels 2014). Using this analytical distinction, Creissels (2014) has proposed that the difference between existential sentences and locative sentences lies in the difference of perspectivization of the relationship between Figure and Ground. This

[1] Flemish Sign Language is the language signed in Flanders, the northern part of Belgium. Finnish Sign Language is signed in Finland, as is Finland-Swedish Sign Language.

prototypical Figure-Ground relationship expresses an episodic spatial relationship between a Figure entity and a Ground entity.

Concerning sign languages, Kristoffersen (2003) has used the notions of Figure and Ground to investigate the order of constituents in existential, possessive and locative sentences in Danish Sign Language. Her study showed that there is a clear syntactic relationship between these sentence types and that each sentence type uses the same verb. Similarly to the findings of typological studies in spoken languages, Kristoffersen (2003) found that in existential sentences in Danish Sign Language the Ground typically precedes the Figure. The typological study of sign languages carried out by Zeshan & Perniss (2008) showed that other sign languages also use a certain verb, such as HAVE, to express existence, although other mechanisms (elaborated in §2.2) to express existence have also been found (see also Pichler et al. 2008; De Weerdt 2008).

The goal of this study is to describe and compare existential sentences in VGT and FinSL. This descriptive work aims to gain basic insights into how existential sentences in two different sign languages are constructed by looking at the order of Figure and Ground when the existence or presence of something is expressed. The analyses of existential sentences in both sign languages are compared in order to identify the similarities and/or differences. On the basis of previous studies, I suspect that existential sentences in both sign languages share similar syntactic properties such as the order of Ground preceding Figure, and that the Ground can be omitted from the construction. The major difference may have to do with the use of adposition signs to mark the spatial relationship between Figure and Ground in an existential sentence.

Theoretically, this study is situated in a functional framework because it views expressing existence or presence as 'a functional domain within the context of a cross-language typology' (Givón 1981: 163). With a typological approach to grammar, Givón (2001a: 25) notes that languages can code the same functional domain by more than one structural means. This research also follows the main insights of the theoretical framework called Basic Linguistic Theory (Dryer 2001; 2006). This framework is widely used to describe and compare languages, especially in the grammatical description of entire languages (Dryer 2001; 2006). Dryer (2001; 2006) also notes that descriptive work cannot be completed without theories: descriptive theory differs from explanatory theory in that the former describes what languages are like while the latter explains why a language looks the way it does.

The data for this study comprise about 80 minutes of videotaped data from four VGT signers and four FinSL signers. The data were elicited with stimulus material used in Zeshan & Perniss's (2008) typological study on possessive and existential constructions across sign languages. The videotaped data were transcribed with the ELAN annotation tool. Utterances carrying the function of expressing the existence or presence of an object as a novel referent within discourse were extracted from the data and their constructions were functionally analysed.

This paper is organized as follow. Section 2 describes the function of an existential sentence, the locative approach towards this sentence type and its structural properties across both spoken and signed languages. Section 3 presents the methodology and data for this study. Section 4 deals with the description and analysis of existential sentences in VGT and FinSL. The final sections, 5 and 6, include the discussion and conclusion, respectively.

2 Existential sentences

2.1 On research into existential sentences in spoken languages

Lyons (1967; 1968) initially distinguished existential sentences in English, as in (1a), below, from locative sentences and possessive sentences, exemplified in (1b) and (1c) respectively. He argued that these three sentence types are semantically related as they all express a certain object (*a book*/*the book*) located in a certain place (*on the table*/*John*).

(1) a. There is a book on the table.
b. The book is on the table.
c. John has a book. / The book is John's. (Lyons 1968: 390–391)

From the perspective of semantics, Lyons (1968: 390) suggested that existential sentences as in (1a) above could be treated as implicitly locative. His argument was that if an object exists, it must be located in a certain time and place. In addition to the semantic relationship between existential and locative sentences, Heine (1997) identified that possessive sentences are derived from existential sentences. Prototypical possessive sentences are existential sentences whose locative elements are prototypically human (Wang & Xu 2013). This also confirms Lyons's (1968) claim that existential sentences are semantically related to possessive ones; Examples

(1a) and (1c) both express the location (*on the table*/*John*) of an object (*a book*/*the book*).

Adopting the locative approach, typological studies have shown that there is also a syntactic relationship between these three sentence types (e.g. Clark 1978; Freeze 1992). Clark (1978) found, with a sample of approximately 40 languages, that in many languages the word order in existential sentences resembles the word order in possessive sentences but is reversed in locative sentences. Comparing existentials with locatives, Clark (1978) observed that where a language has, for example, the order of locative phrase (Loc; cf. Ground in this study) preceding the nominal (Nom; cf. Figure), with the verb (V) in various positions in an existential sentence, in locative sentences it has the opposite order of nominal preceding locative phrase.[2] Table 1 gives an overview of word order in existential sentences and locative sentences, as found by Clark (1978).

Table 1. Word order in existential and locative sentences, as found by Clark (1978)

Existential sentence	**Locative sentence**	**Examples of languages**
Loc Nom V	Nom Loc V	Turkish, Eskimo, Swahili
Loc V Nom	Nom V Loc	Finnish, Mandarin Chinese
Pro-Loc V Nom Loc	Nom V Loc	English, French, Spanish
V Nom Loc	Nom V Loc	Hebrew, Hungarian

Due to their syntactic relationship, Clark (1978) claimed there should be a relationship in the verbs used in these sentence types. She showed that 26 out of 40 languages use one verb to express all three sentence types – existential, locative and possessive. For example, Finnish uses the verb *olla* and Mundari uses *menaq*. However, there are some languages that use 2 different verbs; for example, *avoir* or *être*, and *to have* or *to be*, for French and English respectively. Despite the fact that an existential verb is an essential unit in many existential sentences, from a cross-linguistic perspective this unit is optional and its presence varies from language to language (Francez 2007).

Freeze (1992) exemplified the relationship in word order and the use of one verb in existential, locative and possessive sentences from Russian in his typological work, as shown in the following examples, (2a), (2b) and (2c) respectively.

[2] As this study focuses only on the syntactic properties of existential sentences, it should be noted that there are also other features that affect the structure of this sentence type, such as morphology, which distinguishes existential sentences from locative sentences.

(2) a. *na stole byla kniga*
on table.LOC was book.NOM.FEM
'There was a book on the table.'

b. *kniga byla na stole*
book.NOM.FEM was on table.LOC
'The book was on the table.'

c. *u menja byla sestra*
at 1SG.GEN was sister.NOM
'I had a sister.' (Freeze 1992: 553–554)

Concerning existential and locative sentences, similarly to Clark (1978), Freeze (1992) showed that the existential sentence in (2a) and the locative sentence in (2b) both include a theme argument (cf. Figure in this study) *kniga* ('book') and a locative argument (cf. Ground) *na stole* ('on the table'). The existential sentence in (2a) has the order of locative argument preceding theme argument while the locative sentence in (2b) has the opposite order of theme argument preceding locative argument. Similar word order alternation was also found for Chamorro, Tagalog and Hindi. In addition, Russian uses one verb, *byt`*, in these three sentence types.

Clark (1978) observed in her typological studies that existential sentences in 27 out of 35 languages have the order of locative phrase (Loc) expressing the Ground preceding the nominal (Nom) expressing the Figure (the position of the verb can vary). For example, Turkish and Finnish both have the order of Loc preceding Nom, but the verb in Turkish appears after the nominal while in Finnish the verb precedes the nominal. A few languages follow the order Nom Loc, giving relatively little importance to the placement of the verb. Table 2, following Clark (1978; for a full overview see Clark 1978: 93), shows the word order in existential sentences and the number of languages in which this word order applies.

Table 2. Word order in existential sentences, as found by Clark (1978)

Location preceding Nominal	**Number of languages**
Loc Nom V	13 languages (e.g. Japanese, Swahili, Turkish)
Loc V Nom	10 languages (e.g. Finnish, German, Panjabi)
Loc Nom	1 language (Tagalog)
Pro-Loc V Nom Loc	3 languages (English, French, Spanish)
Nominal preceding Location	**Number of languages**
V Nom Loc	4 languages (e.g. Hebrew, Hungarian)
Nom V Loc	6 languages (e.g. Yoruba, Twi)
Nom Loc V	3 languages (e.g. Nasque, Mundari)

Following Creissels (2014), existential sentences such as *There is a book on the table* (see 1a) are sentences that have the ability to encode a prototypical Figure-Ground relationship similar to that in locative sentences such as *The book is on the table* (see 1b) in English. Existential sentences can be distinguished from locative ones by the difference in the perspectivization of the Figure-Ground relationship. The Ground is the concept acting as a reference point, while the Figure is the concept that needs anchoring. This pair of concepts can refer to the spatial relation of two objects in an event of motion or location. For example, in the following sentence, *There is a book on the table*, 'book' is the Figure and 'table' is the Ground, and Ground acts as the reference point in relation to the Figure, which needs anchoring.

The concepts of Figure and Ground are widely explored in Talmy's (2000) cognitive semantics, and he also puts forward the theory called the *windowing of attention*. The windowing of attention is a cognitive process that includes both windowing and gapping. Windowing is foregrounding portion(s) of the referent scene by explicitly mentioning that portion(s). Gapping refers to backgrounding portion(s) of the referent scene by omitting sentence constituent(s), as the portion(s) is/are generally provided by the context or by convention.

2.2 Existential sentences in signed languages

Although there have been studies on existential sentences in spoken languages, in sign languages this theme has not yet been studied widely or in depth. Early comments on the subject come from Deuchar (1984), who noted that British Sign Language (BSL) uses one lexical item, HAVE[3], to express both existence and possession. Hughes et al. (1984) investigated the issue further and found a small group of signs in BSL, including HAVE, whose primary function was to express both existence and possession. Other researchers have also found that some sign languages use the lexical sign HAVE in existential sentences, but other mechanisms are also possible.

Kristoffersen (2003) studied the order of constituents in existential, possessive and locative sentences in Danish Sign Language (DTS). The dataset for this study consisted of 1½ hours of videotaped monologues produced by Deaf native signers. 28 constructions were found that included the sign EXISTENTIAL with a mouth pattern similar to /ar/. According to

[3] It is the tradition in sign language linguistics to gloss a sign with small capital letters.

Kristoffersen, this sign is used in DTS to express existential, locative and possessive sentences, as shown below in Examples (3a), (3b) and (3c) respectively.

(3) a. REASON HOTEL+fl NEXT-TO+fr / EXISTENTIAL+fr DISCO
Ground Figure
'The reason was there was a disco next to the hotel.'

b. MAYBE METTE / EXISTENTIAL PRON+l / KC
Figure Ground
'Maybe Mette is at KC.'

c. 1.p EXISTENTIAL / PILLOW /
Ground Figure
'I had a pillow.' (Kristoffersen 2003: 134–136)

In her analysis of the order of constituents, Kristoffersen (2003) used the notions of Figure and Ground. In line with the trend found in Clark (1978), she observed that the word order in existential sentences resembled the word order in possessive sentences, while locative sentences had a different word order. The sign EXISTENTIAL was generally positioned between Figure and Ground in all three kinds of constructions, regardless of their actual word order. This is also shown in these examples.

In Kristoffersen's dataset, only half of the existential sentences were expressed with both Ground and Figure overt, as in Example (3a) above. In the remaining sentences, only one of the units – typically the Figure – was expressed. According to Kristoffersen, the omission of the Ground depends on a context which makes the referent of the missing element retrievable (see Engberg-Pedersen 1993; Jantunen 2013).

According to Kristoffersen (2003), the omission can affect the otherwise relatively invariant order of Ground EXISTENTIAL Figure. For example, when the Figure's existence is unexpected, as in (4) below, the constituents do not follow the typical order: In (4), the Figure precedes the verb EXISTENTIAL and the Ground ('bus') is retrieved from the context. The sign EXISTENTIAL is produced with raised eyebrows.

(4) SECOND TOILET / EXISTENTIAL /
'[and] secondly there was even a toilet [on the bus].' (Kristoffersen 2003: 134)

Since Kristoffersen (2003), De Weerdt (2008) has described the different ways of expressing the function of existence in VGT. His analysis has shown that VGT can express existence not only by means of the lexical sign HEEFT[4] ('have'), but also with a verb construction, a localized lexical sign, pointing, or a combination of the previous ways, all of which localize a sign or a referent somehow in the space. The term 'verb construction' is not a term that is used widely in the sign language literature – 'classifier construction' or 'depicting sign' are much more common. In this study, the term 'depicting signs' is used to refer to complex signs that contain a classifier handshape and possibly a varying place of articulation, orientation, and a movement (Vermeerbergen 1996). The choice of the handshape in these signs varies according to the salient characteristics of the referent (Schembri 2003: 3). Localized lexical signs are signs produced in a non-neutral articulation place to connect a referent to its locus (Vermeerbergen 1996). Pointings are signs produced with a closed handshape with stretched index finger, and a movement or orientation towards a certain place.

Existential sentences in De Weerdt's (2008) study, as in Kristoffersen's (2003) study of DTS, were mainly ordered as Ground preceding Figure. The Ground was the only argument that could be omitted from the construction; the Figure was always explicitly mentioned. In addition, the verb sign HEEFT was frequently found to be omitted from the construction.

As a part of the typological study conducted by Zeshan & Perniss (2008), De Weerdt & Vermeerbergen (2008) observed that, in VGT, the sign HEEFT can be used to express both existence and possession. When used to express existence, some sentences, such as in Example (5), may still carry a possessive meaning:

(5) MOUNTAIN HEEFT HOTEL ON
'There is a hotel on the mountain.'
or
'The mountain has/possesses a hotel.' (De Weerdt & Vermeerbergen 2008: 209)

[4] Glosses are labels referring to specific signs. As the lexical signs HEEFT/OLLA are important in existential sentences in both VGT and FinSL, and in line with my practice in the rest of this article, I would like to emphasize the difference in both sign languages between the gloss and the lexical sign by using HEEFT ('have') for VGT and OLLA ('have') for FinSL (see also later in §4 for FinSL) instead of HAVE.

On the use of nonmanual markers, that is, linguistic elements that are not expressed by the hands (Pfau & Quer 2010: 381), in VGT existential sentences, De Weerdt & Vermeerbergen (2008) pointed out that the idea of existence is also incorporated in nonmanual topic marking in order to show that something is the theme or the issue to be discussed later in the discourse. This is exemplified in Example (6), in which the sign HOUSE is nonmanually produced with raised eyebrows to mark the topic of the sentence; this is followed by a small pause and TREE BEHIND, which fill the rest of the sentence. Some signers also use the existential HEEFT in initial position to mark the topic, as in Example (7).

(6) _____t
HOUSE / TREE BEHIND
'There is a tree behind the house.' [author's translation] (De Weerdt & Vermeerbergen 2008: 210)

(7) HEEFT HOUSE TREE BEHIND
'There is a house with a tree behind it.' (De Weerdt & Vermeerbergen 2008: 210)

Concerning FinSL, no research into existential sentences has yet been published. However, some work was done in connection with answering the questionnaire in the Zeshan & Perniss (2008) project. The main findings of this work (De Weerdt & Takkinen 2006) are included in the present study.

3 Methodology and data

This study is based on videotaped data involving four VGT signers and four FinSL signers. The data were elicited with stimulus material from the typological investigation of possessive and existential constructions across sign languages conducted by Zeshan & Perniss (2008). The data for VGT in this study came from De Weerdt's (2008) study on expressing existence in VGT.

The stimulus material is a picture comparison game whose aim is to create conversations between two signers. The material includes four pairs of pictures, i.e. a total of eight pictures. Each of the two pictures in a pair is basically similar to the other, but there are some differences between the two: a missing or different object (e.g. in one picture there are two vases on the table while in the other picture there is only one) or different colours

(e.g. the man in one picture is wearing a blue sweater while in the other picture he is wearing a green one). As the signers cannot see their interlocutor's picture, the aim is to jointly discuss what differences there are in their pictures. At the end of each conversation, one of the signers was asked to make a kind of report saying what differences they had found. The position of the informants during the data collection is shown in the top left-hand corner in Figure 1[5]:

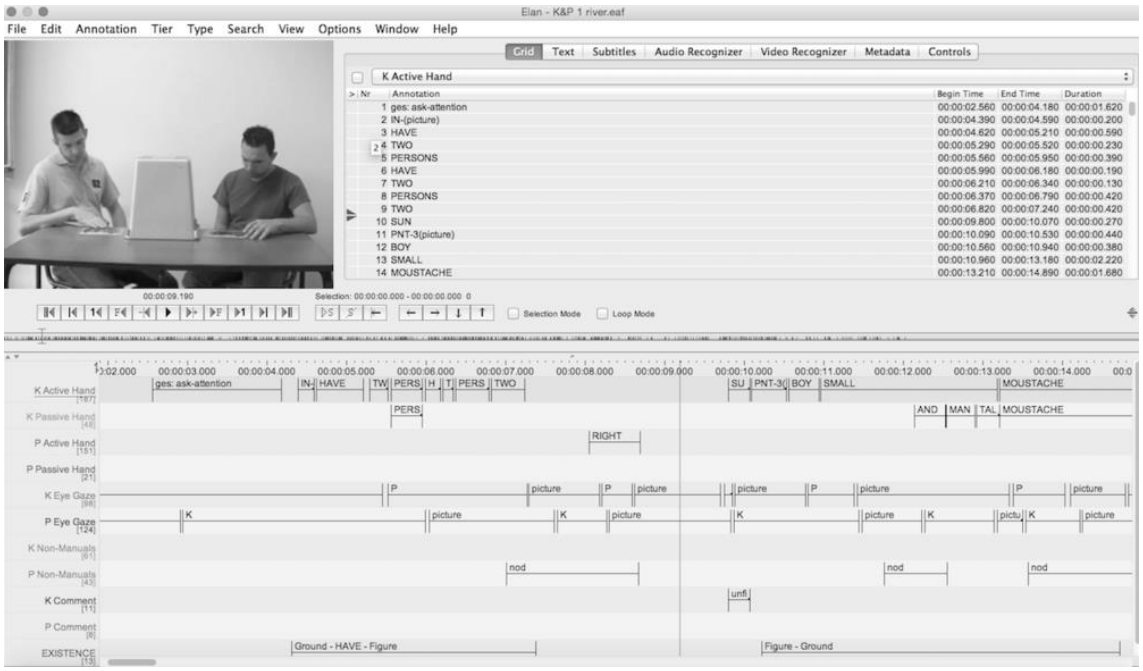

Figure 1. A screenshot from the ELAN annotation tool used to transcribe the videotaped data.

This activity led to 8 different video clips and a total length of approximately 40 minutes of videotaped material per language, i.e. a total of 16 video clips of about 80 minutes. The videotaped conversations were transcribed with the ELAN[6] annotation tool. A screenshot of the transcription work in ELAN is shown in Figure 1, above. Eight tiers were created for the transcription of each existential sentence that was found: the dominant (or active) and the non-dominant (or passive) hands of each signer (4 tiers), the nonmanual elements from each signer (2 tiers), comments (1 tier) and finally the syntactic analysis of the construction (1 tier). In the first four tiers, the active and passive hands were separated in order to take simultaneity into account, as it might be important for

[5] Copyright by the author.
[6] http://www.lat-mpi.eu/tools/elan/elan-description

marking the spatial relationship between the focus information (Figure) and its location (Ground).

The following steps were taken to extract the existential sentences from the data. Following Francez' (2007: 4) view, the analysis of existential sentences in both sign languages in this study starts from their context dependence and is functionally approached. Therefore, first of all, every videotaped conversation was watched twice in order to understand the discourse and the context. Bearing in mind the discursive function of an existential sentence, every utterance a) that expresses existence or the presence of an object or a person and b) in which the object or person is a novel referent within the conversation, was considered to be an existential sentence. The discursive function of each existential sentence was first described, and then followed an analysis of the order of Ground and Figure.

4 Existential sentences in VGT and FinSL

This section presents a descriptive and comparative analysis of existential sentences in VGT and FinSL based on this study's data, described in the previous section. To start with, the lexical signs HEEFT ('have') for VGT and OLLA ('have') for FinSL are introduced first together with a quantitative approach to the number of existential sentences formed around these signs in both sign languages. Then the results are presented in terms of five categories or groups. The first group uses the lexical signs HEEFT for VGT and OLLA for FinSL. The second group is characterized by the omission of HEEFT/OLLA in the existential sentences in both languages. The third group centres around the omission phenomena affecting the Ground. The fourth group concerns the omission of both HEEFT/OLLA and the Ground, and the fifth group focuses on sign language-specific or modality-specific mechanisms, including both simultaneity and the use of space. Mittelberg (2013: 769) has done some work on existential constructions in co-speech gestures. A list of the notational conventions used in the transcriptions in this study can be found at the end of the article.

The main findings are that existential sentences in both VGT and FinSL invariably have the order of **Ground** preceding **Figure** regardless of whether the sentence is formed around HEEFT in VGT and OLLA in FinSL or not. Both HEEFT and OLLA are mainly positioned between the Ground and Figure in an existential sentence.

4.1 The use of HEEFT/OLLA

The lexical sign HEEFT in VGT has the function of expressing possession or existence (De Weerdt & Vermeerbergen 2008). This sign is produced with a Y-handshape, the thumb pointing to the signer's chest with a repeated movement towards the chest. The mouth pattern resembles the Dutch word /heef/. The lexical sign OLLA in FinSL is formed with a B-handshape and the palm facing downwards. The fingers are oriented to the side and produced with a single movement towards the upper-left torso (for a right-handed signer). Two other phonological varieties of this sign were found in the data: the handshape can be a G-hand (a closed handshape with stretched index-finger) or a 5-hand (an open handshape with all fingers stretched) with similar hand and finger orientation and movement. The mouth pattern resembles the Finnish /on/.

In terms of outcomes, looking quantitatively at the data reveals some interesting facts concerning the presence or omission of HEEFT and OLLA in existential sentences. A total of 40 existential sentences were found in VGT and 51 in FinSL. The number of existential sentences formed in VGT around HEEFT (n=14) was much lower than the number of FinSL existential sentences constructed around OLLA (n=38). Conversely, the number of VGT existential sentences where HEEFT was omitted (n=26) was higher than the number of FinSL existential sentences with the omission of OLLA (n=13). These numbers are summarized in Table 3.

Table 3. Number of existential sentences with overt or omitted HEEFT/OLLA in VGT and FinSL

Existential sentences	**VGT**	**FinSL**
overt HEEFT/OLLA	14	38
omitted HEEFT/OLLA	26	13
TOTAL	40	51

4.2 Existential sentences with an overt HEEFT/OLLA

Existential sentences constructed around the signs HEEFT and OLLA in both languages invariably show the order of Ground HEEFT/OLLA Figure**,** as shown in Examples (8) for VGT and (9) for FinSL.

(8) _____t _____ed
OUTSIDE LOOK-LIKE HEEFT GRASS GREEN
Ground Figure
'It looks like there is green grass outside.'

The utterance in (8) was followed by a whole conversation about the inside of the house that was shown in their pictures. Once both interlocutors thought they had finished with that part, one of the signers wanted to move on to discuss what was present outside the house. The existential sentence in (8) occurred when the signer wanted to introduce a new referent ('green grass') into the conversation, resulting in a construction expressing existence or presence. The Ground ('outside') is uttered first, followed by the lexical sign HEEFT, and the Figure ('green grass') appears in final position in the construction: Ground HEEFT Figure. The Ground is nonmanually marked as a topic with raised eyebrows while the rest of the construction takes place with eyebrows down, as the signer was a little doubtful. Like VGT, FinSL also exhibits the order of Ground OLLA Figure to express existence or presence, as shown in Example (9), below.

(9) RIVER OLLA TWO-PIECES FISH TWO-PIECES FISH TWO FISH
Ground Figure
'There are two fishes in the river.'

In (9), the fishes are introduced as new referents that are present in the river. The construction starts with the Ground ('river'), as being less movable and having a fixed position in space, followed by the sign OLLA, with the Figure ('two fishes'), as being more movable and with unknown spatial property, appearing in final position in the construction. The Figure is repeated twice at the end of the utterance while the interlocutor is checking his own picture.

Adposition[7] signs occur within existential sentences for both VGT and FinSL, although the number of occurrences is higher in VGT than in FinSL. In VGT, 15 out of a total of 40 existential sentences were found with adposition signs, while for FinSL it has 7 out of 51 existential sentences. For VGT, 5 of the examples were found in the 14 existential sentences with an overt HEEFT, and 10 in the 26 existential sentences with the omission of HEEFT. In contrast, in FinSL, 5 of the existential sentences

[7] I will use the general term *adpositions* as it is not clear whether both sign languages do have pre- or postpositions.

with adposition signs were found in the 38 constructions with an overt OLLA, and 2 in the 13 sentences with the omission of OLLA. The reason for discussing adposition signs here is to show that this is also important not only in sentences with the omission of HEEFT in VGT (discussed later in §4.3) but also in cases with omission phenomena affecting the Ground (discussed later in §4.4).

Adposition signs mainly appear after the Ground and mark the spatial relationship between Figure and Ground in an existential sentence. The order remains invariably Ground HEEFT/OLLA Figure, as shown in Examples (10b) for VGT and (11b) for FinSL.

(10) a. DH C-A-C-T-U-S ds-(cactus) […] IX-1 TWO ds-(cactus) ds-(cactus)-a
NDH ds-(cactus) […] ds-(cactus) ds-(cactus)-b

b. _____t nod
ON-THE-RIGHT-SIDE / CACTUS NEXT-a HEEFT STONE ds-(stone) ENORMOUS
Ground Figure
'The cactus on the right, there is an enormous stone next to it.'

In (10a), the presence of two cacti in the picture had been discussed earlier, as was confirmed by the other interlocutor. After this confirmation, the informant noted the presence of an enormous stone next to the cactus on the right-hand side of the picture. The existential sentence (10b) started with the Ground ('cactus'), which is less movable and has a fixed position in space. The nonmanual nod appearing during a short break between ON-THE-RIGHT-SIDE and CACTUS functions as asking for confirmation from the interlocutor that they both know what they are talking about. The sign CACTUS is followed by the adposition NEXT-a, with locus a referring to the exact location of the Figure entity. This part is followed by HEEFT and the Figure ('stone'), which is more movable and has unknown spatial property. In addition, in this utterance I perceive 'cactus' as less movable than 'stone' because the cactus in the picture is fixed in the ground and it is bigger than the stone itself.

The FinSL example in (11b) shows a similar structure, i.e., it also includes an adposition in the construction. The presence of the 'door' in the picture had already been discussed earlier and was known by both informants. One of them asked whether their interlocutor's picture included a door somewhere in between, as shown in (11a), followed by a confirmation on the part of the interlocutor. Later on, the other interlocutor

expressed an existential sentence as in Example (11b) below, to announce the presence of a painting, which is introduced as a new referent.

(11) a. _____polar-question
DOOR IN-BETWEEN OLLA PNT-2

b. DOOR BEHIND-a OLLA SOMETHING SEEM-SO PAINTING ds-(painting)-a
Ground Figure
'There is a painting, or something like that, hanging behind the door.'

In (11b), the Ground ('door') comes in initial position and is followed by the adposition BEHIND-a. The signs OLLA and the Figure ('painting') complete the construction. Note that the signs STONE and PAINTING, which denote the Figure in (10b) and (11b), respectively, are both followed by depicting signs glossed as ds-(stone) and ds-(painting). Depicting signs are complex signs that, according to the view most typically held nowadays (Schembri 2003; Takkinen 2008), contain a classifier handshape and a possibly varying place of articulation, orientation and movement (Vermeerbergen 1996). Schembri (2003: 3) noted that the handshape in these signs is generally described as a classifier morpheme because the choice of handshape varies according to the referent's most salient characteristics.

The classifier handshape in ds-(stone) in (10b) is a claw-hand, which is used to refer to the characteristics of a stone as a single, complete entity. The classifier handshape in (11b) is a C-hand, which also denotes the painting as a whole. In addition, the data for both languages show that depicting signs such as ds-(painting) in (11b), for example, are produced with a short directional movement and a final hold to express the presence of an object in a certain location. Part of the inherent nature of depicting signs is to describe an event in a certain spatial location and thus they also introduce locational information about (new) referents in a discourse. Since there is an inherent relationship between location and existence (Lyons 1967; 1968; also see §2), utterances with depicting signs are also found quite frequently in the present data.

4.3 The omission of HEEFT/OLLA

Although most researchers of both spoken and signed languages have mentioned the use of a specific verb when expressing existence or

presence, the analysis in this study has shown examples of existential sentences that do not include either HEEFT or OLLA (see also Table 3 above). The order in existential sentences with the omission of HEEFT/OLLA remains mainly Ground preceding Figure for both VGT and FinSL.

Existential sentences in VGT with the construction Ground Figure mostly contain two special features. Firstly, the Ground entity is expressed nonmanually with a quick head nod that functions as asking for confirmation from the interlocutor that the Ground entity refers to a known referent within the discourse for both interlocturs. Secondly, an adposition sign always appears immediately after the Ground. An example of this is shown in (12c) for VGT:

(12) a. WOMAN BEHIND-a […] GREEN ds-(cover)

b. OF LAMP OF LAMP

c. _nod
LAMP / NEXT-a PAINTING
Ground Figure
'There is a painting next to the lamp.'

Previously, the presence of a lamp behind the woman in the picture had been discussed, as shown in (12a), which was confirmed by the interlocutor with 'it's a lamp' as in (12b). After a short break, this discussion is followed by an existential sentence in (12c). The Ground ('lamp') is expressed first simultaneously with a quick repeated head nod, followed by the adposition sign 'next', which is produced at a certain locus in the signing space to mark the specific location (called a, next to the lamp) of the Figure in relation to the Ground. The sentence ends with the Figure ('painting'), which is the focus of attention in the existential sentence.

In such structures the use of space is important. The Figure entity, as shown in (13), also for VGT, is produced with a lexical sign signed at a certain locus in the signing space. The sign order remains Ground Figure.

(13) _____nod
GREEN ds-(lamp-shade)-a / FRAME-b
Ground Figure
'There is a frame next to the green lamp.'

In utterance (13), the ‘green lamp’ had been discussed earlier and when the signer wanted to come back to it he started the construction with the Ground, referring to ‘the lamp’, which was located at a locus called a, and giving a short nod to ask for confirmation. This is followed by the Figure ‘frame’, which is signed at locus b, which is next to the Ground and marks the spatial relationship between ‘lamp’ and ‘frame’.

There is no example of such a structure being found in FinSL. However, FinSL does also show existential sentences with the ommission of OLLA, but in these cases the Figure is mainly produced by means of the simultaneous production of depicting signs (discussed in §4.6) or localized lexical signs (discussed in §4.5).

4.4 Omission phenomena affecting the Ground

The Ground can be omitted from existential sentences in both sign languages when it can be retrieved from the context. When this is the case, the sentence can have an adposition sign in initial position of the construction followed by HEEFT or OLLA and Figure: adposition sign HEEFT/OLLA Figure. This type of structure is shown in Examples (14) for VGT and (15b) for FinSL, below.

(14) ____eg
_____t
NEXT-a HEEFT TABLE NEXT-a
Figure
‘There is a table next to [the stove].’

The Ground (‘stove’) in (14), whose presence had been discussed earlier in the conversation, is omitted from the construction as it can be retrieved from the context for both signers. In order to express the presence of a table next to it, the signer produces an existential sentence starting with an adposition sign NEXT-a followed by HEEFT and the Figure entity (‘table’). NEXT-a is repeated at the end of the sentence. The first NEXT-a is produced while the signer has eye contact with his interlocutor and nonmanually marks a topic that sets a spatial framework (Jantunen 2008: 163). This is not the case for the second adposition sign. Both adoposition signs are produced in locus a to mark the spatial relationship between the focus information ‘table’ and its location. Whereas adposition signs frequently appear in VGT, they occur much less frequently in FinSL.

Similarly to VGT, the existential sentence in (15b) below, for FinSL, comes at the end of a description of a woman lying down in bed; the signer says that she is wearing something black around her head, as shown in (15a). Immediately after the final sign HEADWEAR, produced at a locus called a, which is around the head in (15a), the signer goes on to report the presence of a pillow behind her head, as shown in (15b).

(15) a. SOMEONE ILL ds-(lie-down-in-bed) […] BLACK HEADWEAR-a

b. BEHIND-a OLLA ds-(some-shape)-a / SOMETHING /// PILLOW
Figure
'There is a pillow, or something, behind [the head of the woman].'

The existential sentence (15b) starts with an adposition sign, BEHIND-a, produced behind the signer's head and referring to the woman's head in the picture. The woman's head as location, or Ground, is not explicitly expressed but is retrieved from the context. The construction therefore starts with the adposition sign BEHIND-a, followed by OLLA, and the Figure completes the sentence.

There are cases where the sentence has the order of HEEFT/OLLA Figure without an adposition sign, and the Ground is retrieved from the context. This is shown in Examples (16) for VGT and (17) for FinSL, below.

(16) HEEFT MAN HEEFT POCKET
Figure
'There is a man who has a pocket.'

The first HEEFT in Example (16) introduces a man as a new referent within the conversation while the second HEEFT expresses possession. A similar construction has also been found in other studies of existentials and possessives in VGT (De Weerdt & Vermeerbergen 2008). One example in FinSL shows the structure presented in (17) below.

(17) OLLA FEW ds-(spots)-distr
Figure
'There are a few spots [on the vase].'

In utterance (17), the Ground (‘vase’) is retrieved from the context and the Figure is expressed by means of depicting sign that refer to the few spots on the vase. Both (16) and (17) have the order HEEFT/OLLA Figure.

4.5 The omission of Ground and HEEFT/OLLA

The omission of both the Ground and HEEFT/OLLA is also possible. An existential sentence can start with an adposition sign to mark the spatial relationship between Ground and Figure as shown in (18), below, for VGT.

(18) NEXT-a PAINTING-a
Figure
‘There is a painting next [to the lamp].’

In (18), the Ground (‘lamp’) is retrieved from the context and the sentence starts with an adposition sign NEXT-a followed by the Figure (‘painting’), which is produced in the place where the ‘next’ ended, i.e. the locus called a, resulting in the order adposition sign Figure.

The Figure itself can also stand alone in an existential sentence, in which case the use of signing space is relatively important. In the next two examples, (19) for VGT and (20b) for FinSL, both Ground and HEEFT or OLLA are ommitted from the construction.

(19) DRAWER-a DRAWER-b TWO
Figure
‘There are drawers [on the stove].’

In (19), the signer expresses the presence of two drawers on the stove by producing DRAWER-a DRAWER-b in two different loci, a and b, marking the specific locations of these drawers in relation to the stove (as Ground). This sentence appears after both interlocutors have provided descriptions of the mother standing in front of the stove. Once they think they have finished with the descriptions, one of the signers went on to utter this existential sentence.

In the existential sentence in (20b), below, for FinSL, the signer expresses the presence of ‘tiles’ next to the hood of the stove and produces ‘tiles’ with both hands in two different loci called a and b.

(20) a. OLLA HOOD OLLA ds-(hood) […]

b. TILE-a
TILE-b
Figure
'There are tiles on the left and the right of the hood.'

The loci a and b refer to the left and the right-hand sides of the hood respectively, and here the Ground is retrieved from the context (as shown in (20a)). This type of occurrence of simultaneity frequently appears in existential sentences and will be discussed in the next section.

4.6 Depicting signs and simultaneity

As mentioned earlier in this paper, part of the inherent nature of depicting signs is that they describe an event in a certain spatial location and thus also introduce the locational information of (new) referents into a discourse. Since there is an inherent relationship between location and existence (Lyons 1967; 1968), utterances without HEEFT and OLLA and with the Figure expressed by means of depicting signs also occur in the present data.

Vermeerbergen et al. (2007) noted that manual simultaneity occurs in sign languages by using two hands simultaneously, each hand conveying different information. It can take the form of 'full simultaneity', when the two different lexical items are produced simultaneously. Alternatively, one hand may hold a sign's position in the signing space while the other hand continues. For the latter, Vermeerbergen et al. (2007) noted the simultaneous production of classifiers, i.e. the handshape of depicting signs, as a way to express the relative location between actors in an event of motion. Each hand's classifier handshape represents the actors.

The existential sentences in (21) and (22) below, both for VGT, are examples in which depicting signs representing Ground and Figure are produced simultaneously to show the spatial relationship.

(21) nod
DH TABLE BROWN / VASE ds-(vase-on-table)
NDH ds-(table) ---------
Ground Figure
'There is a vase on the table.'

The sentence in (21) starts with the Ground (‘brown table’), whose presence is already known, followed by a short break and a head nod to request confirmation from the interlocutor. Next come the Figure (‘vase’) and the simultaneous occurrence of two depicting signs in final position in the construction. The depicting sign produced with the dominant hand (DH) has the classifier handshape of a C-hand representing the Figure (‘vase’) and the non-dominant hand is a flat hand representing the Ground (‘table’). Interestingly, this simultaneous production is combined with mouthing /op/, which is equivalent to the Dutch ‘on’.

In addition, as seen earlier in Example (11b), the sign depicting the Figure (‘vase’) is produced with a short downward movement and a final hold. Liddell (2003) claims that this movement is a lexically fixed aspect of depicting verbs which occurs frequently in American Sign Language, where the placement of the hand depicts the location. This movement with a final hold can be analysed as carrying the meaning of existence but implying location.

In (22) below, also for VGT, we see another way of simultaneous production. Here the Ground (‘curvy river’) was produced with a depicting sign on the dominant hand in initial position. The presence of the river had already been discussed. This depicting sign remained configurated in the signing space, and the non-dominant hand went on to point to the exact location of the Figure. The depicting sign referring to ‘mountain’ was produced in the location where the pointing sign (IX-a(river-curve)) ended. Producing both depicting signs in space marks the spatial relationship between Ground and Figure. In contrast with Example (21), the depicting sign ds-(mountain) did not show a short movement with a final hold but depicted a mountain-like shape.

(22) DH ds-(river-curve) ----------
NDH IX-a(river-curve) WHITE ds-(mountain)-a
Ground Figure
‘There is a white mountain beyond the end of the river.’

Another form of full simultaneity appearing in initial position in the sentence is shown in Example (23), below, for FinSL.

(23) nod
DH ds-(pot) / FISH ds-(fish-swimming-in-pot)
NDH ds-(pot) / ----------
Ground Figure
'There is a fish in the pot.'

The Ground entity 'pot' in this sentence has been mentioned before and both signers know there is a person holding a pot filled with water. One of the interlocutors wishes to introduce a new referent, ('fish'), which is present in the pot, by expressing the Ground ('pot') first; this is done by means of a two-handed depicting sign with two C-handshapes referring to the shape of the pot. The non-dominant hand, formed with a C-handshape, remains stationary, while 'fish' is produced by the dominant hand as the Figure. Taking final position in the construction, the depicting sign for 'a fish swimming in the pot' is produced right next to the non-dominant C-hand to show the spatial relationship. The order here is Ground preceding Figure.

Finally, an adposition can appear in both languages. An example for FinSL is given in (24), below.

(24) DH BEHIND-a BLACK ds-(mountain)-a BLACK ds-(mountain)
NDH ds-(bush)-b ----------
Ground Figure
'There is a black mountain behind the bush.'

This existential sentence (24) shows the simultaneous production of Ground and Figure with both expressed as depicting signs. As mentioned earlier, adposition signs appear rarely in FinSL, but this construction starts with the simultaneous production of the adposition sign 'behind' with the dominant hand and a depicting sign for 'bush' with the non-dominant hand. The bush, here functioning as the Ground, has been discussed earlier, and this depicting sign remains in the signing space till the end of the construction. Immediately following the dominant hand's 'behind' comes the Figure, which occupies the rest of the construction: 'black mountain', produced in a particular space. These depicting signs and their simultaneous production are sufficient to mark the spatial relationship between Ground and Figure, but the adposition sign is apparently used for this purpose too.

4.7 Summary

The main findings on the similarities and differences between existential sentences in both VGT and FinSL are summarized in Table 4.

Table 4. Main findings of the similarities and differences between existential sentences in VGT and FinSL

Comparisons of existential sentences in VGT and FinSL	
Similarities	**Differences**
• Use of a certain verb, HEEFT/OLLA • Ground precedes Figure • HEEFT/OLLA can be omitted • Ground can be omitted • Simultaneous occurrence of Ground and Figure • The use of signing space	• Number of existential sentences with overt HEEFT/OLLA is higher in FinSL than in VGT • Number of existential sentences with the omission of HEEFT/OLLA is higher in VGT than FinSL • VGT uses adposition signs more frequently than FinSL

5 Discussion

Until now, there has been no single in-depth research focusing solely on existential sentences in any sign language. This research aims to fill this gap by focusing on existential sentences in two sign languages: VGT and FinSL. This study will contribute significantly to the understanding of the interface between syntax and discourse in signed languages. The outcomes of this investigation will lead to new theory building about the syntax of both sign languages, which, by extension, will further our understanding not only of the typological status of signed languages but also of the typology of natural languages worldwide.

This paper has presented a descriptive and comparative study of existential sentences in VGT and FinSL. An existential sentence is a sentence that is used to express the existence or presence of an object or person. This sentence type has the primary function of introducing a new, important referent within a discourse. This study aimed to gain some basic insights into the order of Figure and Ground in existential sentences in both these sign languages and into what differences and similarities there are between the sentences in the two languages.

The analysis showed that existential sentences in both sign languages can be grouped according to whether the sentence is formed around the sign HEEFT for VGT and OLLA for FinSL or without them; both these signs

carry the meaning of 'have'. The reason for this kind of grouping is that most studies show that existential sentences use one specific verb in this sentence type (e.g. Clark 1978, Kristoffersen 2003). This is not always the case in the data in this study, which has produced several noteworthy results.

To start with, a quantitative approach to the data in this study shows a difference in the numbers of existential sentences in the two sign languages. In FinSL, 38 out of 51 existential sentences were formed around the existential sign OLLA. In 13 sentences this sign was omitted. In VGT, only 14 out of 40 existential sentences were formed around the sign HEEFT and in 26 sentences the verb was not explicitly expressed.

By viewing existential sentences as a functional domain within the context of cross-language typology, this study has shown that existential sentences in both sign languages can be encoded in different syntactic structures. This means that, for example, besides the signs HEEFT and OLLA, the Ground can also be omitted from the construction. Adposition signs can have an important function, and simultaneity and the use of space are other important mechanisms used to express existence or presence in both sign languages.

Existential sentences in VGT and FinSL both invariably have the order Ground preceding Figure, regardless of whether the sentence is formed around HEEFT/OLLA or not. This order resembles the most common pattern found in typological studies into spoken languages (Clark 1978; Freeze 1992) as well as in Danish Sign Language (Kristoffersen 2003).

In existential sentences that are formed around the signs HEEFT/OLLA in both sign languages, Ground mainly takes initial position in the construction, followed by HEEFT/OLLA, with Figure appearing in final position: Ground HEEFT/OLLA Figure. Adposition signs, which mark the spatial relationship between Ground and Figure, can appear in existential sentences in both languages, though the number is higher in VGT than in FinSL. Adposition signs are mainly placed immediately after the Ground.

The order in existential sentences that are not formed around HEEFT/OLLA is Ground preceding Figure in both sign languages. VGT typically shows structures with the Ground in sentence-initial position and produced nonmanually with a short, quick head nod. This is followed by a short break while the signer waits for confirmation from the interlocutor that they both know what they are talking about. An adposition sign produced in a specific location in the signing space and then the Figure complete the sentence. No such structure was found in FinSL. However

there are sentences with the omission of OLLA, though fewer in number, which use different mechanisms, i.e., the use of depicting signs. This type of structure, with the omission of HEEFT/OLLA, contrasts with previous research that mentions the use of a specific verb. Additionally, the studies on spoken languages presented in §2 do not take into account the possibility of the omission of the Ground from existential sentences. As this study proceeds from function to form, it stands in contrast to Kristoffersen's (2003) study, as she starts from the form, i.e. sentences that include the verb EXISTENTIAL.

As was found in Kristoffersen's (2003) study of Danish Sign Language, the Ground can be omitted from the construction when it can be retrieved from the context. In addition, Jantunen (2013; 2016) states that thematic elements are constantly omitted in FinSL. This also links well with Talmy's (2000) theory of windowing of attention, where parts of sentences are either foregrounded, to draw attention to them (windowing), or backgrounded, by omitting parts (gapping) from the construction when the meaning of the missing parts can be retrieved from the context. In such cases, both languages show the use of either an adposition sign in initial position followed by HEEFT/OLLA and the Figure, or just HEEFT/OLLA followed by the Figure. The higher appearance of adposition signs in the VGT data can perhaps be ascribed to language contact, on the one hand between VGT and Dutch, and on the other hand between FinSL and Finnish, as a natural phenomenon between languages which are used in the same community. Spoken Dutch has prepositions while spoken Finnish has postpositions. Although FinSL does use adposition signs in natural conversations, more investigation is needed to understand the use of such signs in both FinSL and VGT. The use of an elicitation task in this study may have affected the amount of use of adposition signs in both languages.

Where structures do show the omission of both Ground and HEEFT/OLLA, the use of space is very important. In VGT, the sentence can start with an adposition sign followed by the Figure as long as both are produced at a place in the signing space that marks the specific location of the Figure in relation to the Ground, which is then retrieved from the context. FinSL did not produce any examples with adposition signs but, as in VGT, in FinSL the Figure can stand alone in the construction when it is produced at a certain locus in the signing space in relation to the Ground that will be retrieved from the context. In contrast with Kristoffersen's (2003) study, no examples were found where the Figure is omitted from the sentence.

Finally, sign language-specific, or modality-specific, mechanisms appear frequently in the data with simultaneity and depicting signs. Depicting signs are produced immediately after the Figure to mark the spatial relationship, and the classifier handshape denotes the salient properties of the entity that is the Figure. This type of sign does appear frequently in simultaneous productions of Ground and Figure, following various patterns. Sometimes the Ground can be produced first, followed by the Figure and then the simultaneous production of two depicting signs, with the dominant hand referring to the Figure and the non-dominant hand to the Ground. At other times the dominant hand can produce the Ground with a depicting sign and then remain stationary in the signing space, followed by a depicting sign denoting the Figure on the non-dominant hand. Finally, when the Ground is produced with a two-handed depicting sign in initial position, the non-dominant hand remains in the space followed by the Figure produced as a depicting sign marking its location in relation to the Ground. An adposition can also be used here to mark the spatial relationship.

In order to fully understand the semantics and syntax of existential sentences in VGT and FinSL, more in-depth research is needed, for example into how the location of objects or persons that are hearer-new or hearer-old is expressed, as it is claimed that a different word order is used in each case. Also, existential sentences need to be investigated in relation to possessive sentences, as most studies (e.g. Clark 1978, Kristoffersen 2003) have shown that the word order in both sentence types is very similar. These studies also showed that existential, locative and possessive sentences are expressed by means of one verb. This is most probably not the case in VGT, as HEEFT is only used to express existence and possession (De Weerdt & Vermeerbergen 2008). Equally, BSL uses only one verb, HAVE, to express both existence and possession (Deuchar 1984) while BSL also has other signs to express existence (Hughes et. al 1984). Finally, the utterances in this study were elicited and textual; it will also be necessary to study isolated utterances, as these will provide basic understanding of the structure of existential sentences, and spontaneous expressions from corpus data. Indeed, researchers (e.g. Jantunen 2008) have shown that word order in isolated utterances can differ from word order in textual utterances.

This study only focuses on concrete referents in elicited conversations and cannot generalize about existential sentences in either or both sign languages. However, on the basis of previous studies and the method used in this study, it is possible to say that existential sentences in both sign

languages typically have the order of Ground preceding Figure and that Ground and the lexical signs HEEFT/OLLA can be omitted from the construction. The production of adposition signs, which appears more in VGT than in FinSL, could be a result of the elicitation task. Research on the presence and use of adposition signs is needed to understand their form and function. Adposition signs are, along with depicting signs and localized lexical signs, a way to mark the spatial relationship between Ground and Figure. More investigation is needed to understand the expressions of spatial relationship and the use of these markers in both VGT and FinSL. The influence of spoken Dutch and spoken Finnish on the use of adposition signs in VGT and FinSL respectively is another possible field for further investigation.

6 Conclusion

To conclude, this study shows syntactic variations in the expression of the function of existence or presence of an object or a person in VGT and FinSL. Existential sentences can be schematized as (Ground) (HEEFT) Figure for VGT and (Ground) (OLLA) Figure for FinSL. Both Ground and HEEFT/OLLA can be omitted from the construction in both sign languages, and the use of adposition signs may be important. In both languages Ground invariably precedes Figure. Due to the visual-manual modality of both sign languages, the use of space and simultaneity are also quite important.

This study contributes to the field of sign language linguistics a better understanding of the form and function of existential sentences, taking into account their discursive functions. Despite the fact that both sign languages use the same visual-manual modality, this study also shows that both sign languages express the function of existence in more than one way and that there are differences between the two sign languages. The phenomenon of ellipsis occurs frequently in such sentence types when they appear in a discourse or when they are contextualized. As for language typology in general, this study also shows that existential sentences in VGT and FinSL have a similar structure to that found in most spoken languages around the world. However, this study has also shown that, due to sign language-specific or modality-specific characteristics, sign languages also have other mechanisms to do with simultaneity or the use of the signing space.

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Notational conventions used for transcriptions

HOUSE	gloss in small capital letters representing a sign in VGT or FinSL
NEXT-a	-a refers to the locus in the signing space called a
IX	pointing sign
ds-(xxx)	depicting sign
DH	dominant hand
NDH	non-dominant hand
DH ds-(cactus) NDH ds-(cactus)	both signs are produced simultaneously
ONE pot --------- BROWN	simultaneity: final sign of dominant hand is hold in space
-distr	distributed
_____	marking the nonmanual production during the sign(s)
___eg	eye gaze
___t	topic marking
___nod	head nod
___ed	eyebrows down
/	short pause
///	long pause

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Syntactic investigation of nunation in Haili Arabic

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Abstract

This research study investigates nunation (Arabic *tanwi:n*) in Haili Arabic (HA). Haili Arabic is a dialect spoken mainly in Hail, the Kingdom of Saudi Arabia (KSA). It argues that the nunation suffix, *-n*, is used to fill the position of the head in a determiner phrase (i.e. the head Dº position) when the latter is not occupied by the definite article or a personal pronoun. The filling follows from a proposed condition that demands the head Dº position to be filled by an overt element in the Arabic dialect under investigation. This accounts for the lack of *-n* with definite entities (i.e. definite determiner phrases, DPs) headed by the definite article *ʔal,* on the one hand, and the presence of *-n* in indefinite entities and proper nouns, on the other. Additionally, to account for the use of *-n* with adverbs, the current study assumes that adverbs in HA are underlyingly DPs headed by Dº; hence, the demand to fill Dº due to the head Dº condition. With regard to the semantic function of *-n*, the study argues that the nunation suffix creates a predicational relation between the noun and the remnant of the DP through forcing the given noun to move to the Specifier position of the associating DP. What forces this movement is the [EDGE] feature, which is part of the featural bundle of the nunation suffix, requiring the edge of a phrase to be filled.

Keywords: Haili Arabic, definiteness, DP theory, nunation

1 Introduction

Nunation is the suffixation of the so-called nunation suffix *-n* to nouns, nominal modifiers and adverbs. Several studies have maintained that nunation is still retained in some Arabic varieties and, thus, not restricted to

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Standard Arabic. Consider the following examples from Haili Arabic (nunation suffix is glossed as -NUN):[1]

(1) a. *ʔismiʕi-t gisʕsʕiti-n ħazi:nah*
heard-1SG story-NUN sad.3SG
'I heard a sad story.'

b. *ʔismiʕi-t gisʕsʕiti-n ħazi:nati-n gadi:mah*
heard-1SG story-NUN sad.3SG-NUN old.3SG
'I heard an old sad story.'

c. *ʔismiʕi-t gisʕsʕiti-n ʔamsi-n ʔasʕ-sʕubuħ*
heard-1SG story-NUN yesterday-NUN DEF-morning
'I heard a story yesterday morning.'

In (1a), *-n* is suffixed to the noun *gisʕsʕit* 'story', whereas it is suffixed to the nominal modifier *ħazi:nat* 'sad' and to the temporal adjunct *ʔams* 'yesterday' in (1b) and (1c), respectively. Of note here is that *-n* cannot be suffixed to definite determiner phrases headed by the definite article *ʔal* 'the'. Consider the following ill-formed examples:

(2) a. **ʔismiʕi-t ʔal-gisʕsʕiti-n ʔas-ʕsʕubuħ*
heard-1SG DEF-story-NUN DEF-morning
Intended: 'I heard the story in the morning.'

b. **ʃif-t ʔaʃ-ʃamsi-n ʔasʕ-sʕubuħ*
saw-1SG DEF-sun-NUN DEF-morning
Intended: 'I saw the sun in the morning.'

c. **ʃif-t ʔal-gumari-n ʔasʕ-sʕubuħ*
saw-1SG DEF-moon-NUN DEF-morning
Intended: 'I saw the moon in the morning.'

This complementarity against the suffixation of *-n* to definite determiner phrases headed by *ʔal* 'the' has been the main motivation for the commonly suggested assumption that this suffix is a morphological realisation of the indefinite article in Standard Arabic (see Fischer & Rodgers 2002; Schulz 2004; Ryding 2005; Versteegh 2014). However, data from Haili Arabic

[1] All sentences in this study are from Haili Arabic (HA) unless stated otherwise. Additionally, all HA sentences that appear in this study were supplied by ten native HA speakers.

casts doubt on this assumption in that *-n* can be suffixed to proper nouns, which are definite on their own (cf. Fraurud 1990; Wacholder et al. 1997; Longobardi 2001).[2] Consider the following examples:

(3) a. *ʃif-t* *sali:mi-n* *ʔamsi-n* *ʔasˁ-sˁubuħ*
saw-1SG Salim-NUN yesterday-NUN DEF-morning
'I saw Salim yesterday morning.'

b. *ʔidʒa* *fahdi-n* *ʕala* *ʔad-da:r*
came.3SG.M Fahd-NUN on DEF-house
'Fahd came to the house.'

The examples in (3) make clear that the analysis of *-n* as an indefinite article is empirically untenable. Proper nouns are widely counted as definite entities. Additionally, what rules out the possibility that *-n* is an indefinite article is its suffixation to adverbs (see 1c). The (in)definiteness dichotomy is basically linked to nominal entities. An adverb cannot be definite/indefinite, since adverbs are not used for referentiality, the main notion behind definiteness (cf. Bellert 1977; Traugott 2014; Valera 2014 and numerous others).

This study brings nunation to the fore, attempting to provide a new account of its role in the relevant determiner phrase (DP) derivation. Here, we focus on examples from a regional variety of Najdi Arabic, namely, Haili Arabic (henceforth, HA) in which nunation is used.[3] The article is organised as follows: Section 2 reveals that the relevant approaches already advanced to account for the nunation suffix and its distribution in Standard Arabic and Dialectal Arabic lack evidence and suffer from empirical problems. Section 3 introduces our account of *-n* as a device to fill the head Dº position due to the *Head Dº Condition* (HDC), which demands that the head Dº position be overtly filled. The HDC accounts for the presence of the nunation suffix in nominal elements with empty Dº, including indefinite

[2] The nunation suffix can also be attached to proper nouns in Standard Arabic, an observation ignored by some approaches. Consider the following example from Standard Arabic:

(i) *ðahaba* *muħammad-u-n* *ʔila* *ʔal-masdʒid*
went Muhammad- NOM-NUN to DEF-mosque
'Muhammad went to the mosque.'

[3] See Alshamari (2015a; 2015b) and Alshamari & Jarrah (2016) for recent works on Haili Arabic.

entities and proper nouns. Section 4 tackles some residual issues: the use of *-n* with adverbs and its absence with verbs, prepositions and personal pronouns. The section argues that adverbs in HA are underlyingly DPs headed by Dº; hence, the use of the nunation suffix to fill the head Dº position due to the HDC. The lack of the nunation suffix with verbs and prepositions is reduced to the lack of Dº in these constructions. As for the lack of the nunation suffix with personal pronouns, we assume that the head Dº position is filled by the personal pronoun, meeting the demands of the HDC. Section 5 concludes the study.

2 Nunation

This section touches on the major arguments proposed for nunation treatment in Standard Arabic as well as Dialectal Arabic. We focus here on the traditional perspectivists' approach to nunation, approaches on some Arabic varieties proposed by Holes (1990), Ingham (1994) and Brustad (2000), and finally Fassi Fehri's (1993; 2012) approaches on Standard Arabic. This section introduces these approaches with what we think are arguments against them.

2.1 Traditional perspectivists' approach

Traditional perspectivists' approach to nunation is highly descriptive; they argue that nunation mainly differentiates between nouns and verbs (Al-Rajihi 1988; Abdel-Hamid 1995a; 1995b). Contrary to nouns, *-n* never appears on verbs. Nunation, in this sense, is a sign of *tamki:n*, literally 'complete nominality'; so a line between nouns and other categories can be drawn (Al-Rajihi 1988: 11; Abdel-Hamid 1995a: 21–22). However, this argument is seriously weakened by the fact that the nunation suffix *-n* is still used with adverbs and nominal modifiers. Following this, nunation is what distinguishes nouns, adverbs and adjectives from verbs. Additionally, the nunation suffix cannot be used in conjunction with prepositions. Here, one must ask what makes verbs and prepositions resistant to the suffixation of the nunation suffix, as compared with nouns, adjectives and adverbs. Any account of nunation must consider this observation; otherwise facts are obfuscated (we return to this observation in the following sections, arguing that the nunation suffix is a head; hence its complementarity with other heads).

Furthermore, traditional perspectivists use nunation to differentiate between what they call diptotes (entities which do not accept Genitive Case when they are indefinite) and non-diptotes (entities which accept Genitive Case when they are indefinite). The former cannot be marked with the nunation suffix *-n*, as in (4a) – compare with (4b) –, while the latter can, as in (4c) (Abdel-Hamid 1995b: 293). The following examples are from Standard Arabic.[4]

(4) a. **marar-tu* *bi-ʕumari-n*
passed-1SG by-Omar-NUN
Intended: 'I passed by Omar.'

b. *marar-tu* *bi-ʕumar-a*
passed-1SG by-Omar-ACC
'I passed by Omar.'

c. *marar-tu* *bi-xa:lid-i-n*
passed-1SG by-Khalid-GEN-NUN
'I passed by Khalid.'

This account is again descriptive at best and provides no actual manifestation of the true nature of nunation, and how it functions in relation to various types of nouns. For instance, the reason why diptotes are unable to bear nunation has not been investigated yet (see Holes 2004 for the refutation of the dichotomy of diptotes and non-diptotes as well as the types of structures in which nunation can appear in some Arabic dialects). Additionally, the dichotomy between diptotes and non-diptotes does not hold true in HA. This is because diptotes in HA can be attached with the nunation suffix. Consider the following examples.

[4] Following the rules to differentiate between diptotes and non-diptotes in Arabic, the proper noun *Omar* is a diptote, since its morphological template is CV.CVC. This indicates that *Omar* is neither marked with the Genitive Case nor suffixed with nunation as opposed to non-diptotes. Other nouns that have the same template as *Omar* are *Mudˁar* and *Hubal*. Not only nouns are treated as diptotes in Standard Arabic, but also certain adjectives are regarded as diptotes, e.g. adjectives realising the template CVC.CVVC as in *ʕatˁʃa:n* 'thirsty' (see Abdel-Hamid 1995b for a complete list of diptotes vs. non-diptotes rules). Reviewing the literature on diptotes, perspectivists provide no justifiable reason for classifying certain nouns and adjectives as diptotes. Arguing that a number of diptotes are of non-Arabic origin does not justify why they do not accept nunation, given the fact that other nouns of Arabic origin are also diptotes. However, such a phenomenon is beyond the scope of this study and is thus not pursued any further here.

(5) a. *marre:-t* *bi-ʕumari-n* *ʔamsi-n* *ʔasʕ-sʕubuħ*
passed-1SG by-Omar-NUN yesterday-NUN DEF-morning
'I passed by Omar yesterday morning.'

b. *marre:-t* *bi-xa:lid-in* *ʔamsi-n* *ʔasʕ-sʕubuħ*
passed-1SG by-Khalid-NUN yesterday-NUN DEF-morning
'I passed by Khalid yesterday morning.'

Therefore, the dichotomy between diptotes and non-diptotes is irrelevant to HA and to any syntactic proposal to nunation in the dialect.

Another function of nunation, for traditional perspectivists, is what they label "non-specification" when *-n* is used with proper nouns (Al-Rajihi 1988). If the proper noun is not marked with *-n*, then the speaker has a specific referent of the person in mind (see 6a). Conversely, the realisation of *-n* on a proper noun indicates that the referent of the given noun is non-specific, as in (6b). The presence vs. absence of *-n* on proper nouns gives a clue as to whether the person in question is known to the speaker or not. Consider the following examples from Standard Arabic:

(6) a. *raʔay-tu* *si:bawayh*
saw-1SG Sibawayh
'I saw Sibawayh.'

b. *raʔay-tu* *si:bawayh-a-n*
saw-1SG Sibawayh-ACC-NUN
'I saw a Sibawayh.'

The question to ask here is: if proper nouns are definite by virtue of their properties (of naming), then why would they be marked with a device that de-specifies them? The dichotomy between specific proper nouns and non-specific proper nouns is far from plausible, even within intuitive terms. Moreover, this is not the case in HA, in which the nunation suffix is attached to a proper noun, even if the proper noun is specific. Consider the following natural example, reported by one of the HA native speakers.

(7) *ʔamsi-n* *ʔaχu:-y* *fahdi-n* *ʔiʃtara* *siyya:rti-n*
yesterday-NUN brother-my Fahd-NUN bought.3SG.M car-NUN
'Yesterday, my brother Fahd bought a car.'

In (7), the speaker talks about his brother, *Fahd*, who is specific in such a context. The nunation suffix is still attached to it, indicating strongly that

the dichotomy of specific/non-specific proper nouns does not play any role in nunation assignment in HA.

Given that nunation is not exclusive to Standard Arabic as hinted at above, the realisation of *-n* in spoken Arabic has been attested and analysed by several researchers (e.g. Holes 1990; 2004; Ingham 1994; Brustad 2000). The following section provides a discussion of the approaches to nunation in spoken Arabic.

2.2 Nunation in spoken Arabic

Contrary to common belief at the time, Brustad (2000) stated that nunation does appear in spoken Arabic dialects. In particular, a significant number of spoken dialects of Arabic use *-n* with adverbs, such as *ʔabadan* 'ever', *da:yman* 'always', *ʕa:datan* 'usually', etc. and indefinite nouns used in Bedouin dialects, such as Najdi Arabic (Brustad 2000). Holes (1990) argues that such a type of nunation is only a relic of the lost case marking system of Standard Arabic, which persisted in a number of spoken dialects. Yet, Holes's (1990) assumption is inaccurate as far as HA is concerned. This is because nunation still holds irrespective of the syntactic position of the respective noun.[5] Consider the following examples, in which the noun *ridʒa:l* 'a man' occupies different syntactic positions (a subject in 8a, a direct object in 8b, a predicate position in 8c and an indirect object in 8d).

(8) a. *ʔidʒa* *ridʒa:li-n* *ʕala* *ʔad-da:r*
came.3SGM man-NUN to DEF-house
'A man came to the house.'

b. *ʃuf-t* *ridʒa:li-n* *bi-d-da:r*
saw-1SG man-NUN in-DEF-house
'I saw a man in the house.'

c. *fahd* *ridʒa:li-n* *muħtaram*
Fahd man-NUN respected
'Fahd is a respected man.'

d. *ʔaʕtˁe:-t* *ridʒa:li-n* *l-kta:b*
gave-1SG man-NUN DEF-book
'I gave a man the book.'

[5] Thanks to a *SKY JoL* reviewer for pointing that out to us.

The obvious conclusion is that nunation is not paired with Case in HA. This assumption had already been suggested and argued for by Ingham (1994) and Brustad (2000) for other Arabic dialects. Ingham (1994) and Brustad (2000) assume that *-n* is not connected to case assignment. For them, the lack of *-n* on definite nouns, which are usually marked with the definite article *ʔal-*, is a clear indication that *-n* is "an indefinite-specific marker" (Brustad 2000: 28). Brustad (2000) employs Ingham's (1994) account on Najdi Arabic to support her argument on the nunation suffix, which acts for her as an indefinite-specific marker (the examples in 9a–c are from Najdi Arabic, cited in Ingham 1994: 49):

(9) a. *be:t-in* *kibir*
house-NUN large
'a large house'

b. *wɑ̃ħd-in* *min* *ar-rabuʕ*
one-NUN of DEF-group
'one of the group'

c. *kalmit-in* *gɑ̃l-õ-hɑ̃-li*
word-NUN said-they-it-to.me
'a word which they said to me'

In a related vein, although Ingham (1994) observes that *-n* appears on nouns usually modified by an adjective, a prepositional phrase or a relative clause (see examples 9a–c, respectively), he failed to account for his own observation that the indefinite noun marked with nunation always accompanies further information. If we assume that the noun marked with nunation is followed by some material, the sole function of which is to specify the given noun, Ingham's (1994) account follows. In this regard, Jarrah and Zibin (2016) argue that nunation is an information-trigger device that motivates the speaker to add further information to specify the noun marked with *-n*. Thus, the accompanying adjectives, prepositional phrases or relative clauses serve as what they call *balancing materials* that level the definiteness status of the sentence and promote its acceptability. Such analysis sounds reasonable and accounts for the true pragmatic/semantic function of nunation (first noticed by Ingham 1994).

Other arguments that depart from anaphoricity and informativity are supplied by Fassi Fehri (1993; 2012). The following subsection illustrates his point.

2.3 Fassi Fehri (1993; 2012)

Fassi Fehri (1993: 216) points out that Arab grammarians have puzzled over the function of nunation for centuries. The seeming complementary distribution between the definite article and nunation has driven Arab grammarians to treat the latter as an indefinite marker, which is for Fassi Fehri (1993) hardly logical. The main contention against the argument that nunation is an indefinite marker is the observation that proper nouns can also bear the so-called indefinite marker. Additionally, examining NPs and adjectival genitive possessive constructions, Fassi Fehri (1993: 216) assumes that while in NP genitive constructions, both the definite article *ʔal-* and the nunation *-n* are banned from appearing on the head of the NP construction (see examples 10a–b), only nunation is lacking in adjectival genitive constructions. Compare example (10c) with (10d) (all examples are from Standard Arabic, cited in Fassi Fehri 1993: 217–218).

(10) a. **daxal-tu ʔad-da:r-a ʔar-rajul-i*
entered-1SG DEF-house-ACC DEF-man-GEN
'I entered the house of the man.'

b. **daxal-tu da:r-a-n ʔar-rajul-i*
entered-1SG house-ACC-NUN DEF-man-GEN
'I entered a house of the man.'

c. *hind-un ħasan-at-u ʔal-wajh-i*
Hind-NOM nice-F-NOM DEF-face-GEN
'Hind has a nice face.'

d. *ša:had-tu ʔal-bint-a ʔal-ħasana-t-a ʔal-wajh-i*
saw-1SG DEF-girl-ACC DEF-nice-F-ACC DEF-face-GEN
'I saw the girl with the nice face.'

Examples in (10) demonstrate that both the definite article and nunation are absent in nominal genitives, while only nunation is absent from adjectival genitives. Based on this, Fassi Fehri (1993) proposes that nunation is a realisation of Poss(essive) head, since *-n* realises Poss only when the Possessor is absent. The main argument is that genitive nominal constructions receive a possessor role not within the lexical projection of N, but rather from an abstract functional theta marker referred to as Poss. In this way, similar to a preposition, Poss construes a relational category,

incorporating N, which enables it to assign a theta role to the possessor indirectly (Fassi Fehri 1993: 220).

On the other hand, Fassi Fehri's (1993) analysis is evidently exclusive to the behaviour of nunation in nominal and adjectival constructions. The "Poss marker" account provides no explanation as to why proper nouns and adverbs are marked with *-n*. Furthermore, being a Poss marker entails that the relevant constructions in which nunation appears must have possessive interpretative reading, a conclusion whose exception is much broader than the regular pattern (see Kouloughli 2001 for refutation of Fassi Fehri's 1993 account of nunation).

Later, Fassi Fehri (2012: 160–169) takes nunation to be comparatively equivalent to Ezafe in Persian or in Hawrami, where Ezafe is best analysed as a case marker or a nominal linker.[6] However, this analysis is inapplicable as far as HA is concerned. Unlike the case in HA, (temporal) adverbs are neither marked with the Ezafe clitic in Persian nor Hawrami (cf. Karimi & Brame 2008). Secondly, the Ezafe clitic is never used with bare nouns (without accompanying nominal modifiers) either in Persian or Hawrami; this state of affairs is not required in HA, in which nunation must be adjoined to non-modified nominal entities. Consider sentence (1c), reproduced below for convenience:

(11) *ʔismiʕi-t gisʕsʕiti-n ʔamsi-n ʔasʕ-sʕubuħ*
heard-1SG story-NUN yesterday-NUN DEF-morning
'I heard a story yesterday morning.'

The nunation suffix is attached to the DP *gisʕsʕit* 'a story' although the latter is not modified.

In the following section, we provide our approach to nunation in HA from a syntactic perspective, assuming that this suffix is used in conformity with some syntactic condition, namely the Head Dº Condition, which demands the head Dº position in HA to be overtly occupied.

3 Analysis

We argue that the nunation suffix is used when the Dº head is not filled by the definite article or another element that occupies this position, including

[6] Fassi Fehri (2012) builds his argument on Larson & Yamakido (2008) on Persian and Holmberg & Odden (2004) on Hawrami.

personal pronouns. We appeal here to the DP theory first pioneered by Abney (1987). For Abney, noun phrases are syntactically determiner phrases (DPs) in the sense that the maximal projection housing the noun is DP, rather than NP. The head of the phrase is Dº, rather than Nº. Evidence for the DP theory has been adduced cross-linguistically, and the DP is now considered the main practice within the generative enterprise (Stowell 1991; Longobardi 1994; Siloni 1997; Coene 2003; Choi 2014).

We claim that the nunation suffix is a head having the same position of the definite article *ʔal* 'the', which is widely assumed to occupy the head Dº position (see Fassi Fehri 1993; 1999; 2012; Siloni 1997; Shlonsky 2004; Ouhalla 2011). At face value, the nunation suffix and the definite article may have different positions in syntax, given their position vis-à-vis the associating noun: *-n* is a suffix, rather than a prefix like the definite article in Arabic. Consider the ungrammatical example:

(12) **in-walad in-ðaki:*
NUN-boy NUN-smart
Intended: 'a smart boy'

Despite this observation being only preliminary and in need of closer analysis, we argue that the nunation suffix and the definite article occupy the same position in syntax, namely, Dº. This proposal is supported by the fact that they are mutually exclusive. Consider the ungrammatical example:

(13) **ʔal-walad-in*
DEF-boy-NUN
Intended: 'the boy'

Either *ʔal-* or *-n* is used, not both. The obvious observation is that the use of the nunation suffix *-n* is only triggered when the definite article *ʔal* 'the' is not used. We argue that this trigger boils down to a demand of one condition which is operating in HA grammar. This condition is the *Head Dº Condition* (HDC), which demands the head Dº position in HA to be overtly occupied. In case the definite article is used, no HDC violation is incurred. On the other hand, when the definite article is not used, the nunation suffix is used to fill Dº in compliance with the demands of the HDC. What supports this assumption is the use of the nunation suffix with proper nouns in this language. Research in a wide variety of languages has argued for the assumption that proper nouns have empty Dº (Longobardi 1994; Berk 1999; Givón 2001). If we extend this approach to proper nouns

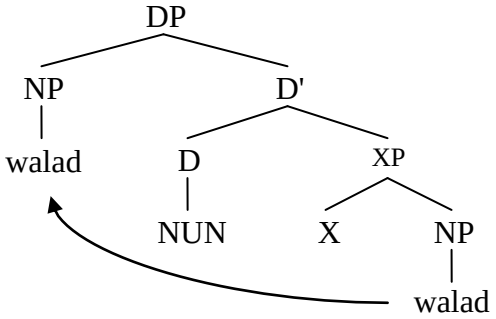
in HA, the use of the nunation with such entities follows. Proper nouns in HA are headed by Dº, which must be filled by the HDC; hence, the use of the nunation suffix (this entails that proper nouns in HA neither have articles nor NUN-to-D with proper nouns, as Longobardi has argued for in some languages).

This analysis can be situated within the minimalist views. Following Chomsky (1995), if the subarray of the DP includes an overt Dº, like the cases of definite nouns, then the Dº head will be occupied and, hence, there will be no demand for the nunation suffix. When the subarray lacks overt Dº, like the cases of indefinite DPs or proper nouns (cf. Coene 2003), the Dº head will not be occupied, and hence the nunation suffix is used, forced by the HDC.

The question that promptly arises is how we can account for the different position the two affixes occupy with respect to the respective noun. Couching within the main assumptions of the Minimalist Program (Chomsky 1995; 2005), we argue that *ʔal-* and *-n* are both heads but with different feature sets (cf. Baker 2008). One difference is that *-n* has the [EDGE] feature within its featural grid (see Chomsky 2005), whereas the definite article *ʔal* 'the' is not endowed with the [EDGE] feature. Given the [EDGE] feature, the noun must vacate its position to the Specifier of DP headed by *-n* (see Epstein & Seely 2006; 2008; Miyagawa 2010, for similar approaches). Consider the syntactic derivation of the DP in (15) (all irrelevant details are skipped).[7]

(14) *walad-in*
boy-NUN
'a boy'

(15)



[7] XP projection in the tree stands for any projection between the Dº and the NP headed by the given noun.

In case Dº is headed by *ʔal-*, no movement of the NP *walad* 'boy' is forced to the Specifer of DP, given that Dº is not endowed with the [EDGE] feature. One may ask here why *ʔal-* has no [EDGE] feature, whilst *-n* does. It can be postulated that the [EDGE] feature derives a predicational reading. What is in the Specifier position of the DP is predicated by what remains unmoved, i.e. the remnant of the DP. The belief is that the movement of the associating N to the Specifier of DP must be envisioned as an attempt to place the N in a position with other entities predicating about it. That is to say, the N, while being in situ, has no advantage to be the locus of information inside the DP. Only the Specifier position of the DP (within the DP construction) can provide this advantage to the N (see Higginbotham 1985; 1987; Rapoport 1987; Doron 1988; Rothstein 1995; Adger & Ramchand 2003). The predicational reading approach provides a plausible account of why indefinite entities having the nunation suffix are in most cases followed by nominal modifiers (see Ingham's 1994 observation on the relation between nunation and the presence of nominal modifiers). Given that the nunation suffix triggers the noun to target a Specifier position with a predicational locus, the use of nominal modifiers is seen as an outcome of the movement of the noun to a position expressing predicate-argument relationships. In saying that, we do not think that the [EDGE] feature is motivated to account for linearisation or phase formation, as assumed by some researchers (cf. Chomsky 1999; 2005 and related work). For us, the [EDGE] feature is motivated to place the given element in a position in which the remnant material of the construction predicates about it.[8]

Following this line of thought, the appearance of *-n* as a suffix follows. Once the DP computation is handed over to the morphological computations, *-n* appears appended to the associating N in morphological components (see Chomsky 1995). The nunation *-n* materialises the head Dº, forcing the associating N to move to Spec DP to satisfy its [EDGE] feature, which cannot be fulfilled by a probe-goal configuration in the sense of Chomsky (1999). Based on this, it follows that there is no option but movement; otherwise the derivation crashes.

[8] Having said this, we should not neglect the cases in which the nunated noun can appear without any accompanying nominal modifiers. Under such cases, the nunation suffix would, as a *SKY JoL* reviewer pointed out, precede the bare noun. For this, we assume that the [EDGE] feature on the nunation marker has another function beside creating a predicational relation between the noun and accompanying nominal modifiers. This function can be something like setting a host for the nunation suffix.

Here, one may wonder about the level of syntax in which *-n* is introduced. Following our approach that *-n* is introduced to fill the head D° position and it has the [EDGE] feature, we claim that *-n* is inserted in the narrow syntax level (in pre-morphological, phonological syntax) as an overt D°. It seems that the numeration of DP in HA always has an element to fill the head D° position.

The next issue we address here is the fact that nunation can appear multiple times within a single DP as in (1b), repeated below for convenience.

(16) *ʔismiʕi-t gisʿsʿiti-n ħazi:nati-n gadi:mah*
heard-1SG story-NUN sad.3SG-NUN old.3SG
'I heard an old sad story.'

It appears that the nunation suffix is marked on the adjectives that modify the nunated noun.[9] If the adjective modifies a definite noun (with the definite article), the former must be attached to the definite article rather than the nunation suffix. Consider the following example:

(17) *ʔismiʕi-t ʔal-gisʿsʿiti-n ʔal-ħazi:nat**(*-n*) *ʔal-gadi:mah*
heard-1SG DEF-story-NUN DEF-sad.3SG.F(-NUN) DEF-old.3SG
'I heard an old sad story.'

The straightforward assumption is that there is nunation spreading where the nunation suffix spreads all over the nominal modifiers within the same DP, as is the case with the well-known assumption of definiteness spreading (cf. Borer 1999). The exact nature of this spreading and its evidence are left open for further research.

In the next section, we investigate certain issues that support our analysis to the nunation suffix as an element to fill the head D° position.

[9] The question that arises here is why the nunation suffix does not appear on the final adjective *gadi:mah* in example (16). It can be assumed that the nunation suffix is dropped out of *gadi:mah* by some phonological rule that prohibits [n] at the end of speech. The evidence for this assumption is that if *gadi:mah* is followed by a PP, the nunation suffix must be pronounced. Consider the following sentence:

(ii) *ʔismiʕi-t gisʿsʿiti-n ħazi:nati-n gadi:mati**(*-n*) *fi-s-su:g*
heard-1SG story-N sad.3SG-N old. 3SG(-N) in-DEF-market
'I heard an old sad story in the market.'

4 Residual issues

4.1 Use of the nunation suffix with adverbs and adverbial PPs

As noted above, the nunation suffix is used with adverbs and adverbial PPs. Consider sentence (1c), reproduced below for convenience:

(18) *ʔismiʕi-t gisʕsʕiti-n ʔamsi-n ʔasʕ-sʕubuħ*
heard-1SG story-NUN yesterday-NUN DEF-morning
'I heard a story yesterday morning.'

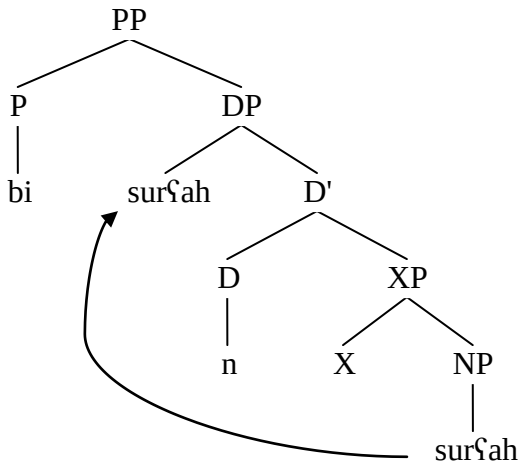
The temporal adjunct *ʔams* 'yesterday' is attached with the nunation suffix. To account for this observation, we follow here a line of research instantiated by Bresnan (1994) and further developed by Kayne (2006). These researchers argue that some adjuncts, especially temporal and locative, are underlyingly DPs headed by phonetically-null temporal or locative head Dº.[10] The assumption is that (temporal) adjuncts in HA are underlyingly DPs headed by Dº. Evidence for this assumption can be found in that the temporal adverb *ʔams* 'yesterday' can be suffixed with the definite *ʔal-*, forming *ʔal-ʔams*, literally 'the yesterday'. As such, Dº heading such adjuncts must be filled overtly due to the HDC. The nunation suffix is used to meet the demands of the HDC when the definite article is not used.

It should be noted here that not all adjuncts in HA can be suffixed with the definite article. For example, the habitual adverb *da:yim* 'always' does not accept the addition of the definite article *ʔal* (*da:yim* → **ʔal-da:yim*). This may predict that the nunation suffix is also barred, contrary to fact (*da:yim* → *da:yimin*). In view of this, it is postulated that habitual adverbs are headed by Dº which must be filled due to the demands of the HDC. Given that the definite article cannot be used in conjunction with habitual adverbs, the nunation suffix is the only possible device to satisfy the HDC. The adverb *da:yim* moves to the Specifier position of DP, forced by the [EDGE] feature on Dº.

As for manner adverbs, they come in HA as adverbial PPs headed by the preposition *bi* 'with'. For instance, the manner adverb 'quickly' is rendered into HA as *bi-surʕah*, literally 'with quickness'. In such cases, the noun must be indefinite, attached with the nunation suffix. See the following schematic derivation of the adverbial PPs *bi-surʕah* 'quickly':

[10] See Stanton (2016) for a similar approach to locative and temporal adjuncts.

(19)



The observation that adverbs are adverbial PPs has been attested in several Semitic languages, including Hebrew. For instance, Siloni (1997: 77) made it clear that adverbs in Hebrew are mostly adverbial PPs, as in the following Hebrew examples taken from Siloni (the adverbial PP is in boldface).[11]

(20) *ha-harisa* *ʃel* *ha-batim* ***be-'axzariut***
DEF-destruction of DEF-houses in-cruelness
'The destruction of the houses cruelly/in cruelness'

However, HA is different from Hebrew in that NPs within the adverbial PP are not attached to the nunation suffix. This entails that the HDC is not operating in Hebrew.

Taken together, the examples in this subsection show that adverbs and adverbial PPs in HA are underlyingly DPs headed by Dº, which is lexicalised by the nunation suffix due to the HDC.

4.2 Absence of the nunation suffix on verbs, prepositions and pronouns

The absence of the nunation suffix on verbs and prepositions follows from our analysis with reference to the HDC, which demands the Dº position to be filled. Consider the following examples:

[11] The gloss of example (20) is modified to be consistent with this paper.

(21) a. *ʔismiʕi-t*(-n)* *gisʿsʿiti-n*
heard-1SG(-NUN) story-NUN
Intended: 'I heard a story.'

b. *ʔidʒa* *ridʒa:li-n* *ʕala*(-n)* *ʔad-da:r*
came.3SGM man-NUN on(-NUN) DEF-house
'A man came to the house.'

As is clear from the examples in (21), the respective sentence becomes ungrammatical if the nunation suffix is attached to a verb, as in (21a), or to a preposition, as in (21b). Since neither verbs nor prepositions have Dº position, the lack of the nunation suffix with such phrases directly follows. The HDC is not activated in such expressions. This observation lends further support to our assumption that the nunation suffix is a zero-level element. In the case of verbs and prepositions, the head position is occupied by a preposition and a verb, respectively.

As for personal pronouns, it is quite clear that neither the definite article nor the nunation suffix can be attached to such entities (consider (*ʔal-)*hu:* 'he', (*ʔal-)*hi:* 'she', **hu:-n*, **hi:-n*). The account of this observation is simple following our approach. Such pronouns occupy the head Dº position, and hence there is no need to fill it (see Cardinaletti 1994; Baggaley 1998; Fassi Fehri 2012, among others, for arguments that personal pronouns occupy the head Dº position). For demonstrative pronouns, the situation is different. Such pronouns precede or even follow a DP headed by the definite article. Consider the following examples (the demonstrative pronoun is in boldface):

(22) a. ***ha:ða*** *ʔar-radʒil*
this DEF-man
'this man'

b. *ʔar-radʒil* ***ha:ða***
DEF-man this
'this man'

If the DP appears without the definite article, the resulting structure will be ungrammatical under the DP-reading.[12]

[12] Examples in (23) are grammatical under sentential readings. See Alrasheedi (2016) for details on this matter.

(23) a. ***ha:ða*** *radʒil*
this man
'this man'

b. **radʒil* ***ha:ða***
man this
'this man'

Such behaviour of demonstrative pronouns in HA is captured assuming that they occupy a distinct functional layer, DemP, in the sense of Cinque (2000; 2005), that c-commands the DP. DemP sub-categorises for a DP the head of which is filled by the definite article, *ʔal*.[13] This analysis predicts that the nunation suffix is not attached to demonstrative pronouns, given that sub-categorisation properties of DemP will not be met. HA data confirms this prediction, because adding the nunation suffix to nouns in examples (23a–b) does not either ameliorate them.

(24) a. ****ha:ða*** *radʒili-n*
this man-NUN
Intended: 'this man'

b. **radʒili-n* ***ha:ða***
man-NUN this
Intended: 'this man'

Here, one may ask whether quantifiers occupy the head Dº position in HA or not. The answer, for both this dialect and other Arabic varieties, is no. Quantifiers in Arabic can be prefixed with the definite article as in *ʔal-kull* 'the all' and suffixed with nunation *-n*, as in *kulli-n*. Recent approaches to Arabic quantifiers treat them as NPs rather than Ds (see Abdel-Ghafer 2015).

4.3 Lack of the nunation clitic with possessive constructions

The question that arises here is whether there is NUN-to-D raising in NA. If such raising takes place, there is no need for the nunation suffix to fill the head Dº position which is already filled by the raising N. Additionally, the

[13] For cases when the demonstrative pronoun is preceded by the DP, it is assumed that the DP moves to the Spec of DemP, following Cinque (2000; 2005). However, a full analysis of this matter lies beyond the scope of this study.

definite article is banned in such an environment for the same reason. As far as HA is concerned, a possible context for NUN-to-D raising is possessive constructions in which the head noun is suffixed with a pronominal clitic as in *bint-i* 'my daughter', literally 'daughter-my'. In such constructions, neither the definite article nor the nunation suffix is allowed. Consider the following examples:

(25) a. **ʔal-bint-i*
DEF-daughter-my
Intended: 'my daughter'

b. **bint-t-n*
daughter-my-NUN
Intended: 'my daughter'

c.**bint-n-t*
daughter-NUN-my
Intended: 'my daughter'

The definite article is disallowed, as in (25a), and so is the nunation suffix irrespective of whether the nunation suffix is inserted to the end of the Dº, as in (25b), or between the head noun and the possessive clitic, as in (25c). If we assume here that the head noun is raised to the head Dº position, the ban on the use of the definite article and nunation suffix follows. Note, here, that such a ban lends further support to the idea that the definite article and the nunation suffix vie for the same position in narrow syntax, which is the head Dº position.

In view of this, the observation that no cases in HA whereby a DP contains no Dº are found can be straightforwardly accounted for. Consider the following examples.

(26) a. *ʔismiʕi-t* *gisʕsʕiti**(***-n***) *ʔamsi-n* *ʔasʕ-sʕubuħ*
heard-1SG story(-NUN) yesterday-NUN DEF-morning
'I heard a sad story yesterday morning.'

b. *ʔismiʕi-t* **(**ʔal**)-gisʕsʕa* *ʔamsi-n* *ʔasʕ-sʕubuħ*
heard-1SG DEF-story yesterday-NUN DEF-morning
'I heard the sad story yesterday morning.'

In (26a), the nunation suffix is obligatory, and the same applies to the definite article in (26b). Otherwise, the DP, *gisʕsʕit* 'story' appears plain,

i.e. without *-n* or *ʔal-*, which leads to the ungrammaticality of the respective sentence. It can be generalised that DPs in HA must be either marked by the definite article or the nunation suffix, following the HDC.

5 Conclusion

In this study, we pursued a research agenda that seeks to account for the use of nunation in HA. The main argument we put forward was that the nunation suffix, *-n*, is Dº, in accordance with the Head Dº Condition (HDC), which requires the head Dº to be overtly filled. The HDC provides feasible explanation to 1) the lack of *-n* with definite DPs the head of which is the definite article *ʔal-*, and 2) the presence of *-n* in indefinite DPs and proper nouns. The discussion also revealed that adverbs in HA are underlyingly DPs headed by Dº, which explains the appearance of *-n* on adverbs. We proposed that the nunation suffix, *-n*, is employed to establish a predicational relation inside the DP under examination. What lends credence to our argument is the fact that the nunation suffix is neither suffixed to verbs, personal pronouns nor prepositions; the categories occupying the head position in their relevant constructions.

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Abbreviations

1 = first person; 2 = second person; 3 = third person; ACC = accusative; DEF = definite; F = feminine; GEN = genitive; M = masculine; NOM = nominative; NUN = nunation; SG = singular

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Distance, visual salience, and contrast expressed through different demonstrative systems: An experimental study in Estonian[1]

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Abstract

This study explores the factors that are considered to have an influence on exophoric or deictic demonstratives. Using an experimental approach, the choice of demonstrative pronouns *see* 'this' and *too* 'that', and demonstrative adverbs *siin* 'here', *siit* 'hence' and *seal* 'there', *sealt* 'thence' are tested for the effect of distance, visual salience and contrast in Common Estonian. In addition, this study also deals with the effect of experimental instructions given before the experiment on the use of Common Estonian demonstrative pronouns and adverbs. Data analysis confirmed statistically significant association between the distance of the referent and the choice between demonstratives, but no such association was found between the use of demonstratives and visual salience/contrast stimuli. However, a more detailed analysis of the data revealed that although visual salience does not have enough power to influence the choice of Common Estonian demonstratives, it does influence the way distal demonstrative adverbs are used. In addition to the influence of distance on demonstrative choice and the influence of visual salience on demonstrative use, the importance of different experimental instructions on the use of the distal demonstrative pronoun *too* 'that' was also discovered.

Keywords: exophoric demonstratives, experimental approach, distance, visual salience, contrast, Common Estonian

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1 Introduction and background

1.1 Demonstratives and their usage

Language is one of the means for communication and individuals use language on a daily basis to exchange information and thoughts. When individuals communicate, the communicative acts take place in space and time, and things being mentioned have to be identified within that space and time. When identifying these entities, we refer to them using referential expressions. Reference can be defined as a "three-place relation that holds when speaker x uses expression y to identify entity z" (Abbott 2010: 2). One means for referring is using demonstratives[2] – deictic expressions such as *this* and *that* and *here* and *there* in English.

The use of demonstratives can be divided into two groups: *endophoric use* – the use of demonstratives takes place in text and helps to keep track of what happened to whom – and *exophoric use* – the use of demonstratives takes place in the physical world where interlocutors refer to actual entities in the space in which they are currently located (Halliday & Hasan 1977). Yet, it should be noted that it is not possible to distinguish demonstratives as endophoric or exophoric in every situation, as the intended referent may belong to the physical as well as discourse world at the same time.

In the classical view, demonstratives are treated as egocentric devices (Lyons 1977) where the speaker considers him/herself as the anchor point in time and space, i.e., the choice of exophoric demonstratives is dependent on the spatial location of the referent relative to the speaker. Also, demonstratives are seen as universal linguistic elements, as it has been claimed that "all languages have at least two adverbial demonstratives (or deictic particles) that indicate the distance contrast between two referents or locations" (Diessel 2005: 3). In this, the English demonstrative pronoun *this* and demonstrative adverb *here* could be interpreted as referring to something that is near to the speaker, and the demonstrative pronoun *that* and demonstrative adverb *there*, as something that is far from the speaker.

Although this distance-based approach for the choice of exophoric demonstratives is supported by typological (Diessel 1999; 2005) as well as experimental studies (Coventry et al. 2008; Tóth et al. 2014; Reile 2015), several authors (Hanks 2009; Jarbou 2010) have found the near-far distinction too simplistic. For example, it does not explain how the same

[2] Following Diessel (1999; 2014) the term demonstrative is used to indicate demonstrative pronouns, demonstrative adjectives, and demonstrative adverbs.

referent can be referred to with a different demonstrative, while the location of the interlocutors and the referent remains the same (Jarbou 2010). Moreover, Kemmerer (1999) has argued that while there is a fundamental distinction between far (extrapersonal) and near (peripersonal) space in the visual system, the notion of proximal and distal which is encoded in demonstratives is "very abstract" (ibid.: 56). Therefore, the connection between the notion of near and far is not as straightforward in language as it is in perception.

Increasingly, the choice of demonstratives is explained with means other than distance. Distance is thought to be "only one possible parameter alongside others", such as perception, salience (cognitive or perceptual), and so on (Hanks 2011: 320). Several authors (e.g. Laury 1997; Hanks 2005; Marchello-Nizia 2005; Etelämäki 2009) have shown the importance of different contextual frames on demonstrative choice. In addition, Diessel (2006) proposes that demonstratives function to create a joint focus of attention. Therefore, they also serve to create and guide the attention of the addressee to the intended referent, not merely mark the distance of the referent from the interlocutors.

In recent years, different empirical studies have been conducted that test the influence of distance (Coventry et al. 2008; Tóth et al. 2014; Reile 2015) and other possible factors on demonstrative choice. For example, the effect of joint attention (Stevens & Zhang 2013; Peeters et al. 2014) and contrast (Tóth et al. 2014) have been found to be as important as distance. Another possible affective factor is the accessibility of the referent. However, when dealing with accessibility, there are different notions on what is meant by this. In discourse studies, which focus on referential expressions in text flow, accessibility refers to how accessible the referent is mentally for the addressee (Ariel 2001). According to Ariel (2001: 29), referring expressions "instruct the addressee to retrieve a certain piece of Given information from his memory by indicating to him how accessible this piece of information is to him at the current stage of discourse". Put simply, there are low accessibility markers, such as proper names and definite descriptions, which indicate the mentally least accessible referents; high accessibility markers such as personal pronouns, which indicate the most accessible referents; and mid accessibility markers, i.e., demonstratives, which "connect discourse to given entities from the physical surrounding" (Ariel 1988: 76). Compared to the discourse settings, spatial situations require identification of the referents in a physical world. With vision being a key source in spatial deixis (Hanks 2011), the speaker

has to take into account the visual field. Moreover, there are languages that have demonstratives which even encode the invisibility of the referent (Diessel 1999). Thus, visual perception seems to play an important role in exophoric demonstrative choice.

However, it should be noted that Piwek et al. (2008) define a referent's accessibility in spatial context through mental rather than visual access. According to Piwek et al. (2008), new referents have low accessibility (similarly to Ariel's approach) and referents situated in the domain focus have high accessibility. For a referent to be in the domain focus, it has to be "referred to in the preceding utterance or be adjacent to an object that was referred to in the preceding utterance" (Piwek et al. 2008: 708). A similar approach is adopted by Tóth et al. (2014) in the study of Hungarian and Dutch demonstratives. At the same time, Jarbou (2010) relies on his definition of a referent's accessibility more on a visual ground in the sense that the speaker takes into account the addressee's viewpoint. Referents with low accessibility will not be easily recognizable for the addressee and so s/he "has to exert some effort to recognize it". On the other hand, referents with high accessibility are already recognizable for the addressee or s/he "will easily recognize it based on prominent perceptible features in context" (Jarbou 2010: 3088). Similarly, Coventry et al. (2014) used an experiment to test the influence of the visibility of a referent on the choice of English demonstratives. Blocking visual access to referents had an effect on the participants' choice of demonstratives. Thus, the referent is accessible if it is in joint focus of attention of the speaker and the hearer (Piwek et al. 2008; Tóth et al. 2014), i.e., it is "mentally accessible". The referent is accessible if it is easily recognizable to the addressee (Jarbou 2010), that is, the referent is visually accessible. And finally, the referent is accessible, if the referent is visible for the speaker (Coventry et al. 2014). These three notions are intertwined, as it is harder to create joint focus of attention when the visual access to an intended referent is not easily established or if the referent is not visible at all. While the studies on influence of distance on the choice of demonstratives in different languages have had uniform results, previous research on the accessibility or salience of the referent (whether mental or visual) has found inconclusive evidence of the effect on demonstrative choice from studies of different languages (Jarbou 2010; Coventry et al. 2014; Tóth et al. 2014) as well as in the same language but using varying experimental designs (Piwek et al. 2008; Tóth et al. 2014).

While there has been quite extensive research on demonstrative pronouns, demonstrative adverbs have had only limited research attention. Yet typological studies (for example, Diessel 1999; Dixon 2003) show that there are many different demonstrative systems in the world's languages and not all of these have more than one demonstrative pronoun (such as in German, Diessel 1999). In this case, the spatial contrast is conveyed through demonstrative adverbs (Diessel 1999; Levinson 2004). Thus, Levinson (2004: 116) has proposed that demonstrative adverbs might be "the most universal examples of spatial deixis". Moreover, Laury (1996) has suggested that in the Finnish use of demonstrative pronouns or adverbs, more precisely internal case forms or locative-adverbial forms of demonstratives, location is conceptualized either as figure or ground, respectively. This finding and the variety of different demonstrative systems in the world's languages suggests that it is likely that the mechanisms of demonstrative choice are not yet fully understood.

1.2 Estonian demonstratives

Estonian is a Finno-Ugric language with approximately 1 million native speakers. Despite this relatively small number, there are three regionally varying demonstrative pronoun systems in Estonian (Pajusalu 2009), which is not that common among the world's languages. In northern Estonia, there is only one demonstrative pronoun *see* (with meanings like those of *this* and *that* in English), which is used distance-neutrally (Larjavaara 2007; Reile 2015). For example, in a sentence *see auto on punane* 'this car is red' the demonstrative pronoun *see* would be used when referring to a car that is near to the speaker as well as to a car that is far away. Common Estonian has two demonstrative pronouns: proximal *see* 'this' and distal *too* 'that'; however, distal *too* is mostly used in southern Estonia. For example, in a sentence *see auto on punane ja too auto on roheline* 'this car is red and that car is green', the demonstrative *see* would be used for a car that is near to the speaker and demonstrative *too* for the car that is far from the speaker. In South Estonian[3], there are three demonstrative pronouns: *sjoo* (refers to something near to the speaker), *taa* (refers to something near to the hearer), *tuu* (refers to something that is far from both, the speaker and the hearer) (Pajusalu 2009).

[3] As this study focuses on the two-way system in comparison to the one-way system, a more detailed overview of the three-way system is not given.

While the Estonian reference grammar (Erelt et al. 1993) has treated *see* and *too* as distance-oriented demonstrative pronouns, Pajusalu (1999) suggests that *too* is used when there is a spatially contrastive situation, otherwise *see* is used for both, spatially near and far referents. Another important aspect of Estonian demonstrative pronouns is that contrary to most languages, for example English (Strauss 2002) and Hungarian (Tóth et al. 2014), the proximal demonstrative *see* is used much more frequently than distal *too*. From the Frequency list of the Balanced Corpus of Estonian (2012), which consists of fiction, journalistic, and scientific writings (5 million words from every genre), *see* occurs 263 713 times and *too* 6064 times. This difference in frequency between the two demonstrative pronouns suggests that the use of distal *too* is much more restricted than the use of proximal *see*. Pajusalu (2006) has also suggested that the use of demonstrative *too* might be beginning to disappear, as the results from her study show that the demonstrative *too* is very rare in fiction and is used to refer to the second character of the narrative or in time expressions. The demonstrative *see* is much more frequent and is used to refer to "any suitably activated referent" (Pajusalu 2006: 251).

Also, Estonian has six spatially contrastive demonstrative adverbs: the lative adverbs *siia* 'hither' and *sinna* 'thither'; the locative adverbs *siin* 'here' and *seal* 'there'; and the separative adverbs *siit* 'hence' and *sealt* 'thence', all of which have developed from the demonstrative pronoun *see*. Demonstrative pronouns and adverbs are often combined in Estonian, most probably partly due to the distance neutrality of the demonstrative *see* 'this' in the one-way demonstrative pronoun system of Estonian (Reile 2015). Compared to the frequency of demonstrative pronouns, the frequency of demonstrative adverbs is more balanced between proximals and distals in the Frequency list of the Balanced Corpus of Estonian (2012), though it seems to be a bit more skewed to the use of distal demonstrative adverbs: *siia* 'hither' 3010 vs. *sinna* 'thither' 4501; *siin* 'here' 12 903 vs. *seal* 'there' 12 909; *siit* 'hence' 1894 vs. *sealt* 'thence' 3213 times. This balanced frequency in the corpora gives reason to believe that demonstrative adverbs are also used in a more balanced manner in spatial context than demonstrative pronouns.

Although there have been a number of empirical studies on the use of spatial demonstratives, the experimental studies that have allowed controlling for confounding factors have been mostly carried out on Indo-European languages (such as English and Dutch). With only few exceptions (e.g. Tóth et al. 2014), demonstrative studies on other languages

have relied on observational methods (for example, Laury 1997; Etelämäki 2009; Jarbou 2010; Monzoni & Laury 2015), e.g., video recordings of natural language use, and descriptions of demonstrative use from naturally occurring situations in written form (see Jarbou 2010: 3081–3082). While the observational data have the benefit of naturalness, "the actual speech context almost always involves several different dimensions at once" (Hanks 2009: 12), thus making it hard to tackle the influential parameters of demonstrative choice. Moreover, experimental studies enable one to gather language data using different people in the same situation and to acquire comparative data from different languages. On the other hand, experiments test for concrete aspects of language use and thus provide more limited information. Therefore, to get more detailed explanations for the use of demonstratives, both observational and experimental studies are needed.

1.3 Theoretical background and hypotheses

The methodology of the study was developed by the author following previously published empirical papers by Coventry et al. (2008) and Piwek et al. (2008). In Coventry et al. (2008), demonstrative choice with respect to varying distance was explored in English and Spanish. In the Piwek et al. (2008) experiment, the influence of referents' accessibility on Dutch demonstratives was studied using role-play. This study combines the role-play approach with testing influence of distance on the choice of Common Estonian demonstratives and extends it by adding visual salience and contrast to varying distance of referents.

The first affective factor to be tested is distance. Following Coventry et al. (2008), the division of physical space into near and far regions was based on the physical access of the object – if the object was within arm's reach (the participants could easily touch it and pick it up), then it was considered near and if it was outside arm's reach (the participants had to stand up in order to reach it), it was considered to be far. As Estonian demonstratives are considered to be spatially contrastive (Erelt et al. 1993; Pajusalu 1999), the switch in the use of demonstratives was assumed to happen on the border of the near and far space (roughly 100 cm). The hypothesis was as follows:

(1) Demonstratives *too* ‘that’, *seal* ‘there’, and *sealt* ‘thence’ are used while referring to distant referents while demonstratives *see* ‘this’, *siin* ‘here’, and *siit* ‘hence’ are used for referring to near referents.

The second influential factor under investigation is visual accessibility tested through the visual salience of the referent. The association between accessibility of the referent and the choice of referential expressions has been studied extensively in discourse studies (see for example Ariel 2001). The more mentally accessible the referent is, the shorter the form of the referential expression that is used. Also, it is suggested (Ariel 2001) that demonstratives are positioned on a slightly different scale in the accessibility hierarchy – distal demonstratives indicate less accessible referents than proximals. This division is based on the notion that distal demonstratives are often grammaticalized into definite articles, which indicate even lower accessibility of the referent (Ariel 1988). Relying on Chafe (1994), the accessibility of the referent is defined with respect to the addressee, that is, in order for language to fulfil its communicative function, the speaker has to assess the addressee’s mental processing and act accordingly. As for spatial context, the accessibility of the referent has been identified either as being in joint focus of attention (Piwek et al. 2008) or with the ease of which the addressee will be able to identify the intended referent (Jarbou 2010).

The adopted approach here combines the idea of an accessibility hierarchy where demonstratives refer to referents with different accessibility (Ariel 1988), and the notion that the speaker’s choice of demonstratives is dependent on the visual accessibility of the referent with regard to the addressee (Jarbou 2010). As it is proposed that in spoken Estonian, the proximal demonstrative pronoun is the demonstrative that is in the process of becoming a definite article (Pajusalu 1997), the approach to the accessibility hierarchy is a bit different, i.e., the proximal demonstrative pronoun is considered to be marking lower accessibility than distal. Following Jarbou (2010), visually non-salient referents were defined as referents with low accessibility – they were difficult for the addressee to differentiate among other possible referents – and visually salient referents were defined as referents with high accessibility – they were easily recognizable for the addressee. Thus, to indicate that the intended referent is far and visually salient, distal *too* ‘that’ would be used – the speaker would be suggesting that it is enough for the addressee to rely only on a distance distinction. To indicate far and visually non-salient referents,

proximal demonstrative *see* 'this' would be used – the speaker is indicating that the referent is less accessible and more than just a distance distinction is needed for the addressee to find the intended referent. Also, Reile (2015) found that proximal demonstrative adverbs could be used in indicating the visually less accessible referents regardless of the distance of the referent.

The hypothesis for visual accessibility is as follows:

(2) Demonstratives *see* 'this', *siin* 'here', and *siit* 'hence' are used while referring to visually non-salient and far referents; demonstratives *too* 'that', *seal* 'there', and *sealt* 'thence' are used in referring to visually salient and far referents. The visual salience effect overrides the distance effect on demonstrative choice.

Contrast is the third aspect that is tested for its influential effect on demonstrative choice in this study. Following Kaiser (2010), contrast is taken as comparing or opposing [a] focused entity with the other members of the alternative set. In Estonian, contrast can be expressed either with contrastive conjunctions or with lexical items (Erelt et al. 1993: 278–279). Thus, it can be assumed that in Estonian, demonstrative pronouns implicitly carry the contrastive notion and should express contrastive context, as they can be used with or without contrastive conjunctions to create contrast. For example, with a conjunction: *See on ilus, aga too kole.* 'This one is pretty, but that one is ugly'. And without a conjunction: *See avab kapiukse, too korteriukse.* 'This unlocks the cupboard door (and) that one the door to the apartment'.

The hypothesis of contrast is as follows:

(3) In order to create contrast between two similar objects at the same distance, the demonstrative pronoun *see* 'this' is used in referring to the first referent and the demonstrative pronoun *too* 'that' is used in referring to the second referent. The contrast effect overrides the distance effect on demonstrative choice.

This study explores the role of distance, visual salience, and need for contrast on the choice of demonstrative pronouns and demonstrative adverbs in Common Estonian. Moreover, using an experimental approach, this study explores how the experimental instructions given before the experiment influence the subject's use of demonstratives. In this way, this study contributes and extends the current knowledge concerning factors influencing demonstrative choice in a language with multiple demonstrative pronoun systems.

2 Method and data

2.1 Procedure, stimuli, and the sample

The experiment consisted of two participants (a 'builder' and an 'instructor') reconstructing a sculpture on the basis of a ready-built model from Lego blocks that were situated in front of the participants on a large table (1.2 x 2.75 meters). Only the instructor saw the ready-built model and only the builder was allowed to move the blocks one by one from the table. The blocks on the table and in the pre-built sculpture were numbered in order to keep the sequence of the blocks taken from the table the same for all the participants. The blocks were all of the same size and in two different colors, thus minimizing the possibility for the instructors just describing the blocks without using any demonstratives, yet at the same time making it easy enough to differentiate the blocks combining gesture, demonstratives, and block colors.

The experiment was divided into three series, each of these testing one demonstrative-related stimulus:

1) The first series tested for the effect of distance – the blocks on the table lay seemingly randomly at varying distance. There were 14 blocks in 2 different spatial sections, within and outside of both participants' reach, thereby creating the condition near vs. far (Figure 1 in the Appendix). The instructor was asked to indicate one block at a time. When the builder was certain s/he understood which one of the blocks had been indicated, s/he took the block from the table and returned it to the starting point. Then the instructor continued with the instructions, telling the builder where to put the block which had been taken.

2) The second series tested for the effect of visual salience and distance – the 14 blocks lay on the table and were grouped together within and outside of both participants' reach, creating visual salience (Figure 2 in the Appendix). Three same-colored blocks were grouped together, in this way being visually less distinctive from one another and therefore visually less accessible, i.e., visually non-salient. The fourth block in front of the three in different colors was made visually salient. Also the blocks that were positioned alone on the table were considered visually salient as they were easy to differentiate from other similar blocks. The experimental condition was: salient vs. non-salient and near vs. far. The instructor was asked to indicate one block at a time. When the builder was ready, s/he took that block from the table and returned it to the starting point. When returned, the instructor resumed instructing the sculpture building.

3) The third series tested for the effect of contrast and distance – the blocks lay seemingly randomly on the table (the layout was the same as in the distance series, Figure 3 in the Appendix). The instructor was asked to indicate two blocks

> (one at a time) instead of one, after which the builder put the two blocks on a marked location on the table in the near distance. Then the instructor indicated the blocks on the marked spots (one at a time) and instructed where to put the blocks. The conditions for this series were near distance and contrast.

In addition, to detect possible changes in the use of the distal demonstrative pronoun *too* 'that', the participants were divided into two groups, depending on the instructions that the experimenter gave them. Group A received fairly loose instructions, the only restriction being not to use the numbers on the blocks while instructing the builder. Group B was not allowed to use spatially descriptive phrases such as "the last block at the back", "the first block", and "left" and "right". They were told that they could use demonstratives (demonstrative pronouns/adverbs)[4], gestures, and block colors while giving the instructions. The restriction of block numbers applied to group B as well.

The participants were assigned to their roles at random. Each pair of participants went through all three series. The sequence of series was kept random to minimize the possible influence of a carry-over effect (Field & Hole 2003). Respondents were given standardized oral instructions before each series, thus making the participants feel more comfortable yet granting the same level of guidance within the sample. Participants were told that the study explores the connections between space and language, but not that the study explores the use of demonstratives. Pilot studies confirmed that the participants did not realize that the goal of the experiment was to elicit demonstratives and were completely concentrated on the task of building the sculptures.

2.2 Participants

As the use of the demonstrative *too* has regional restrictions, the data were collected in 3 high schools in South Estonia[5] – in Võru, Antsla, and Põlva

[4] The experimental instructions for the instructors in group B regarding the use of demonstratives were as follows: While instructing, do not use the block numbers, expressions like 'the right one', 'the left one', 'the first one', 'the last one'. You can use block colors, gestures, and demonstratives such as *see, too, siin, seal*, etc.
The participants were not asked to use precisely these forms, but these were named to give an example of demonstratives so participants would know what was expected of them.

[5] More specifically, in this study the regions where the two-way demonstrative system is used (Võru, Põlva and Tartu counties) are referred to as South Estonia.

regions – between March and May in 2013. In addition, the participants were asked to fill in a sociodemographic questionnaire, making it possible to eliminate the participants that originated from regions outside of South Estonia. This careful consideration of the participants made it possible to assess whether the use or lack of use of the demonstrative pronoun *too* 'that' is caused by the stimuli in the experiment or instead by the regional origin of the participants (Reile 2015).

The experiment was conducted in a classroom on a school day and the study was approved by school authorities beforehand. Participation was voluntary and informed consent was obtained from each participant. The permit for conducting the experiment was obtained from the Ethics Committee of the University of Tartu (Approval No. 248/M-19).

All trials of the experiment were recorded using a video camera and were later transcribed by the author (coding the use of demonstratives as well as gestures).

The experiment was carried out using a total of 37 pairs of participants, but as there was a need to keep the data balanced between regional sites and groups (in Võru, there were only 4 pairs of participants in group A) as well as due to several technical and other reasons (absence of the participants due to illness, leaving only one participant for the study, too loud background noise, etc.), only data from 24 pairs of participants were included in the analysis. Respondents were pupils between the ages of 16 and 19 (mean age 17 years) mostly in their 11th school year. There were 24 instructors of which 6 were male and 18 were female, and 24 builders of which 7 were male and 17 were female. All the participants took part in all the experimental series.

2.3 Data analysis

The current analysis uses data from the instructor's utterances only, as the builders tended to use scarce linguistic devices, mostly just carrying out the given instructions. The focus of the analysis is on the utterances that apply to the activity taking place on the table. The units of analysis are demonstrative pronouns and demonstrative adverbs. Included are all the references to the object until the builder had found the block. Since the aim of the experiment was to confirm whether distance, visual salience, and need for contrast differentiates the use of Estonian demonstratives, the utterances without any demonstratives were left out of the analysis. In total, the data included 264 units of analysis for the distance series (112 in group

A and 212 in group B, respectively), 273 for the visual salience series (106 in group A and 215 in group B), and 218 for the contrast series (64 in group A and 154 in group B). Due to the small sample size, the locative and separative forms of the same adverbial series (*siin* 'here' and *siit* 'hence'; *seal* 'there' and *sealt* 'thence') were grouped together. Since the analysis was focused on the activity that took place while referring to the blocks on the table, no lative forms of demonstrative adverbs occurred (these forms were used only while building the sculpture). The data analysis is conducted using Fisher's exact test to test for statistical significance of the association between stimuli and the choice of demonstratives within the two groups and the difference of demonstrative use between groups (§ 3.1–3.4), and a Chi square test to assess the statistical significance of the association between the experimental series and demonstrative use (§ 3.4).

3 Results

3.1 Results of the distance series

Table 1 presents the overall use of demonstratives in the distance series, where the effect of distance on the choice of Estonian demonstratives was tested. In group B, the use of the demonstrative *too* 'that' increases while the use of the demonstrative *see* 'this' decreases as the distance grows. In group A, the frequency of the use of the demonstrative *see* 'this' is quite even in both distance categories. The demonstrative *too* is used infrequently and only in the far distance category. It can be seen in Table 1 that the use of proximal and distal demonstrative adverbs is similar to the use of demonstrative pronouns. In group A, proximal demonstrative adverbs (*siin* 'here', *siit* 'hence') can be used in referring to the blocks in both distance categories quite evenly, similarly to the use of proximal demonstrative pronouns. For group B, there is a clear distinction in using the proximal demonstrative adverbs in the near distance category, even more so than with proximal demonstrative pronouns. In group B, Fisher's exact test shows a statistically significant association between the chosen demonstrative and the distance of the referent from the speaker for both demonstrative pronouns and adverbs ($p < 0.001$). In group A, this association was statistically significant only for demonstrative adverbs ($p < 0.01$).

Table 1. The frequency of demonstratives used in the distance series of the experiment

Demonstrative pronoun/adverb	**Near (row %)**	**Far (row %)**	**Total, n**	***p*-value***
Group A				
see 'this'	32 (49)	33 (51)	65	= 0.118
too 'that'	0 (0)	4 (100)	4	
siin 'here' and *siit* 'hence'	17 (59)	12 (41)	29	< 0.01
seal 'there' and *sealt* 'thence'	1 (7)	13 (93)	14	
Group B				
see 'this'	59 (66)	30 (34)	89	< 0.001
too 'that'	4 (7)	51 (93)	55	
siin 'here' and *siit* 'hence'	16 (94)	1 (6)	17	< 0.001
seal 'there' and *sealt* 'thence'	4 (8)	47 (92)	51	

**p*-value presents the statistical significance of the association between distance and the choice of Estonian dem.pron-s and dem.adv-s

Table 2 presents the uses of demonstrative combinations in an utterance. Three combinations of demonstrative pronouns and demonstrative adverbs were used: a proximal demonstrative pronoun combined with a proximal adverb, as in (1); a proximal demonstrative pronoun combined with a distal demonstrative adverb, as in (2); and a distal demonstrative pronoun combined with a distal demonstrative adverb, as in (3). Though for some language users, combining a distal demonstrative pronoun with a proximal demonstrative adverb is possible, no such combination occurred in the sample.

Table 2. The frequency of pronoun and adverb combinations used in the distance series of the experiment

Demonstrative pronoun and adverb combinations	**Near (row %)**	**Far (row %)**	**Total, n**
Group A			
See+siin/siit 'this+here/hence'	9 (70)	4 (30)	13
See+seal/sealt 'this+there/thence'	0 (0)	7 (100)	7
Group B			
See+siin/siit 'this+here/hence'	10 (91)	1 (9)	11
See+seal/sealt 'this+there/thence'	1 (8)	13 (92)	14
Too+seal/sealt 'that+there/thence'	3 (15)	17 (85)	20

(1) *Siis võta <u>see</u> sinine <u>siit</u>.*
then take this.DEM.PRON.NOM blue here.DEM.ADV.SEP
'Now take this blue one here.'

(2) *Võta* *see* *kõige* *tagumine* *klots* *sealt*.
take this.DEM.PRON.NOM most back block there.DEM.ADV.SEP
'Take that block that is furthest to the back over there.'

(3) *Ee* *võta* *too* *tagumine* *sealt* *punane*.
um take that.DEM.PRON.NOM back there.DEM.ADV.SEP red
'Take that back one there, the red one.'

In group A, the demonstrative *too* did not combine with any demonstrative adverbs, while the demonstrative *see* was used in combination with both distal and proximal demonstrative adverbs.

For example, while indicating the blocks near:

(4) *Ja* *siis* *võta* *see* *punane* *klots* *siit*.
and then take this.DEM.PRON.NOM red block here.DEM.ADV.SEP
'And then take this red block from here.'

and far:

(5) *Mm* *võta* *see* *kõige* *tagumine* *klots* *sealt*.
um take this.DEM.PRON.NOM most back block there.DEM.ADV.SEP
'Take the block furthest to the back over there.'

In group B, the demonstrative *too* was used in combination only with distal demonstrative adverbs. The demonstrative *see* was used with both proximal and distal adverbs. For example, while referring to the blocks at near distance:

(6) *Ja* *siis* *ee* *võta* *see* *siit*.
and then um take this.DEM.PRON.NOM here.DEM.ADV.SEP
'And then take this one from here.'

And at far distance:

(7) *Siis* *ee* *too* *viimane* *punane* *klots* *seal*.
then um that.DEM.PRON.NOM last red block there.DEM.ADV.LOC
'Then that last red block over there.'

(8) *Siis* *see* *sinine* *sealt*.
then this.DEM.PRON.NOM blue there.DEM.ADV.SEP
'Then this blue one over there.'

However, it seems that when a distal demonstrative pronoun was actively used (as in group B) then distal adverbs were more prone to combine with distal demonstrative pronouns (20 out of 34) rather than with proximal ones (14 out of 34).

As can be seen in Table 2, in the case of the combinatory use of demonstrative pronouns and adverbs, proximal demonstrative adverbs are more prone to combine with proximal demonstrative pronouns. In the case of combinatory uses, the demonstrative adverbs hold the position of marking the distance of the referent from the speaker. For example, in the case of a proximal demonstrative pronoun and distal adverb combination, the referred object tends to be situated in the far not in the near category.

3.2 Results of the visual salience series

Tables 3, 4, and 5 present the uses of demonstrative pronouns and adverbs and the combination of the two in the visual salience series. The use of the demonstrative *too* 'that' is almost absent in group A (only 1 occurrence). Demonstrative *see* 'this' is used mostly for salient referents at both near and far distance. In group B, the proximal demonstrative pronoun is still used for near referents and the distal for far referents. The same applies for demonstrative adverbs. In addition, participants tend rather to use demonstratives for referring to salient referents than to non-salient ones.

Table 3. The frequency of the demonstratives used in the visual salience series of the experiment

Demonstrative pronoun/adverb	**Near (row %)**		**Far (row %)**		**Total, n**
	Salient	Non-salient	Salient	Non-salient	
Group A					
see 'this'	22 (39)	3 (5)	28 (49)	4 (7)	57
too 'that'	0 (0)	0 (0)	1 (100)	0 (0)	1
siin 'here', *siit* 'hence'	11 (48)	2 (9)	10 (43)	0 (0)	23
seal 'there', *sealt* 'thence'	0 (0)	0 (0)	17 (68)	8 (32)	25
Group B					
see 'this'	40 (38)	23 (22)	34 (32)	9 (8)	106
too 'that'	2 (5)	0 (0)	28 (72)	9 (23)	39
siin 'here', *siit* 'hence'	11 (39)	8 (27)	7 (24)	3 (10)	29
seal 'there', *sealt* 'thence'	1 (2)	0 (0)	27 (66)	13 (32)	41

Table 4 shows that there is no statistically significant association between the choice of demonstratives and the visual salience of the referent ($p > 0.05$ for both demonstrative pronouns and adverbs in both groups).

Table 4. The frequency of the demonstratives used while referring to salient and non-salient referents in the far distance category

Demonstrative pronoun/adverb	**Far distance**		
	Salient	**Non-salient**	***p*-value***
Group A			
see 'this'	28	4	= 1
too 'that'	1	0	
siin 'here', *siit* 'hence'	10	0	= 0.073
seal 'there', *sealt* 'thence'	17	8	
Group B			
see 'this'	34	9	= 0.791
too 'that'	28	9	
siin 'here', *siit* 'hence'	7	3	= 1
seal 'there', *sealt* 'thence'	27	13	

**p*-value presents the statistical significance of the association between visual salience and the choice of Estonian dem.pron-s and dem.adv-s

Table 5 shows that combinatory use of demonstrative pronouns and adverbs is more prone to occur while referring to visually salient objects rather than visually non-salient objects. Interestingly, in group A, there is one instance of combinatory use of a distal demonstrative pronoun and proximal demonstrative adverb for a salient object in the far category.

Table 5. The frequency of the demonstrative combinations used in the visual salience series of the experiment

Demonstrative pronoun and adverb combinations	**Near**			**Far**		
	Salient	**Non-salient**	**Total, n**	**Salient**	**Non-salient**	**Total, n**
Group A						
See+siin/siit 'this+here/hence'	7	0	7	2	0	2
See+seal/sealt 'this+there/thence'	0	0	0	11	1	12
Too+siin/siit 'that+here/hence'	0	0	0	1	0	1
Group B						
See+siin/siit 'this+here/hence'	7	4	11	3	1	4
See+seal/sealt 'this+there/thence'	1	0	1	8	2	10
Too+seal/sealt 'that+there/thence'	0	0	0	9	1	10

As there seemed to be no association between visual salience and the choice of proximal and distal demonstratives, the analysis focused on the cases where adverbs were used while referring to salient and non-salient blocks. More detailed analysis showed that although the incongruent use of

demonstratives (proximal demonstratives used for distant and non-salient blocks) was not statistically significant as was predicted; the position of the demonstrative adverbs in the word order of the utterances showed a clear distinction while referring to the salient and non-salient blocks. Table 6 presents the position of the adverbs used in the first mentions taking into account the visual salience of the referent. Only the first mentions of the blocks were included in the analysis to be certain that the referred block was not first identified before the use of the demonstrative adverbs.

Table 6. The frequency of the adverb position in utterances in the visual salience series

Demonstrative adverb	**Position of the adverb in the utterance**	**Salience of the referent**		***p*-value***
Group A		**Salient**	**Non-salient**	
siin 'here', *siit* 'hence'	First	8	6	= 0.5
	Not first	2	0	
seal 'there', *sealt* 'thence'	First	4	6	< 0.05
	Not first	11	1	
Group B				
siin 'here', *siit* 'hence'	First	3	4	= 0.363
	Not first	11	5	
seal 'there', *sealt* 'thence'	First	5	10	< 0.001
	Not first	20	1	

**p*-value presents the statistical significance of the association between visual salience and the position of the adverb used in the utterances

There was a statistically significant ($p < 0.05$) association between the visual salience of the referent and the position of the adverb used in the utterance. However, this association was proved to be significant only for distal demonstrative adverbs (for both groups). Another interesting feature of this kind of use is that when demonstrative adverbs were used in the first position of the utterance the use of a demonstrative pronoun very rarely followed (only 5 times out of 42). The participants tended to use NPs without demonstrative pronouns.

An example of this is the use of a distal demonstrative adverb for a visually non-salient block in the far distance category. In example (9), the demonstrative adverb is in the first position of the utterance which is used to indicate one of the non-salient blocks at far distance. In (10), the demonstrative adverb is at the end of the utterance (instead of the first position) and indicates a salient block at far distance.

(9) *Sealt* *kolmikust* *kõige* *sinupoolsem* *klots.*
there.DEM.ADV.SEP trio most your.side.COMP block
'From those three there, the one that is the nearest to you.'

The use of a distal demonstrative adverb for a visually salient block in the far distance category.

(10) *Too* *punane* *seal.*
that.DEM.PRON.NOM red there.DEM.ADV.LOC
'That red one there.'

The association between visual salience and the choice of demonstrative pronouns and demonstrative adverbs proved not to be statistically significant, yet this factor had enough power to influence how demonstrative pronouns and adverbs were used. In group B, this factor decreased the use of distal demonstratives and increased the use of proximal demonstratives (Table 1 in § 3.1 and Table 3 in § 3.2). In addition, the position of distal adverbs in the word order of an utterance was affected by the visual salience of the referent.

3.3 Results of the contrast series in the experiment

Table 7 presents the use of demonstrative pronouns in the third series of the experiment. In this series, the use of demonstratives is different, as the referred blocks are already found and the reference status of the objects is not new. Thus, demonstratives are not used to mark the location of the blocks. The indicated blocks were situated near the participants and side by side with each other (Figure 3 in Appendix). As can be seen in table 6, the use of the demonstrative *too* is as infrequent in group B as it is in group A.

Table 7. The frequency of demonstrative pronouns used in referring to the first and second block in the contrast series of the experiment

Demonstrative pronoun	**First (row %)**	**Second (row %)**	**Total**	***p*-value***
Group A				
see 'this'	28 (48)	30 (52)	58	= 0.125
too 'that'	2 (33)	4 (67)	6	
Group B				
see 'this'	77 (56)	60 (44)	137	= 0.125
too 'that'	6 (35)	11 (65)	17	

**p*-value presents the statistically significant association between contrast and the choice of Estonian dem.pron-s

There was no statistically significant association between the choice of demonstrative pronouns and the order in which the referents were indicated ($p > 0.05$). The participants in group A tended to use left and right to contrast between two blocks (11). However, there were some uses of proximal demonstrative pronouns for indicating both the first and second block (12). In group B, the proximal demonstrative pronoun was also used in referring to the first and second block. There were also some instances of using a proximal demonstrative pronoun for the first block and a distal demonstrative for the second one (13). Interestingly, the instructor who used proximal for the first block and distal for the second one switched, at one point, to using distal to refer to both (the first and second) blocks (14).

(11) *Ee vasakpoolse klotsi asetada kohe eelnevale siis klotsile järgi ja parempoolse klotsi asetada (.) ee uuest reast vasakule ee peale nii et ee üks rida jääks välja*.
'You put the left block next to the previous block and the right block on the left of the new row, so that a bit of the block is over the edge.'

(12) *See* *roheline* *läheb* *keskele* *ja* *see*
this.DEM.PRON.NOM green go middle and this.DEM.PRON.NOM
läheb *pikkupidi*.
go lengthwise
'This green one goes in the middle and this one goes lengthwise.'

(13) *Selle* *klotsi* *sa* *paned* *ka* *niimoodi* *pikkupidi* *ja*
this.DEM.PRON.GEN block you put also this.way lengthwise and
tolle *klotsi* *sa* *paned* *ää* *nende* *peale* *pikkupidi*.
that.DEM.PRON.GEN block you put um these on.top lengthwise
'You put this block this way, lengthwise, and you put that block um on top of these lengthwise.'

(14) *Too* *klots* *lähäb* *ka* *niimoodi* *pikkupidi* *ja*
that.DEM.PRON.NOM block go also this.way lengthwise and
too *klots* *lähäb* *risti*.
that.DEM.PRON.NOM block go across
'That block goes lengthwise like this and that block goes across.'

3.4 Overall results regarding the influence of experimental instructions on the use of Estonian demonstratives

As can be seen in Table 8, the use of distal demonstratives in Common Estonian decreases, when the participants are given loose experimental instructions as in group A. The use of the distal demonstrative *too* is rare in group A (overall only 11 uses) where the only restriction regarding instructions was not to use the numbers of the blocks. When the participants were told not to use spatially descriptive phrases, but were allowed to use demonstrative pronouns and adverbs, then the distal demonstrative pronoun *too* was used. Although the use of the demonstrative *too* is not as frequent as the use of the demonstrative *see* in group B, it is still used. Another interesting aspect of the overall usage of demonstratives is that in group B the use of distal demonstrative adverbs is also much higher than in group A (92 uses in group B vs. 39 in group A). The association of the use of demonstratives and the experimental instructions was statistically significant in the distance series (for both demonstrative pronouns and adverbs $p < 0.001$) and in the visual salience series (only for demonstratives pronouns, $p < 0.001$), but not in the contrast series ($p > 0.05$).

Also, in group B the use of distal demonstratives decreases and the use of proximal demonstratives increases in the visual salience and contrast series compared to the distance series. In group B, the difference in the use of demonstrative pronouns and demonstrative adverbs between the series is statistically significant. As expected, this kind of difference in use of demonstratives between the series was not detected in group A since the use of the demonstrative pronoun *too* was infrequent overall.

Table 8. The frequency of demonstratives used in the experiment between groups

	Demonstrative pronoun/adverb	**Group A loose instructions (column %)**	**Group B restrictive instructions (column %)**	**Total, n**	***p*-value**
Distance series	*see* 'this'	65 (94)	89 (62)	154	< 0.001
	too 'that'	4 (6)	55 (38)	59	
	Total, n	69	144		
	siin 'here', *siit* 'hence'	29 (67)	17 (25)	46	< 0.001
	seal 'there', *sealt* 'thence'	14 (32)	51 (75)	65	
	Total, n	43	68		
Visual salience series	*see* 'this'	57 (98)	106 (73)	111	< 0.001
	too 'that'	1 (2)	39 (27)	40	
	Total, n	58	145		
	siin 'here', *siit* 'hence'	23 (48)	29 (41)	52	= 0.572
	seal 'there', *sealt* 'thence'	25 (52)	41 (59)	66	
	Total, n	48	70		
Contrast series	*see* 'this'	58 (91)	137 (89)	195	= 0.812
	too 'that'	6 (9)	17 (11)	23	
	Total, n	64	154		

4 Discussion

The aim of this study was to assess the association between distance, visual salience and need for contrast, and the choice of Common Estonian demonstrative pronouns and adverbs. In addition, this study handled the influence of experimental instructions on the use of Common Estonian demonstratives.

Overall results indicate that the most affective factor influencing the choice of demonstratives in Common Estonian in spatial context is distance. Distance was the only stimulus which reached the statistical significance level ($p < 0.05$) in association with the choice of both demonstrative pronouns and demonstrative adverbs. This finding suggests that the primary differentiating factor between demonstratives in Common Estonian in spatial context could be distance, as it is consistent with previous demonstrative studies in different languages (Coventry et al. 2008; Coventry et al. 2014; Tóth et al. 2014). This is also supported by the findings of an empirical study on acquisition of Turkish demonstratives

(Küntay & Özyürek 2006) that shows that the use of spatially contrastive demonstratives is learned earlier than the use of the demonstrative which encodes visual attention. Yet, it should be noted that the aforementioned studies do not take into account social factors, which have been shown to strongly influence demonstrative reference (e.g. Hanks 2005; Etelämäki 2009).

However, there was a difference in the use of the distal demonstrative pronoun *too* 'that' between groups. Not specifying to participants that they were to use demonstratives considerably decreased the use of the distal demonstrative pronoun *too* 'that' in group A. For both groups, the association between distance and demonstrative adverbs was statistically significant, but in group A the same did not hold between distance and demonstrative pronouns. The distal demonstrative pronoun *too* 'that' was rarely used; instead, the use of the proximal demonstrative pronoun *see* 'this' occurred in both distance categories (near and far) as it was used distance-neutrally (Larjavaara 2007; Reile 2015). Similarly to German (Diessel 2005), the distance of the referent from the speaker was communicated through demonstrative adverbs that were combined with the distance-neutral demonstrative pronoun *see* 'this'.

An interesting aspect in the difference of demonstrative use in groups A and B in the distance series is that the choice between demonstrative adverbs is more consistent than between demonstrative pronouns. The scope of use of proximal demonstrative adverbs *siin* 'here', *siit* 'hence' seems to be wider for group A than for group B. In group B, the proximal demonstrative adverbs are clearly used for near distance, while in group A, these are used for far distance more frequently (Table 1 in § 3.1). This gives evidence that using only one demonstrative pronoun (demonstrative pronoun *see*) also has an effect on the use of demonstrative adverbs. The scope of proximal demonstrative adverbs widens when there are fewer possible combinations with demonstrative pronouns. In group A, there are only two possible combinations of demonstrative adverbs and demonstrative pronouns, but in group B there are three. Thus, it could be argued that while in group A, the distance between demonstratives is divided into two regions, near and far, with possible combinations being *see siin* 'this here' and *see seal* 'this there', in group B, because of the three possible combinations, the distance is divided into three regions: near (*see siin* 'this here'), far (*see seal* 'this there'), and the furthest (*too seal* 'that there'). This finding suggests that the plurality of possible combinations limits more strictly the use of proximal demonstrative adverbs (as these

occur almost exclusively with proximal demonstrative pronouns) and gives a wider scope for distal demonstrative adverbs *seal* 'there', *sealt* 'thence'.

The connection between demonstrative pronouns and demonstrative adverbs shows that the focus of demonstrative studies should not be only on demonstrative pronouns, but that demonstrative adverbs should be included, as well. In demonstrative pronoun and adverb combinations, the adverbs indicate whether the referent is situated near or far from the speaker. Another interesting result from the analysis is that demonstrative adverbs tend to combine with demonstrative pronouns only when the demonstrative pronoun is in the first position of the utterance, i.e., when speakers start their referential clause referring first of all to the intended object with a NP and then adding the location of the mentioned referent with a demonstrative adverb (for example *see klots seal* 'this block there'). In addition, using demonstrative pronoun-adverb combinations, the speaker can give more precise information about the referent and its location when it is among multiple referents of the same kind.

Contrary to findings in studies of English (Coventry et al. 2014) and Jordanian Arabic (Jarbou 2010), the results from the visual salience series show that this stimulus has no statistically significant association with demonstrative choice in Common Estonian. Although the number of proximal demonstratives increased in the visual salience series in referring to far referents, it was not enough to reach the statistical significance level, which indicates that the effect of this stimulus is weaker on the choice of Common Estonian demonstratives than the effect of distance. Yet, more detailed analysis of the use of demonstrative adverbs showed that while the stimulus does not have enough power to influence demonstrative choice it does have an effect on how demonstrative adverbs are used. More specifically, it changes the position of the distal demonstrative adverbs in the word order of a referential utterance. In the cases when distal demonstrative adverbs were used while referring to non-salient blocks in the far category, the placement of the adverb in an utterance tended to be at the beginning rather than at the end. As word order in Estonian is dependent on what the speaker wishes to emphasize, to focus on (Lindström 2005), it could be concluded that the use of demonstrative adverbs at the beginning of the referential unit emphasizes relevant information and creates joint focus of attention between the instructor and the builder. When joint focus is established by defining the location area of the block on the table, using a demonstrative adverb, the instructor then focuses in on a specific block (example (9) in § 3.2). Also, in endophoric

reference, the connection between word order and a referent's salience has shown to influence the choice of referential expressions in Finnish as well as in Estonian (Kaiser & Hiietamm 2003). Similarly, two empirical studies on Dutch referring expressions (Vogels et al. 2012) and demonstratives (Maes & de Rooij 2007) show that the effect of visual salience of the referent is subtle, as it does not have enough power to influence the choice of referring expressions or demonstratives.

Another important finding is that while in the distance series, the proximal demonstrative adverbs were used clearly in the near distance category in group B, this changed in the visual salience series (Table 1 in § 3.1 and Table 3 in § 3.2). The two series differ on the setting of the blocks on the table. In the distance series, the distance of the blocks from the participants is visually gradual (Figure 1 in the Appendix). In the visual salience series, the blocks are grouped by color, thus making it more difficult to distinguish between them visually. This grouping creates two separate regions, leaving two blocks standing alone in the middle of the table in the far distance category (Figure 2 in the Appendix). Different neurological studies (Berti & Frassinetti 2000; Làdavas 2002; Làdavas & Serino 2008 cited in di Pellegrino & Làdavas 2015) have shown that the range of peripersonal space (space within arm's reach) widens when a tool is used actively. Using a tool while referring to objects also increases the distance in which proximal demonstrative pronouns are used in English and Spanish (Coventry et al. 2008). Therefore, it might be possible that this visual stimulus, the grouping of the blocks and creating two visually salient blocks in the far distance, might stretch the scope of the region that is perceived as peripersonal space, as it does with tool use, and this is expressed in language through the participants' tendency to use the proximal demonstrative adverb rather than the distal one regardless of the distance of the referent. However, due to the small sample size, this cannot be said with full certainty and needs further research.

Like visual salience, contrast stimulus also did not prove to have a statistically significant association with the choice of Estonian demonstratives. Contrary to what was expected and to the results of the study on Hungarian and Dutch demonstratives (Tóth et al. 2014), participants did not use demonstrative pronouns to contrast between two objects of the same kind (Figure 3 in the Appendix). Instead, a proximal demonstrative pronoun was used while indicating both the first and second blocks. Very few instances of distal demonstrative pronoun use occurred in either group. These results might be due to the restricted use of the distal

demonstrative pronoun *too* ‘that’, as it is rarely used in the near distance category (Table 1 in § 3.1 and 3 in § 3.2). The effect of contrast might manifest itself when the contrastive referential act takes place in the far distance category. Thus, the third hypothesis is neither confirmed nor rejected.

Although visual salience and contrast variables had no statistically significant association with the choice of demonstratives, there are statistically significant differences in the use of demonstratives between the experimental series in group B. In comparison to the distance series, the use of the distal demonstratives *too* ‘that’, *seal* ‘there’, and *sealt* ‘thence’ decreases and the use of the proximal demonstrative *see* ‘this’ increases in the visual salience and contrast series. This, though, was not so in group A where due to the effect of more loose experimental instructions, the demonstrative *too* was rarely used. These findings on differences between groups A and B suggest that the use of demonstrative pronouns in Common Estonian is not as unequivocally clear as the use of demonstrative adverbs. While this notion is not surprising, as adverbs refer to places not objects, it suggests that the speakers are not certain in their demonstrative pronoun choice.

The use of the distal demonstrative *too* ‘that’ is remarkably scarce if the participants are not told to use demonstratives before the experiment. This infrequent use of the demonstrative *too* ‘that’ is surprising as the experiments were carried out in regions where the distal demonstrative pronoun is used. In addition, all the participants also confirmed after the experiment that they do use the demonstrative *too* ‘that’. The limited use of the distal demonstrative pronoun in group A suggests that distal *too* ‘that’ has more restricted use than proximal *see* ‘this’ which stands in contradiction to other languages with two-way demonstrative systems such as Hungarian (Tóth et al. 2014) and English (Strauss 2002) where the distal demonstrative pronoun is used considerably more than the proximal one. These findings suggest that either the two-way demonstrative pronoun system is not that fixed in Estonian, giving speakers more liberty in the use of the proximal demonstrative pronoun by combining it with adverbs, or that the participants chose to use the demonstrative pronoun system with one demonstrative pronoun *see* ‘this’ in the experiment. This finding shows that the use of exophoric reference of the distal demonstrative pronoun *too* ‘that’ is considerably rarer than one would expect on the basis of the Estonian reference grammar or Estonian language dictionaries. Thus, it might be that the use of distal *too* is weakening, as it has already in

endophoric use, as proposed by Pajusalu (2006). Therefore, it is possible that there are changes taking place in the Estonian two-way demonstrative pronoun system.

This is the first experimental study testing the effect of distance, visual salience, and contrast on the choice of Common Estonian demonstratives. The design of the experiment made it possible to gather data on natural demonstrative use, while holding possible confounding factors to a minimum. However, due to the small sample size and to possible changes taking place within the two-way pronoun system of Common Estonian, the findings might be somewhat limited. Furthermore, the statistically insignificant outcome of the contrast stimulus is probably due to the design of the experiment, as the distal demonstrative pronoun *too* seems to be used only in the far distance category. Thus, the contrast stimulus seemed rather to reinforce the effect of distance not to elicit contrastive use of demonstratives. To confirm or reject the third hypothesis further research is needed. Regardless of the limitations, the experiment did confirm that there is an association between distance and demonstrative choice, and between visual salience and the use of demonstrative adverbs.

5 Conclusions

The present study has shown that the strongest factor which has an effect on the choice of Common Estonian spatial demonstratives is distance. This finding is consistent with the results from studies in other languages and gives more proof that distance might be the primary influential factor in demonstrative choice in spatial context. The results from the visual salience and contrast series have contradictory results compared to other languages. Although visual salience (or accessibility) seems to have an effect on the choice of demonstratives in languages such as English (Coventry et al. 2014) and Jordanian Arabic (Jarbou 2010) it did not have a statistically significant association with the choice of Common Estonian demonstrative pronouns and adverbs. Yet, more detailed analysis of demonstrative adverbs, which were used while referring to the salient and non-salient objects, revealed that visual salience has an influence not on the choice of demonstratives, but rather on the position of demonstrative adverbs in the word order of an utterance. Thus, it seems that visual salience has a subtler effect on demonstratives than distance, influencing not the choice of demonstratives, but rather the way demonstratives are used. In addition, this finding on visual salience suggests that not only demonstrative

pronouns are used to create joint focus of attention, but demonstrative adverbs, as well. In contrast condition, the association with the choice of Common Estonian demonstratives did not reach the statistical significance level. However, since the demonstrative *too* seems to be marked for far distance, the design of the experiment probably had an influence on the results and thus the effect of contrast on demonstrative choice requires further research.

The experimental findings also show that there seems to be mutual influence between demonstrative pronouns and adverbs, which was manifested through the division of space into near and far regions between experimental groups as well as in reference to visually salient and non-salient referents in both groups. Thus, to get a more detailed overview of the mechanisms of demonstrative choice, it is important to include adverbs in empirical demonstrative research.

Appendix

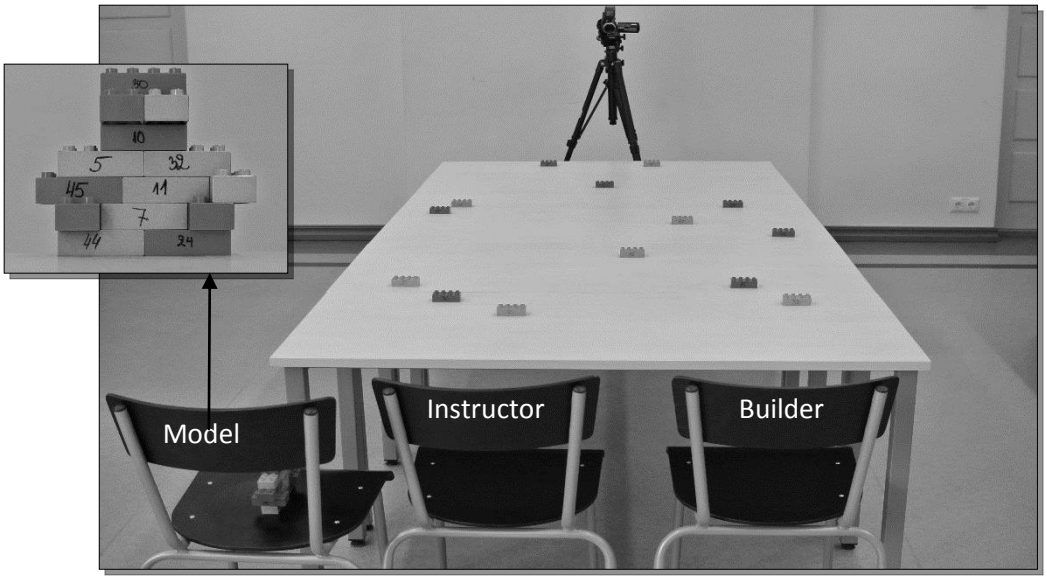

Figure 1. The initial position of the blocks on the table in the distance series

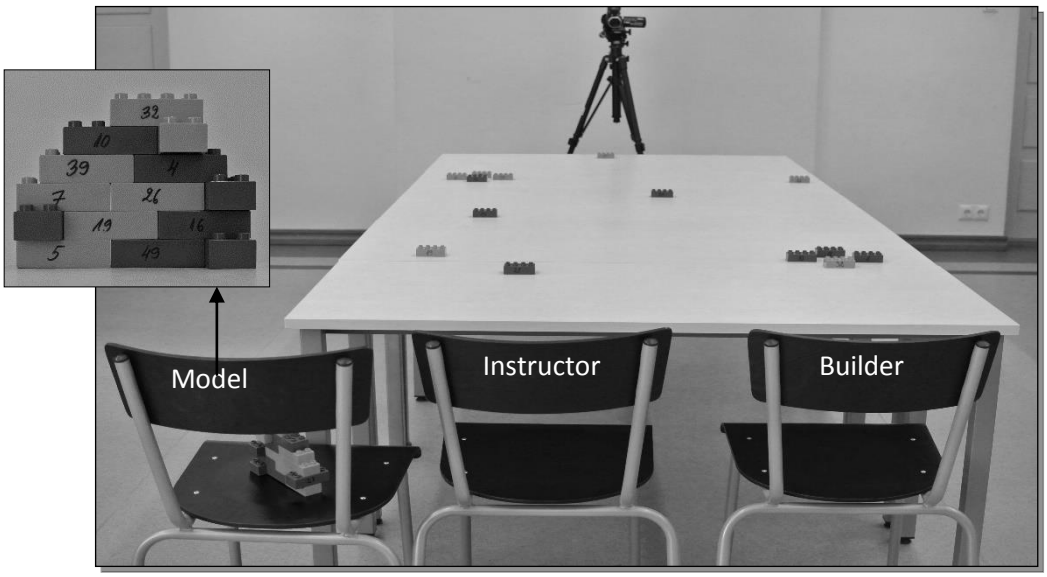

Figure 2. The initial position of the blocks on the table in the visual salience series

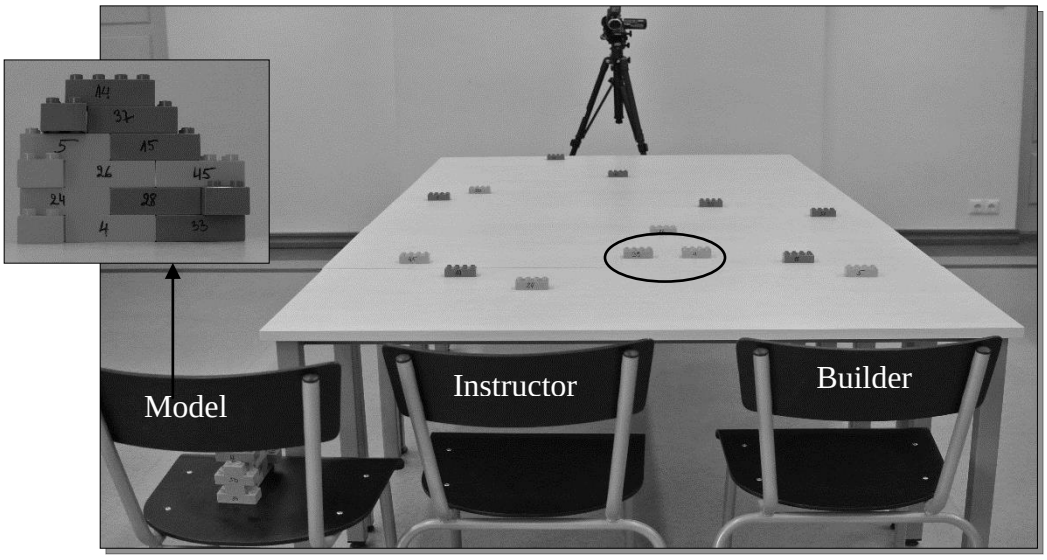

Figure 3. The position of the blocks in creating contrast in the contrast series. The circle denotes the place where the contrastive referential act took place.

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Cohesion in contrast:
A case study of English and German user manuals

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Abstract

In traditional English-German Contrastive Linguistics (CL), the focus used to be on phonology, morphosyntax, and vocabulary, while intersentential relations were largely neglected. Thus, in order to further substantiate current text-linguistic advances in CL, the present paper investigates cohesive ties in English and German user manuals. This genre, which usually appears in several languages simultaneously, is particularly well-suited for this objective, since it is geared towards user-friendly comprehensibility by means of unambiguous reference and precision. After distinguishing between text deixis and cohesion, this study concentrates on coreferential chains as well as on English renderings of German pronominal adverbs. While *explicitness* is here conceptualized as a qualitative category at the informational level, *density* is measured on the basis of quantity, so that both are scalar rather than absolute notions. On this basis, the present case study reviews the general tendency of the German linguaculture to be explicit with reference to special features of user manuals.

Keywords: cohesion, user manuals, contrastive linguistics, text deixis, explicitness, density, coreference

1 Introduction

It is a truism that for most readers user manuals form an unpopular genre, since they are often associated with boring details, confusion and difficulties in understanding (Rothkegel 1986: 389). As a result, style guides in the area of technical documentation give ample advice on the formal and linguistic composition of such written instructions (Robinson 2009; Whitaker & Mancini 2013). In addition, linguists have found descriptive interest in user manuals during the past decades, as these texts

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are very common in everyday life and usually published in several languages simultaneously. To name but a few, relevant publications are the monograph by Nickl (2001) as well as articles by Rothkegel (1986), Kussmaul (1990) and Schreiber (2004). However, these studies mainly focus on syntactic and pragmatic features, whereas grammatical and lexical ties across sentences are hardly taken into account.

In discourse analysis, *coherence* is usually defined as the result of cognitive processing and inferencing on the part of the addressee, who uses context and world knowledge to create discursive meaning (de Beaugrande & Dressler 1981: 85; Bublitz 1999: 2). By contrast, *cohesion* refers to perceptible lexicogrammatical features that signal semantic connections between sentences. In particular, cohesive ties can be divided into grammatical and lexical categories (Halliday & Hasan 1976: 6; Halliday & Matthiessen 2004: 532–538; Schubert 2012: 31–58). The former are realized mainly by pro-forms, ellipsis, and coordinating conjunctions, while the latter rely on lexical repetitions as well as semantic relations and fields. Although cohesion is a fundamental constitutive feature of texts, it used to be largely neglected by both contrastive linguistics and translation studies. This is confirmed by the fact that the text-linguistic level is missing in major publications on English-German contrasts, such as the influential study by John Hawkins (1986) or the recent textbooks by König and Gast (2012) as well as by Beck and Gergel (2014). In addition, the standard compendium *Handbuch Translation* (Snell-Hornby, Hönig, Kussmaul & Schmitt 1999) hardly deals with contrastive cohesion.

However, following up on the seminal paper by Blum-Kulka (1986), individual articles have recently started to highlight specific aspects of cohesion as a feature of language contrast (e.g. Hansen-Schirra, Neumann & Steiner 2007; Klein 2012; Neumann & Fest 2016). Along these lines, the present study intends to further develop and substantiate this emerging research strand on the basis of data retrieved from ten randomly chosen user manuals mainly referring to common electronic household appliances. This technical genre is well-suited for an in-depth contrastive analysis of cohesion, for the success of its informative intention heavily depends on clear and unambiguous referential relations between sentences, ensuring user-friendly comprehensibility. Since the feature of clarity is equally significant across all languages represented in user manuals, a contrastive approach is particularly promising. Thus, as the English and German versions of the manuals serve exactly the same situational functions, they are readily comparable also from a register perspective (Teich 2003: 222).

Furthermore, this paper aims to point out that the "German tendency to be explicit" (House 1996: 354) also holds true for cohesive ties in user manuals. In doing so, the main focus will be on text deixis, German pronominal adverbs and coreferential items such as pro-forms and nouns at the text-linguistic microlevel. On this theoretical basis, the paper proposes a terminological distinction between explicitness and density with reference to the parameters of quality and quantity.

2 The genre of user manuals and the dataset

As the mere titles of the ten items in the dataset demonstrate, the genre of user manuals may appear under a variety of labels, such as "owner's manual", "user instructions", "instruction manual", "operating instructions", "getting started guide", or "instructions for use". These differences in the signifiers may indicate varying lengths of the texts but do not correspond with distinctions on the side of the signified, since the individual manuals share typical content-related and functional characteristics. In order to define the genre of user manuals, Gläser (1990: 50) pragmatically classifies it as a technical text type addressing non-specialists. Along these lines, the genre belongs to the wider discourse domain of technical documentation, which calls for specific formal and structural properties that meet the desirable attributes "correct", "clear", "complete", "consistent" and "changeable", according to the style guide by Whitaker and Mancini (2013: 27). Since the primary communicative function of user manuals is to give instructions on the use of a particular appliance (Schreiber 2004: 54), they form a genre that accompanies a physical product. Thus, although the linguistic forms may be different in various languages, the illustrating images present in user manuals are commonly identical, as is the corresponding gadget. For the sake of informativity, the aim of the manuals is to be unambiguous and brief but still exhaustive. However, heightened informational density, as it is typical of such manuals, may require increased processing efforts on the recipients' side.

In both English and German user manuals, cohesion and coherence are supported by the predominance of instructive speech acts (Schreiber 2004: 52), which show a limited set of formal realizations in this genre. As a result, the grammar of user manuals is marked by formulaic phrases, relatively short coordinated sentences and a high percentage of ellipsis, which precludes redundancy and facilitates cognitive processing (Nickl

2001: 32–33). As for contrastive grammar, Kussmaul (1997: 75–77) points out that directive illocutions are commonly realized by infinitives in German, while English makes use of imperatives. However, the dataset used for this study shows that German user manuals increasingly contain imperatives as well (see, for instance, examples 3, 4, 5, 6, 9, 10 and 11 below), which may be caused by loan syntax or the greater appeal of directness. The vocabulary of user manuals may contain numerous technical terms, which can have the effect of making the text difficult to comprehend for non-initiated readers.

As far as intersentential structures in user manuals are concerned, previous research on the macrostructural level has provided mainly general observations. For instance, since manuals arrange information like schedules, Nyman (1994: 67) stresses their logical structure, which is heavily influenced by their iconic character, evoking a sequence of physical actions that is based on spatial or chronological parameters (Robinson 2009: 53). Along these lines, Stolze (1999: 154) differentiates between the logic of the product and the logic of the user, who is interested in the sequence of different actions in order to achieve a goal. Whenever the two perspectives deviate, the text is bound to fail in its aim of providing concise and clear instructions. The layout or design concept, which usually shows numerous headlines, distinct paragraph structuring and "numbered lists for sequential steps" (Whitaker & Mancini 2013: 31), also supports the patterned character of the instructions (Stolze 1999: 156). Since the different sections of user manuals typically focus on specific parts of the product and on the single steps in dealing with repeated concepts (Robinson 2009: 67), it is particularly fruitful to investigate coreferential items. As nouns and pronouns with referential identity abound in this genre, its texture shows a great variety of grammatical and lexical cohesion.

The following contrastive analysis of cohesion is based on a dataset of ten user manuals, nine of which refer to electronic household appliances – a fan heater, a camcorder, an oven, a TV set, a stereo amplifier, a turntable system, a laser jet printer, a body fat monitor, and a microwave. The tenth is a book-length volume entitled *The Baby Owner's Manual: Operating instructions, trouble-shooting tips, and advice on first-year maintenance* (Borgenicht & Borgenicht 2003), which has been translated into German under the title *Das Baby: Inbetriebnahme, Wartung und Instandhaltung* ('The Baby: Startup operations, servicing, and maintenance'). Owing to its humorous intention, the book appears not to match the other samples, yet it

is precisely because of its parodistic and intertextual composition that this text closely resembles prototypical user manuals with regard to its use of linguistic devices.

As for the research methodology, the English and German texts were extracted from the manuals and all cases of text deixis, coreferential cohesive chains and instances of German pronominal adverbs were investigated contrastively. Since the cohesive relation of a given pronoun is difficult to ascertain by means of computerized corpora (Klein 2012: 162), all occurrences were analysed manually. Thus, owing to the small-scale dataset, the present approach basically has an exemplary character, pointing out significant genre- and language-related tendencies. In contrast to early work on cohesion (Halliday & Hasan 1976: 9), this paper takes into account cohesive ties both across and within orthographic sentences, since cohesion additionally supports the internal syntactic connectedness. On this basis, representative sample extracts from the ten manuals are used in order to demonstrate cohesive differences between German and English.

3 Cohesive explicitness and density in contrast

The heyday of text-linguistic research on cohesion was in the seventies and early eighties of the previous century, as exemplified by the systemic-functional approach by Halliday & Hasan (1976) and the procedural model by de Beaugrande & Dressler (1981: 48–83). After a few decades of reduced linguistic activities in this field, there has been renewed interest in text-linguistic research on cohesion in recent years. In particular, new approaches have dealt with the dynamic relationship between cohesion and coherence (Tanskanen 2006), lexical cohesion from a corpus-linguistic perspective (Flowerdew & Mahlberg 2009), cohesive profiling in weblogs (Hoffmann 2012), contrastive cohesion in various registers of German and English (Neumann 2014: 215–256) as well as cohesive ties across registers in national varieties of English (Neumann & Fest 2016).

As regards cross-linguistic comparisons of cohesion, Eckert (1981: 31) points out salient differences in anaphoric relations. For instance, English uses the anaphoric pro-adverb *there* for spatial adverbials with both local (e.g. *in the forest*) and directional meanings (e.g. *to the forest*), while German provides the simple adverb *dort* (‘at that place’) for the local and the complex adverb *dorthin* (‘to that place’) for the directional meaning. In addition, German may prefer anaphora, whereas English shows ellipsis, as in *Ich verspreche es* in contrast to *I promise*, or in *Wie funktioniert das?* –

Ich zeige es Dir as opposed to *How does it work? – I'll show you* (Eckert 1981: 33). In her monograph on English-German translation, Königs (2004: 568) also dedicates a minor chapter to the stylistic effects of cohesion. Her central conclusion in this area is that in translations from German into English, cohesive adverbs and coordinators may occasionally remain untranslated. Naturally, changes in cohesion also affect coherence, since less cognitive inferencing on the recipients' part is necessary if the cohesion in a text is more close-knit and explicit.

According to Blum-Kulka, a comparison of source language texts with target language texts often shows "shifts in levels of explicitness" (1986: 18), which, she argues, can be explained in two ways: either there are different stylistic preferences in languages, or translation itself involves an inherent explicitation process which triggers increased redundancy in the target language. Referring to the study by Stemmer (1981), Blum-Kulka points out that in the production of English by German learners, "it was *lexical cohesion* (e.g. lexical repetition) as well as conjunctions which were markedly overrepresented in the learner data, with a non-comitant underrepresentation of *reference linkage* (e.g. pronominalization)" (1986: 19, emphasis original).[1] This is proof of the fact that linguistic transfer in EFL discourse occurs not only at the morphosyntactic but also at the text-linguistic level.

With reference to the Cross-Linguistic Corpora (CroCo) project, Erich Steiner (2012: 59) distinguishes between explicitness and explicitation: a text is more explicit if it contains complete constructions instead of reduced structures, while explicitation denotes a dynamic process that can be caused by translation and results in a higher level of explicitness in the target language text. For instance, German texts are typically more explicit regarding postmodifying clauses (Hansen-Schirra et al. 2007: 252), since German makes more use of finite relative clauses, in which tense and mood are overtly expressed, while English texts contain a higher percentage of non-finite constructions.

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[1] Surprisingly, Mark Twain makes similar observations in his humorous, impressionistic and highly subjective account of German entitled "The Awful German Language" (1880): "The Germans do not seem to be afraid to repeat a word when it is the right one. They repeat it several times, if they choose. That is wise. But in English when we have used a word a couple of times in a paragraph, we imagine we are growing tautological, and so we are weak enough to exchange it for some other word which only approximates exactness, to escape what we wrongly fancy is a greater blemish. Repetition may be bad, but surely inexactness is worse" (Twain 1997: 400).

According to the cross-cultural pragmatic approach by Juliane House (1996; 1997), a "cultural filter" (1997: 29) governs "shifts and changes along various pragmatic parameters", so that House establishes five dimensions of cross-cultural difference: German is characterized by "directness", "orientation towards self", "orientation towards content", "explicitness", and "ad-hoc formulation", while English shows "indirectness", "orientation towards other", "orientation towards persons", "implicitness", and the "use of verbal routines" (House 1997: 84). In order to elicit relevant data, House conducted interviews with British and American informants, many of whom highlighted "the preference of members of the German culture to produce detailed signs regulating various aspects of public life" (1996: 354). In this context, explicitness means that more information is provided than would be expected in an English-speaking environment, that new topics in discourse are introduced explicitly, and that rules and regulations may be repeated in case they are not observed. Since House analyses explicitness from a pragmatic perspective, it is illuminating to apply her model to text grammar and cohesion as well.

Instead of "explicitness", Halliday & Hasan speak of "tight and loose" texture (1976: 295), which corresponds to the cohesive density of a text. They argue that cohesion is stronger within paragraphs of a text, while there are fewer cohesive ties across different paragraphs, since here gradual topic drift occurs. Accordingly, they point out that "[t]extuality is not a matter of all or nothing, of dense clusters of cohesive ties or else none at all. Characteristically we find variation in texture, so that textuality is a matter of more or less" (Halliday & Hasan 1976: 296). This scalar notion of cohesive density may be equally utilized in contrastive text linguistics, as shown by Kunz's (2007) model of investigating coreferential expressions. Kunz (ibid. 276) draws attention to the fact that "the more often a referent is reactivated, i.e. the higher the number of coreferring expressions in one reference chain, and the smaller the textual distance between these expressions, the higher the referent is in focus of attention". Consequently, this approach will be useful for the comparison of cohesive density in the English and German linguacultures.

On the basis of these terminological premises, I propose the following use of the two terms *explicitness* and *density*: *Explicitness* will be seen as a matter of quality, referring to the degree of informativity in one particular

cohesive tie.[2] For example, the use of a synonym or hypernym as a coreferential item yields greater explicitness than a semantically empty pronoun. Hence, I adopt a wide concept of *explicitness* which comprises the notions of both Hansen-Schirra & Neumann & Steiner (2007; 2012) and House (1997). By contrast, the term *density* refers to cohesive quantity along the lines of Kunz's (2007) scalar approach to coreferential items, so that the density of a German and an English passage can be compared on the basis of the sheer number of cohesive ties present in a given stretch of discourse.

4 Text deixis

In order to get an accurate picture of cohesion in contrast, it is necessary to make a clear distinction between text deixis and cohesion. In their *cohesive* use, pronouns can have anaphoric or cataphoric reference (Halliday & Hasan 1976: 33), since they can point backward or forward to coreferential noun phrases. By contrast, text deixis "concerns the use of expressions within some utterance to refer to some portion of the discourse that contains that utterance" (Levinson 1983: 85). In other words, text-deictic items directly point to other passages in the same text without having a common extralinguistic referent, such as *in the previous chapter* or *in the next paragraph*. In this way, text deixis supports the textual interconnectedness merely on the surface level of the signifier. Along these lines, example (1) shows differences in explicitness between the German and the English text.[3]

(1) a. *This* manual applies to several TV models. Some of the functions or settings may not be available on the model that you have bought. (*TV User Manual* 1999/2000: E1)

b. *Die vorliegende* Anleitung ist mehreren Fernsehgeräten gemeinsam. Daher kann es vorkommen, dass einige der *hier beschriebenen* Funktionen bzw. Einstellungen an dem von Ihnen erworbenen Modell nicht vorhanden sind. (*TV User Manual* 1999/2000: D1)

[2] The term *explicitation* is avoided in the present study, since the direction of translation cannot be inferred from the texts in the dataset.

[3] In all examples, the relevant lexical items are highlighted by italics. "E1" refers to page one in the English text, while "D1" indicates page one in the German version.

Here the German version contains two clear instances of holistic text deixis, since they point to the complete brochure. The first item, *die vorliegende [Anleitung]* (‘the present [manual]’), consists of the definite article and the present participle of a full verb, while the English equivalent is the demonstrative determiner *this*. The second German case includes the deictic adverb *hier* (‘here’) in collocation with the past participle *beschriebenen* (‘described’), whereas in the English version this instance is completely absent. Consequently, the German text is more explicit because there are more content words involved, and it is denser than the English one, as there is one additional case of textual connectedness at the deictic level. In the German examples (2b) and (3b), the exact position of the deictic centre is more significant than in the English equivalents, since the German versions show the phenomenon of forward-pointing text deixis.

(2) a. Accessories supplied depend on the model. (*Oven* 2005: E14)

b. Der Backofen kann je nach Modell mit *nachstehendem* Zubehör ausgerüstet sein. (*Oven* 2005: D6)

(3) a. Change the bulb (see note). (*Oven* 2005: E17)

b. Wechseln Sie die Glühlampe aus (siehe *nachstehenden* Hinweis). (*Oven* 2005: D9)

In (2b) the present participle *nachstehendem* (‘following’) has no equivalent in the English version in (2a). Owing to the greater explicitness in German, readers are significantly supported in their text comprehension, while English recipients will have to infer where in the text the *accessories* are described. In example (3) the syntactic structures in the two languages are quite similar, but once again, the German section of the manual in (3b) facilitates the process of searching the *note* (‘Hinweis’) mentioned by adding the text-deictic present participle *nachstehenden*.

5 Cohesive ties in contrast

In the comparison of English and German cohesive ties I will focus on two phenomena that are particularly striking in user manuals. First, coreferential chains are pervasive, since manuals tend to focus on specific continuous topics, and second, German pronominal adverbs have the

characteristic function of linking individual instructions, but they rarely have literal counterparts in English.

5.1 Coreferential chains

Chains of coreferring expressions consist of two or usually more linguistic items that refer to the same extralinguistic entity. In their analysis, important factors are the "textual distance" between the single instances and the "frequency of reactivation" (Kunz 2007: 276), which guide the readers' centre of interest.[4] Usually, such chains consist of noun phrases, which can have different realizations. While pronouns belong to the set of function words and thus constitute grammatical cohesion, lexical cohesion can include identical repetitions, synonyms, and hypernyms. As has been observed by de Beaugrande & Dressler (1981: 79–81), these categories differ in their textual functions: while pro-forms compact the text and thus contribute to language economy and efficiency, literal repetitions help to avoid misunderstandings and support the precision and stability of the text. Since the signifiers are different in synonyms and hypernyms, these semantic relations call for more inferencing on the readers' part than identical repetitions, but they all fulfil similar functions in the continuous activation of concepts. In general, cohesive relations of pronouns are clearer in German than in English because of grammatical concord, which makes the reference between pronouns and presupposed nouns more obvious (Klein 2012: 163). As the examples will show, however, this fact does not trigger a pronounced preference for pronouns in German cohesive chains. Extract (4) demonstrates in which way coreferential chains may differ in English and German.

(4) a. Exterior of the oven
Clean with a damp cloth. If *it* is very dirty, add a few drops of washing up detergent to the water. Wipe with a dry cloth. (*Oven* 2005: E15)

[4] Kunz (2007: 270) shows that readers may occasionally need to make use of their culture-specific world knowledge in order to detect coreference between expressions. However, this is hardly the case in user manuals, since here the appliances described will be known to the target audiences in the different nations where the products are distributed.

b. Reinigung der Backofen-Vorderseite
Reinigen Sie die *Vorderseite* mit einem feuchten Tuch. Wenn die *Vorderseite* sehr stark verschmutzt ist, reinigen Sie *sie* mit Wasser und ein paar Tropfen Geschirrspülmittel. Wischen Sie die *Vorderseite* anschließend mit einem trockenen Tuch ab. (*Oven* 2005: D7)

The German headline in (4b) contains the endocentric compound *Backofen-Vorderseite* ('front of the oven'), while the text body shows three identical repetitions of the head of this complex word, which creates a strong cohesive and coreferential chain. The second sentence additionally contains the coreferential third-person singular pronoun *sie*, not to be confused with the second-person pronoun *Sie*, which addresses the reader. While the textual distance between the single items is rather small, the frequency of reactivation is very high, which results in a significant degree of redundancy that precludes ambiguity. In this respect, the text resembles legal registers, which also include numerous repetitions for the sake of precision and clarity (Crystal & Davy 1969: 202). In the English version (4a), however, the headline *exterior of the oven* is exclusively referred to by the personal pronoun *it*. In two cases, the German grammatical object *Vorderseite* ('front') is absent in the English version, since the verbs *clean* and *wipe* can appear in both monotransitive and intransitive complementation. Hence, the direct object is notionally implied but formally ellipted on the English textual surface. In addition, the second English sentence does not include an equivalent to the German verb *reinigen* ('clean') but only advises to add detergent to the water, while the cleaning process is merely implied. Consequently, English is more concise and economical, while German shows both a greater explicitness, based on the lexical content of the nouns, and an increased density, owing to the greater number of ties. What is more, the German manual is more precise in using the noun *Vorderseite*, which provides a direction, in contrast to the English expression *exterior*. In the following extract (5), the English original is less explicit than the German version because of a syntactic peculiarity of the English language.

(5) a. Sit the baby on your lap, facing away from you. (Borgenicht & Borgenicht 2003: E96)

b. Setzen Sie das Baby so auf Ihren Schoß, dass *es* von Ihnen weg sieht. (Borgenicht & Borgenicht 2004: D92)

In the German sentence, the pronoun *es* in the clause of result refers back to the noun phrase *das Baby* (‘the baby’) in the superordinate clause. The English equivalent is a subjectless present participle clause whose implied subject is identical with the direct object of the superordinate clause. Therefore, the reader of the English sentence has to expend more cognitive effort because of the lower degree of explicitness in English. In general, the characteristic adverbial *-ing* clauses are semantically rather open (Quirk et al. 1985: 1123), whereas a German translation needs to introduce an appropriate finite clause and subordinator. Hence, the German sentence is more explicit because of the discontinuous subordinator *so ... dass* (‘so that’) and the coreferential pronoun, and these two features also increase the density of the sentence. The next contrastive example (6) illustrates another English construction which has no direct counterpart in German.

(6) a. Unravel the Supply Cord before use. Failure *to do so* could cause overheating and possible fire hazard. (*Fan Heater* 2004: E4)

b. *Wickeln* Sie *das Kabel* vollständig *ab*. Ein nicht vollständig *abgewickeltes Kabel* kann zu Überhitzung führen und einen Brand verursachen. (*Fan Heater* 2004: D7)

In the terminology of Halliday & Hasan (1976: 122), this use of the pro-adverb *so* in collocation with the pro-verb *do* constitutes a case of verbal substitution, which means that neither the verb *[u]nravel* nor the noun *Supply Cord* need to be repeated. In German, however, there is no literal equivalent to this construction (Hansen-Schirra et al. 2007: 256), so that the German manual contains lexical repetition: in the second sentence the noun *Kabel* (‘cord’) is used again, premodified by the participle *abgewickeltes* (‘unravelled’), which reiterates the discontinuous imperative *[w]ickeln […] ab* in the first sentence. As a further result, the English verbal construction *to do so* is contrasted with a German nominal construction. Hence, the German version is denser than the English one, for it contains two cohesive ties instead of one, and the German text is more explicit, since it repeats the autosemantic items *Kabel* and *abwickeln*, as opposed to the synsemantic pro-adverb and pro-verb in English. In the following example (7) the English use of a non-finite subject clause likewise has no direct equivalent in German, which also affects the use of coreferential items.

(7) a. Damp in rooms where *the set* is installed should not exceed 85% humidity. If you have to use *the television* outdoors, do not expose *it* to water from rain or splashing. Moving *it* from a cold atmosphere into a warm one can cause condensation on the screen (and on some components inside *the television*). (*TV User Manual* 1999/2000: E1)

b. Die Luftfeuchtigkeit im Aufstellungsraum *des Geräts* darf 85% nicht übersteigen. Wenn Sie *Ihr Gerät* im Freien betreiben müssen, schützen Sie *es* unbedingt vor Regen bzw. Spritzwasser. Der Umzug *des Fernsehgeräts* aus einer kalten in eine warme Umgebung kann zur Bildung von Kondensfeuchtigkeit auf dem Bildschirm (sowie an Bauteilen im Innern *des Geräts*) führen. (*TV User Manual* 1999/2000: D1)

In both versions the coreferential chains consist of five items, so that the level of density is identical. However, the degree of explicitness is different, as shown by the members of the chains: in English they are *the set* > *the television* > *it* > *it* > *the television*, while the German text contains *des Geräts* (‘of the set’) > *Ihr Gerät* (‘your set’) > *es* (‘it’) > *des Fernsehgeräts* (‘of the television set’) > *des Geräts*. The most important difference is the repeated use of the pronoun *it* in English, while in the German version the second pronoun is translated as *des Fernsehgeräts*. In English the pronoun is the direct object of the present participle *moving* in the non-finite clause, which cannot be directly imitated in German. Consequently, the German text contains a noun phrase with a genitive postmodification in *[d]er Umzug des Fernsehgeräts* (‘the relocation of the television set’). It is also striking that the German version makes the possessive relation explicit with the pronoun in *Ihr Gerät*, as opposed to *the television*.

Moreover, the German cohesive chain contains more lexical repetitions, while in English there is variation between the hypernym *the set* and *the television*. The German text also places more emphasis on the warning by adding the adverb *unbedingt* (‘by all means’), which has no equivalent in the English text. In addition, the negated modal verb *should not* in the first sentence is translated as *darf [...] nicht* (‘must not’), which is more determined in expressing prohibition. Finally, the English text again contains one instance of substitution, in this case the nominal type in the form of *a warm one*, which is not literally translatable. Here the German equivalent is cataphoric ellipsis in the passage *aus einer kalten [Umgebung] in eine warme Umgebung* (‘from a cold [environment] into a warm environment’). As demonstrated by example (8), enhanced

explicitness in German may be caused by a much more verbose and morphologically redundant texture.

(8) a. If *the AC plug of this unit* does not match the AC outlet you want to use, *the plug* must be removed and *appropriate one* [sic] fitted. Replacement and mounting of *an AC plug* on the power supply cord of this unit should be performed only by qualified service personnel. If connected to an AC outlet, *the cut-off plug* can cause severe electrical shock. Make sure *it* is properly disposed of after removal. (*Integrated Amplifier* 2012: E3)

b. Falls *der Netzstecker des Netzkabels dieses Geräts* nicht in die Zusatzsteckdose einer anderen Komponente passt, muss *er* gegen *einen Netzstecker der geeigneten Ausführung* ausgewechselt werden. Ein derartiger Austausch *des Netzsteckers* muss vom Kundendienstpersonal vorgenommen werden. Wenn *der vom Netzkabel abgeschnittene ursprüngliche Netzstecker* in eine Netzsteckdose eingesteckt wird, besteht akute Stromschlaggefahr! Daher ist unbedingt dafür zu sorgen, dass *der abgeschnittene Netzstecker* sofort vorschriftsmäßig entsorgt wird. (*Integrated Amplifier* 2012: D3)

This is a characteristic warning note, typically to be found in the opening section of user manuals, so that referential clarity is paramount. Consequently, the central object is verbalized a number of times in different formal realizations, as illustrated by Table 1.

Table 1. Referential noun phrase chains in English and German (example 8)

Item	**English**	**German**
(1)	*the AC plug of this unit*	*der Netzstecker des Netzkabels dieses Geräts*
(2)	*the plug*	*er*
(3)	*[appropriate one]*	*[einen Netzstecker der geeigneten Ausführung]*
(4)	*an AC plug*	*des Netzsteckers*
(5)	*the cut-off plug*	*der vom Netzkabel abgeschnittene ursprüngliche Netzstecker*
(6)	*it*	*der abgeschnittene Netzstecker*

Both the English and the German version show the same number of noun phrases continuing the subject, so that the quantitative density is identical. In both texts, however, the third item is not coreferential with the others, since it refers to an alternative AC plug. As a result, English makes use of nominal substitution through *one* (Halliday & Hasan 1976: 91), whereas German uses lexical repetition (*Netzstecker*) in the head of a postmodified noun phrase. Although both versions contain one pronoun in this cohesive

chain, i.e. *it* and *er*, the German text may again be said to be more explicit because of extended premodification by past participles such as *abgeschnittene* and because of postmodification by prepositional phrases such as *der geeigneten Ausführung* (‘of an appropriate kind’), all of which serve the function of unambiguous reference. Apart from this coreferential chain, the German version is marked by multimorphemic compounds such as *Kundendienstpersonal* (‘customer service personnel’), *Zusatzsteckdose* (‘additional power outlet’) and *Netzsteckdose* (‘mains power outlet’), which do not have direct formal equivalents in English. These words are responsible for morphemic redundancy through partial repetition, as the morpheme *netz* (‘the mains’) appears eight times altogether in this short extract.

Increased urgency is expressed in the German version by the additional adverbs *unbedingt* (‘by all means’) and *sofort* (‘immediately’) in the final sentence. Furthermore, the German text employs the modal verb *muss* (‘must’) in collocation with *Kundendienstpersonal*, expressing unconditional obligation, while English uses the less absolute modal *should*. The impression of authority and rigour in the German text is also supported by the exclamation mark after *Stromschlaggefahr* (‘electric shock hazard’), as opposed to the full stop in English. Concerning cohesion, the final sentence in the German version is additionally introduced by the connective adverb *daher* (‘therefore’), which is not reflected in the English text.

5.2 Pronominal adverbs

German pronominal adverbs such as *dabei*, *dafür*, *hierfür*, and *hierbei* are of particular interest here for two reasons. First, they are a cohesive specialty of German and usually do not have literal equivalents in English, and second, they express notions of purpose, effect, and means, which makes them suitable for technical instructions. Formally, they consist of one of the pro-adverbs *da-*, *hier-* and *wo-* in combination with a preposition, so that they can replace prepositional phrases. Owing to their anaphoric and cataphoric functions as pro-forms, they are called “Pronominaladverbien” (‘pronominal adverbs’) and form a large group among German pro-forms (Brinker 2005: 33; Wermke et al. 2005: 585–590). They may refer to presupposed prepositional phrases or to an extended passage of discourse, often describing a course of action. As for

their equivalents in English, there are the possibilities of explicitation and omission, depending on context and genre:[5]

> "Typisch deutsche" Konstruktionen wie "Ich fürchte mich nicht *davor*, ich freue mich *darauf!*" müssen je nach Makrokontext stark expliziert oder stark vereinfacht werden; entweder man sagt ausdrücklich, *wovor* man sich nicht fürchtet und *worauf* man sich freut, oder man sagt nur, *daß* man sich nicht fürchtet, sondern freut. (Albrecht 2005: 125, emphasis original)

In other words, German pronominal adverbs can be translated into English by prepositional phrases or they can be replaced by zero, so that the cohesive function is lost (Fabricius-Hansen 2000: 338). Of course, there are English adverbs such as *thereof*, *hereto*, and *hereunder*, which are direct formal equivalents, since they are also composite lexemes consisting of adverb and preposition. However, they partly have deviating meanings and show significant connotations of obsolescence and formality, as they chiefly appear in the conservative register of legal English, in which they also serve the purpose of exact reference (Crystal & Davy 1969: 208).[6] Example (9) demonstrates that pronominal adverbs can clearly enhance explicitness in German.

(1) a. To reduce the risk of electric shock, do not remove cover (or back). No user serviceable parts inside. Refer servicing to qualified service personnel. (*HD Camcorder* 2008: E2)

b. Um das Risiko von elektrischen Schlägen auszuschließen, öffnen Sie das Camcorder-Gehäuse nicht. Innerhalb des Geräts gibt es keine vom Benutzer zu reparierende Teile. *Dafür* ist ausschließlich der qualifizierte Kundendienst zuständig. (*HD Camcorder* 2008: D2)

The third German sentence is here introduced by the adverb *dafür* ('for that'), which anaphorically refers to the intention of opening the cover and repairing the camcorder, as mentioned in the two previous sentences.

[5] English translation: "Typically German" constructions, such as "Ich fürchte mich nicht *davor*, ich freue mich *darauf!*" need to be either strongly explicitated or simplified, depending on the respective macro-context; either you explicitly say *what* you are not afraid of and *what* you are happy about, or you merely say *that* you are not afraid but happy.

[6] As for the frequent use of anaphora in legal English, Crystal & Davy (1969: 208) additionally comment that "it seems possible to see in the almost ritualistic repetitiveness more than a little reverence for tradition".

Moreover, the English version is strongly elliptical and thus much less explicit, particularly in the second sentence, which does not contain a verb, in contrast to the German counterpart. Besides *dafür*, the adverbs *hierbei* and *hierzu* often increase German explicitness in cohesion, as illustrated by examples (10) and (11).

(2) a. Never pull out fully loaded shelves. Use extreme caution. (*Oven* 2005: E13)

b. Vermeiden Sie es, voll beladene Zubehörteile aus dem Backofen zu ziehen. Seien Sie *hierbei* zumindest äußerst vorsichtig. (*Oven* 2005: D5)

(3) a. You are able to [...] delete channels that are duplicated or of poor quality. Follow the instructions at the foot of the screen. (*TV User Manual* 1999/2000: E3)

b. Sie können [...] doppelt oder schlecht eingerichtete Sender löschen. Folgen Sie *hierzu* den im unteren Bildrand eingeblendeten Anweisungen. (*TV User Manual* 1999/2000: D3)

In (10b), the adverb *hierbei*, whose modal-instrumental meaning (Fabricius-Hansen 2000: 337) could be semantically paraphrased as "bei dieser Handlung" ('during this action'), refers anaphorically to the action mentioned in the previous sentence, while the English text does not contain an equivalent. Since the English version lacks this cohesive tie, the reader must expend more cognitive effort in order to create coherence between the sentences. In addition to its greater cohesive explicitness, the German warning also gains more emphasis by the adverb *zumindest* ('at least'), likewise not reflected in English. In (11b), the adverb *hierzu* verbalizes an adverbial of purpose that could be paraphrased as "zu diesem Zweck" ('for this purpose'). In the English version, however, readers are expected to construct the cognitive link between the two sentences on their own. In exceptional cases, the English text may contain a more elaborate phrase as an equivalent to the German pronominal adverb, as example (12) demonstrates.

(4) a. Do not heat sealed containers in the oven (except for packages specifically designed *for this purpose* [...]). (*Oven* 2005: E13)

b. Verwenden Sie auch keine Behälter aus synthetischen Materialien zur Zubereitung von Speisen im Backofen (ausgenommen solche, die speziell *dafür* geeignet sind; [...]). (*Oven* 2005: D5)

The meaning of the German adverb *dafür* in (12b) is represented by an English prepositional phrase in (12a), consisting of the preposition *for*, the demonstrative determiner *this* and the noun *purpose*. Hence, in such rare cases, the English manual is more explicit, while the quantity-related density is identical in both languages. Apart from that, English also has the possibility of using alternative constructions, as exemplified by extract (13).

(5) a. Feeding should begin automatically. *As the baby feeds*, the ears will move, and you will hear him swallowing. (Borgenicht & Borgenicht 2003: E82)

b. Das Baby beginnt automatisch zu trinken. *Dabei* bewegen sich seine Ohren und Sie hören es schlucken. (Borgenicht & Borgenicht 2004: D82)

The English version (13a) here contains the additional adverbial clause of time *[a]s the baby feeds*, which incorporates the subject that in the German text is introduced in the previous sentence (*Das Baby*). Thus, while German uses the pro-adverb *[d]abei* ('during that action'), there is no pro-form in English, so that in (13a) cohesion results from the recurrence of the word stem *feed* in *[f]eeding* and *feeds*. Hence, whenever German pronominal adverbs do not have a zero equivalent in English, their meaning may be rendered by various structural equivalents in English.

6 Conclusion

All in all, the analyses have shown that text deixis and cohesion play a significant role in the degree of explicitness and density of user manuals. While explicitness is based on the informational quality of a single cohesive tie, density refers to the overall quantity of ties present in a passage or complete text, so that both categories are not absolute but scalar notions. In the genre of user manuals, German is closer to the explicit and dense pole than English, which manifests itself in three features: First, text deixis is more specific and frequent in German instructions, which facilitates the readers' orientation on a specific written page (Section 4). Second, in coreferential chains the German manuals contain more lexical cohesion, especially literal or morphemic repetition, as opposed to pro-forms and partly elliptical expressions in English. The reason for ellipsis in English can be the intransitive use of potentially transitive verbs and the occurrence of subjectless non-finite clauses. The English preference for

pro-forms partly relies on language-specific substitution such as (*do*) *so* or *one*. Increased explicitness in German coreferential chains may also be triggered by extended pre- and postmodification in noun phrases (Section 5.1). Third, pronominal adverbs usually contribute to the greater explicitness and density of German manuals, since these pro-forms do not have direct equivalents in English. However, if they are occasionally reflected in the English version, the English text may be more explicit in these exceptional cases, owing to more elaborate paraphrases. The greater explicitness usually noticed in the German versions is further enhanced by adverbs of urgency such as *unbedingt* ('by all means') or *sofort* ('immediately'), which are especially salient in warning notices (Section 5.2).

Consequently, the increased explicitness and density of German user manuals corresponds to Juliane House's observations concerning the different linguacultures. From an interdisciplinary perspective, thus, the present research on contrastive text linguistics is in line with results from cross-cultural pragmatics. Furthermore, these general tendencies of the two languages show specific functions in the genre of user manuals. In a nutshell, German manuals put greater emphasis on precision and exactness by means of unambiguous cohesive ties, while in English instructions the fundamental aim is conciseness and language economy. Both precision and economy are central concerns of user manuals but at the same time contradict each other, so that an adequate choice of cohesive ties is crucial for both the successful production and translation of user manuals.

From the perspective of Relevance Theory (Sperber & Wilson 1995; Clark 2013), the relevance of a text is based on the relation between cost and benefit in cognitive processing. As Sperber & Wilson (1995: 124) put it, "[t]he assessment of relevance, like the assessment of productivity, is a matter of balancing output against input: here contextual effects against processing effort". In other words, a user manual is more relevant if the reader gains the desired information about the appliance by expending as little processing effort as possible. Hence, according to this theoretical framework, the English user manuals have a slightly lower degree of "relevance" than the German ones, since they contain fewer cohesive ties, so that more inferencing on the readers' part is necessary to grasp the meaning of the texts. By contrast, the German manuals are more "relevant" in this sense, as intersentential relations are more easily accessible, which facilitates comprehension. Increased lexical redundancy in the German manuals may to some extent prolong the reception process but ultimately

serves the purpose of unambiguousness. According to the Cognitive Principle of Relevance (Clark 2013: 107), the maximisation of relevance will therefore be somewhat easier for the recipients of German user manuals. Of course, further corpus-based research will be necessary to provide large-scale statistics, but the relatively small collection of manuals used here already gives quite clear evidence for the typical features of contrastive cohesion in this technical genre.

Dataset of user manuals

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The reading process of dynamic text – A linguistic approach to an eye movement study

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Abstract

Using eye-movement analysis, the article examines the reading process of speech-to-text interpretation involving dynamic text emerging letter by letter on the screen. The article focuses on regressions of gaze as well as on their relationship to linguistic factors in order to reveal how the reader's gaze behaviour reflects the reading process of dynamic text. The data come from an experiment where participants read a dynamic text on a computer screen. The results showed that the first and second landing points of regressions were generally (90.8%) content words, even though the proportion of content words in the whole data set was only 57.1%. The test subjects looked for nouns, verbs and adjectives in order to construct the meaning of what they had just read. Nouns were the most likely landing points of regressions. The landing points of regressions reflected the reading process through which the meaning of the text was constructed. In this kind of dynamic text, a typical cause of regressions seems to be incoherence resulting from omissions.

Keywords: reading, dynamic text, speech-to-text interpreting, regressions of gaze, eye movements, gaze behaviour, discourse processing, lexical hierarchy

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1 Introduction

In this article, we examine the reading process of one type of dynamic text: a text that emerges letter by letter on a screen. This kind of text presentation is used in speech-to-text interpretation, where speech is simultaneously rendered into written format. Intralingual speech-to-text interpreting (termed print interpreting in our earlier studies) is needed for hard-of-hearing and late-deafened people as a communication aid which gives them access to spoken language (cf. Norberg et al. 2015). In a larger project (cf. Tiittula 2009) we investigated the quality of interpretation from various perspectives and with different methods, including eye movement analysis; one of the main questions was how comprehensible the interpretation was and how its methods could be developed in order to enhance accessibility. In the following, we address the reception of speech-to-text interpretation, especially the reading process, through an analysis of eye movements. Our aim is to analyse how the gaze behaviour of the reader reflects the reading process of this kind of dynamic text.

The present work is a pilot study, which consists of an experiment where the participants read a dynamic speech-to-text interpreted text presented on a computer monitor. The text was the output of a speech-to-text interpreting process in which a professional speech-to-text interpreter transformed a spoken conference-like presentation into written format. In Finland, speech-to-text interpreters use a standard QWERTY keyboard; that is, a stenotype is not used. Since speaking is much faster than writing, in spite of a high typing rate, errors and omissions occur. The text appears on the screen letter by letter as the speech-to-text interpreter writes, and recipients see the real-time writing process, including pauses and corrections.

Although the processes of reading and visual perception, in particular, are well studied (cf. Rayner 1998), the research and models are predominantly based on reading static text, often restricted to just one sentence at a time. Today, there is an ever increasing range of dynamic texts enabling different types of reading (for reading web pages, see, for example, Simola 2011), presumably involving different comprehension processes as well. The various formats for presenting dynamic text on screen include scrolling, paging, leading, and RSVP (*Rapid Serial Visual Presentation*). Scrolling involves sliding text displayed, for example, letter by letter or word by word; in Finnish speech-to-text interpreting, both methods are used. Paging presents the text divided into pages that fit the

screen. The reader can move one page at a time to continue reading. In leading, dynamic text is scrolled horizontally from right to left on a single line across the screen. Finally, RSVP presents the text in successive chunks of one or more words at a time in a predetermined location on the screen. Consecutive chunks of text are presented at a predetermined rate that may be selected by the user (Muter 1996; Potter 1984). As the use of dynamic texts is growing rapidly in different forms of translation, media presentations and computer-mediated communication, it is important to study the reading process of dynamic texts in order to make their presentation more effective.

In the present study, readers' gaze behaviour is treated from a linguistic perspective. More precisely, the article focuses on regressions of gaze (i.e. backward-directed eye movements) as well as on their relationship to linguistic factors, such as the class of words on which the gaze lands. The aim of the article is to show that the test subjects need to read certain words again in order to construct the meaning of the text. The hypothesis is that these words are mainly content words, most often nouns[1]. The fact that the text is dynamic makes the experiment more interesting: indeed, as the test subjects know that they will have only a limited time to read the text before it disappears, the reading process has to be particularly efficient.

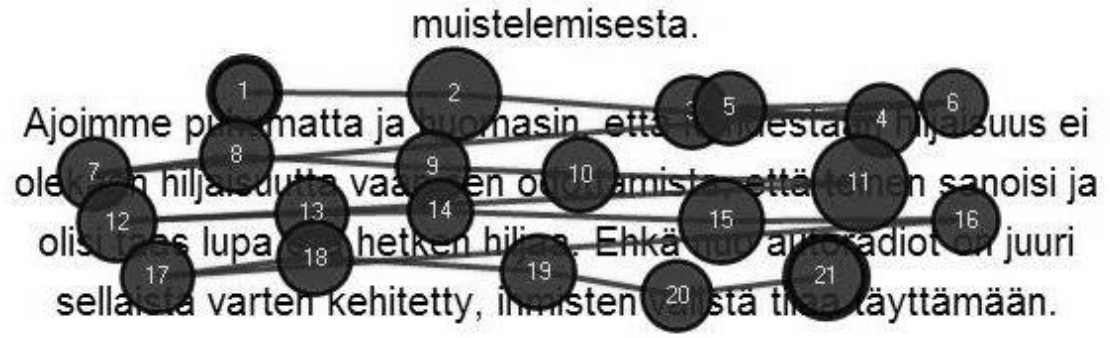
The study consists of quantitative and qualitative analysis. The quantitative analysis deals with regressive eye movements on top of the text being read. Here the number of reread words is examined, with the emphasis on the first and second landing points of regression. The qualitative analysis further scrutinized the examination from a linguistic perspective. More precisely, the qualitative analysis focused on the class of words involved in the first and the second landing points of regression, as well as on the structure and the meaning of the sentences including regressions. Before presenting our study, we will briefly explain the basic terms and findings from previous research into eye movements in reading process (Section 2). In Section 3, we shift the focus to linguistic elements. Section 4 describes the data and the method. The main section (5) consists of the quantitative and qualitative analysis and the results of the eye movement experiment. Section 6 concludes the paper.

[1] Nouns, verbs and adjectives are considered to be 'content words' in this study. All the other words are categorized as 'function words'.

2 Eye movements in the reading process

Reading involves visual processing of the words included in a text. Eye movements in reading can provide a window into the cognitive process of perception and comprehension that takes place during reading. Eye tracking provides eye movement data which demonstrate gaze behaviour in reading. A corneal reflection by infrared light can be recorded through an infrared camera attached to the eye tracker. While reading, eyes make brief jumps along the line of the text, stop for a while and again continue moving forward. Sometimes eyes also move backward. Rapid eye movements from one place to another are known as saccades, while the pauses between saccades are termed fixations. Typical fixation duration in reading an English text is 200–250 ms, and the average saccade length is 7–9 characters (Rayner 1998: 375). Figure 1 presents a typical gaze path in reading with fixations and saccades. The circles marked with numbers are fixations and the straight lines between the circles are saccades.

Figure 1. Gaze path in reading



Eyes do not move steadily forward when reading; rather, they also move backwards for rereading. Eye movements opposite to the direction of written text (right-to-left in the cases where text is read from left-to-right) along the line or movements back to previously read words and lines are called regressions. For the particular time frame in Figure 1, fixations moved forward from number one to four and then moved backward to number five before moving forward again to number six and then on to the next line.

Rereading is a natural human eye movement behaviour in reading. It can indicate an active process that serves a useful function, such as allowing readers to improve text comprehension or fill in gaps in memory about the content of the text (e.g. Levy et al. 1992). Past research has also

shown that look-backs or rereadings are often an indicator of comprehension difficulties (Rayner 1998). If the comprehension process does not proceed smoothly, readers tend to look back more. On the other hand, look-back fixations to the most important segments of the text are strategic in nature (Hyönä et al. 2002; Hyönä & Nurminen 2006). Therefore, different eye movements in reading, such as looking at the text for a long time and producing longer fixations, or looking back and rereading, could be caused by different cognitive mechanisms. Short within-word regressions may occur when the reader has difficulty processing the currently fixated word (Carpenter & Just 1983; Rayner & Duffy 1988). Longer regressions that is regressions longer than 10 characters back along the line or to another line, may occur because the reader has failed to understand the text (Carpenter & Just 1983; Rayner & Duffy 1988). Since eye movements reflect difficulties in understanding the document being read, they can also be used to automatically recognize the quality of the text by integrating gaze data from several readers (Biedert et al. 2012).

The lines of text readers look at can be divided into three regions: the foveal region (the central 2º of vision), the parafoveal region (which extends from the foveal region to about 5º on either side of fixation), and the peripheral region (which includes everything beyond the parafoveal region) (Rayner & Pollatsek 2013: 443). Rayner et al. (2006) study demonstrated the importance of preprocessing the word to the right of fixation for fluent reading: When the next word disappeared or was masked, reading was disrupted, which indicates that readers also acquire information from the parafoveal region. Consequently, different types of text representation may affect the viewing pattern. For instance, when text is displayed in scrolling mode, the absence of the word to the right of fixation may cause regressions. Romero-Fresco (2010), who has studied re-spoken live subtitles, compared scrolling mode (word-for-word) presentation to block subtitles. He found that word-for-word subtitles caused almost twice as many fixations as block subtitles, and very often the gaze went back to previous words (ibid. 187–189). Studies by Sharmin et al. (2015) and Sharmin & Wiklund (2014) found more rereading gaze behaviour in reading dynamic text using word-by-word presentation format compared to letter-by-letter format. Different study by Sharmin et al. (2012) found a larger number of regressions and longer fixation duration in reading text presented in small pieces or chunks (30 characters in length) compared to larger pieces of text (sentences or paragraphs), clearly

indicating that small textual chunks are more difficult to cognitively process.

In another reading context, while reading for translation, translation students were observed to read static source text differently from dynamic target text that they were producing (Sharmin et al. 2008). Average fixation duration was higher on the dynamic text than on the static source text.

Readers do not, however, fixate on all the words in a text. In particular, many short words are skipped over (Weger & Inhoff 2006). Consequently, foveal fixation on each word is not necessary. Previous studies have shown that content words are fixated on much more than function words (Carpenter & Just 1983; Rayner & Duffy 1988). This can be explained by the frequency and the length of the words and by parafoveal processing (Rayner & Duffy 1986; Staub & Rayner 2007). Consequently, re-fixations are also more likely to target longer words (cf. Vitu et al. 1990). Function words provide information about sentence structure and can be neglected as soon as the structure is clear (Müsseler 2003: 604).

3 A linguistic perspective on the reading process

Discourse processing is often considered to consist of three levels: 1) the surface level, 2) the propositional or textbase level (construction of propositions and their relationships), and 3) the situation or mental model level (van Dijk & Kintsch 1983). The surface level contains only the form of what has been read. The textbase level involves understanding the underlying meanings of what has been read. Finally, at the situation model level, the reader connects the information that has been read with prior knowledge in order to build inferences (van Dijk & Kintsch 1983). In our speech-to-text interpreting data, the regressions seem to be related to processing at the textbase level. That is, the regressions show which items the reader needs in order to construct a coherent meaning (cf. also Kintsch 1988; 1998). This is because, on the one hand, our readers did not only see the form of what had been read (the ‘surface level’), but they were also reading in order to understand the meaning of the text (the ‘propositional or textbase level’), and on the other, connecting information that has been read with prior knowledge (the ‘situation model level’) is a cognitive process that is not reflected by eye movements.

According to the Competition Model, a theory of cross-linguistic sentence processing, people take into account several cues contained in the

sentence context (MacWhinney & Bates 1989). These cues include such features as word order, morphology, and semantic characteristics, and are used to compute a probabilistic value for all possible interpretations. Then the interpretation that has the highest likelihood is chosen (MacWhinney & Bates 1989). Our hypothesis is that the gaze behaviour of the reader shows which cues are relevant for understanding the meaning of the text.

The purpose of the present study is qualitative in nature: that is, through analysing regression clusters, we aim to clarify the reading process of dynamic text in speech-to-text interpreting. In addition, we examine the parts of speech of the first and the second landing points of regressions during the reading of dynamic text in letter-by-letter presentation format. The first landing point is the first word on which the regression lands. The second landing point is the second word on which the regression lands – that is, it is the landing point of the saccade subsequent to the first regression. The second landing point can be both forward and backward in terms of reading direction. These were not separated in the quantitative analyses, but they were taken into account in the qualitative analyses.

4 Data and methods

4.1 Data

In the experiment, the participants read a dynamic text on a standard computer monitor. The text was a short extract from the outcome of a speech-to-text interpreting process in which a professional speech-to-text interpreter transformed a spoken conference-like presentation in Finnish into written format using the speech-to-text interpreting tool Sprintanium (Špakov 2011). The interpretation was first produced in a live situation, and afterwards rendered at a real-time pace on the screen in letter-by-letter format. The input of the interpretation was a prepared talk, and although it was freely spoken, the clause structures of the text reflect written language. Furthermore, speech-to-text interpretation tends to be more formal than the oral source text, even if the written output appearing on the screen is supposed to correspond to the spoken input as closely as possible, (for example, pronouns and particles tend to be omitted, see Tiittula 2006). Since the experiment focused on reading, the video of the original talk was not shown.[2]

[2] The setting resembles a remote interpreting situation.

Ten participants took part in the experiment, all of whom had normal or corrected-to-normal vision. The average age of the participants was 29.6 years, with a standard deviation (SD) of 11.14 and an age range of 21–51 years. They were all either members of the university staff or students; they were not clients of speech-to-text interpreting.[3] They reported computer use of an average of 5.6 hours per day with a SD of 2.27 and a range of 2–8 hours.

A Tobii T60 remote eye-tracking device was used to track the participants' gaze on its integrated 17-inch TFT colour monitor (with 1280 x 1024 pixels resolution). Tobii Studio eye-tracking analysis software was used to collect the eye movement data. We also used the software for the observational analysis of eye movements.

4.2 Procedure and design

At the beginning of the experiment, all the participants were informed about the test procedure and a background questionnaire was carried out in order to collect information on the participants' education, age, and work experience, etc. We also provided a post-test questionnaire including some questions related to the text and the user's experience of reading the text. The participants were informed about the post-test questionnaire at the beginning of the test in order to motivate them to read the text carefully.

The eye tracker was then calibrated for each participant's eyes. The distance between the eye-tracking monitor, where the text appeared, and the participant was about 60 cm. The stimulus consisted of one short text, which can be seen in Figure 2, at the end of the next section. The total number of words in the test text was 156. The number of content words was 89 (57.1%), and the number of function words 67 (42.9%). The number of nouns was 46 (29.5%).

[3] Because the clients of speech-to-text interpreting are late deafened or hard-of-hearing, many of them are older people. In order to get reliable eye movement data, the current study investigated able bodied participants. However, we conducted a follow-up experiment with a group of hard-of-hearing subjects. There, we found it challenging to obtain eye movement data from the eye tracking system for participants over 65 years of age with thick extraocular muscles. For example, one participant had to push back the extraocular muscles with his fingers to allow the eyes to be tracked.

4.3 Eye movement data and regression landing points

The eye movements of the test participants were detected using an eye-tracking device. Slow motion video recordings of the eye movement data were carefully examined to detect the fixation points and the regression landing points of the words. In reading, the properties of the words fixated on (e.g. word frequency, word length) have been found to influence fixation duration (Liversedge et al. 2011). Prolonged fixations usually indicate more demanding cognitive processing. However, in the present study we were unable to use fixation data in our analysis. A typical velocity-based fixation algorithm considers two gaze points as belonging to the same fixation if their distance is below a specified threshold value. In the reading of static text, gaze jumps ahead in steps of typically 7–9 characters (Rayner 1998: 375), which makes it easy to distinguish fixations from each other. However, the reading process is fundamentally different in our study, in which dynamic speech-to-text interpreted text was presented in letter-by-letter format where the gaze followed the gradual appearance of letters on the screen. In such a context, the two consecutive data points produced by the eye tracker are relatively close together, making it impossible to distinguish fixations from one another. Indeed, one may question whether reading in this case is based on usual fixations at all, as it more closely resembles the smooth pursuit of emerging text (Räihä et al. 2011).

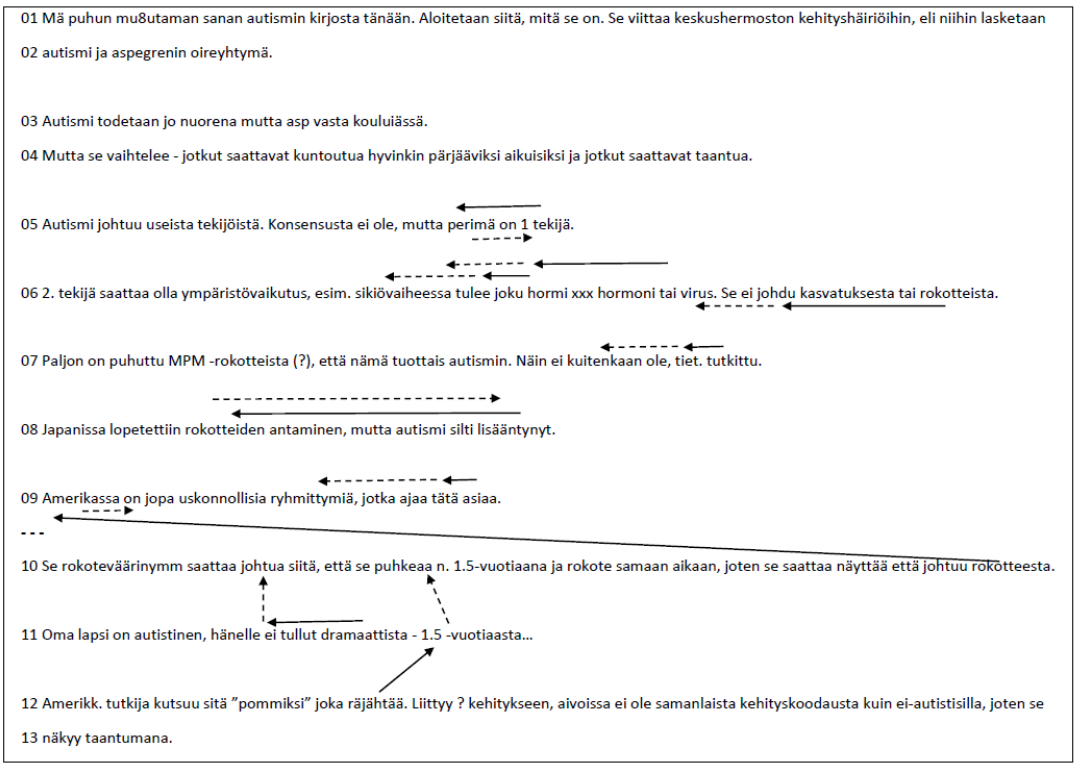
Kruger & Steyn (2013) have also noted the problem of using the standard fixation-based analysis in connection with dynamic text, and they suggest a new metric, a reading index for dynamic texts in subtitling, assuming that gaze data can be reliably classified into fixations and saccades. However, this was also unsuitable for our purposes. Therefore, we adopted a different approach, choosing to consider the number of regressions as an eye movement metric. Regressions have been used in a number of eye-movement studies. For instance, Sanders & Stern (1980) also used regression to study the effects of text characteristics, and Ashby et al. (2005) found that regression reflected the reading proficiency of readers. Furthermore, for dynamic text Specker (2008) used regression as an additional metric to support the fixation-based analysis of eye movements in subtitles.

On the basis of the video observation of eye movements, we marked several regression landing points. In order to avoid complicated and densely populated fixation points, we reprinted the landing points on the

stimuli as shown in Figure 2, with the first two regression landing points as the maximum in a row. Figure 2 thus presents some examples of the regression landing points in our data. The arrows with a solid line are used to indicate the first landing points, and the arrows with a dotted line are used to indicate the second landing points.[4] After that, we classified the first and second landing points of the regressions of gaze according to the part of speech of the word in question.

As mentioned earlier, regressions are points where the eye movements of the subject show that s/he is rereading a part of the text. Regressions may occur when the speech-to-text interpreter pauses and no new text is visible, allowing the reader time to check the overall meaning of the text s/he has read. Nevertheless, regressive eye movements also occur in places without pauses, thereby indicating processing difficulties. In these cases, we can assume that the reader regresses until the problem is solved. These different situations (that is, whether or not there was a pause) were not separated in the quantitative analyses, but they were taken into account in the qualitative analyses.

Figure 2. Examples of regression landing points



[4] The line numbers were added to the pictures afterwards in order to facilitate reference to the examples in the text.

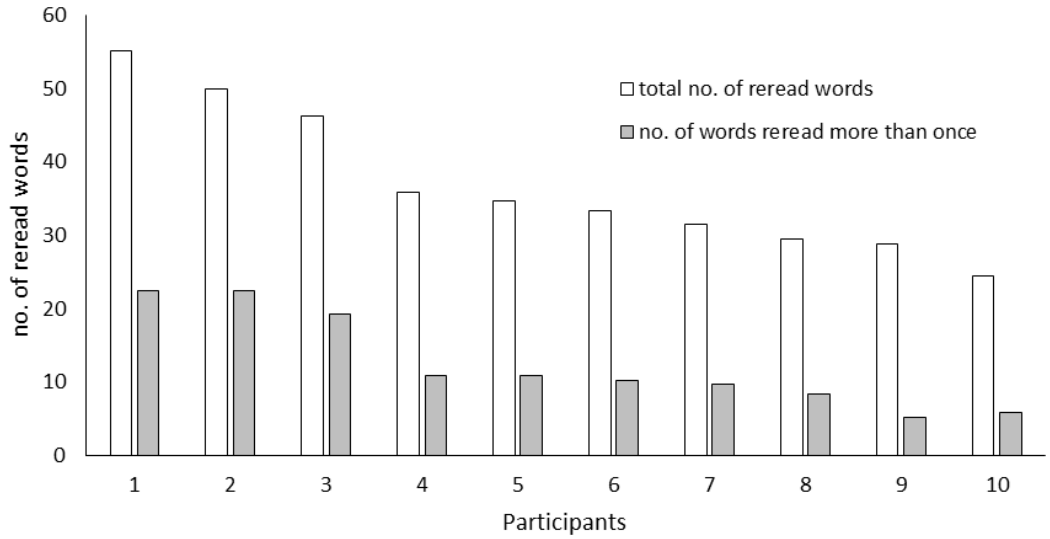
5 Analysis and results

Eye movement videos from each participant for the first 4.5 minutes of reading were used in the analysis, this being the point at which the page began to scroll to allow continued reading. As mentioned earlier, a careful observational analysis was carried out in order to identify both the words from which the regressions or rereading started and, at the same time, the words on which the regressions landed.

5.1 Eye movements in reading speech-to-text interpreted text

All the participants read speech-to-text interpreted text that appeared letter-by-letter. As we were unable to analyse the data by means of fixation duration or fixation count (typical eye movement metrics), we continued our investigation by concentrating on the number of regressions or rereadings by each individual participant. On the basis of the regression landing points, we calculated the number of reread words on the text. Figure 3 presents the total number of reread words for each participant along with the number of words reread more than once. As can be seen, we found variation in reading among the participants in respect to the number of reread words, with participant 1 rereading almost twice as much as participant 10.

Figure 3. The number of reread words for each participant



Our stimuli consisted of speech-to-text interpreted text containing abbreviated words and spelling errors. We found that the frequency of rereading misspelled or abbreviated words was significantly higher than the frequency of rereading the other words in the text. A paired samples t-test produced a statistically significant result in this regard, with $p < .01$, $t = 3.891$ and $df = 9$. Mistyped and abbreviated words are, however, a heterogeneous group. For example, established abbreviations (e.g. *esim.* for *esimerkiksi* 'for instance') are presumably easier to process than the complete word, whereas ad-hoc abbreviations may cause more difficulty. Nevertheless, in order to investigate this issue in greater depth, we need more data.

On the other hand, we also observed a high density of regressions beginning at the end of sentences. A paired samples t-test showed that the number of regressions starting from the last word of a sentence was significantly higher than the number of regressions starting from words in other positions in the sentence ($p < .001$, $t = 13.56$ and $df = 9$).

5.2 Analysing regression landing points

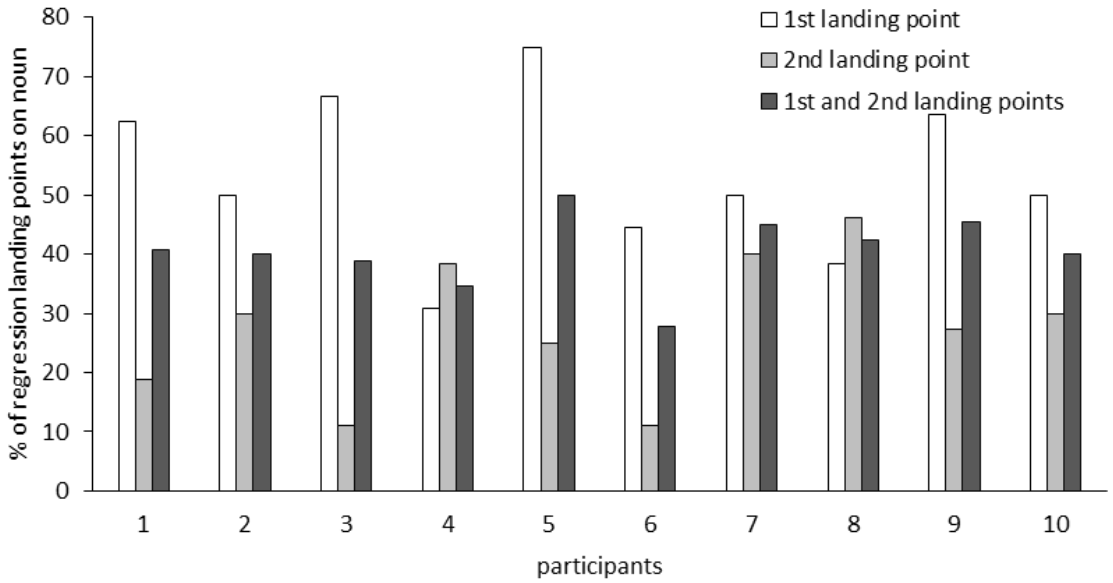
As mentioned earlier, we examined the words at the first two regression points, with our data consisting of a total of 109 regression clusters. All ten informants were represented in the regression cluster data, as well as in all the other figures provided in this article. Analysis revealed individual differences between participants in the number of regressions. The number of regression clusters per participant varied from 8 to 16, with the average number of regression clusters per participant being 10.9.

We analysed the first and second landing points of the regression clusters, with the sum of the first and the second landing points being 218 (= 109 + 109), by sorting them according to parts of speech.

When we considered both the first and the second landing points of the regressions together, we found that the first or the second landing point was a noun in 74.3% (81) of cases, even though only 29.5% (46) of all words in the data were nouns.

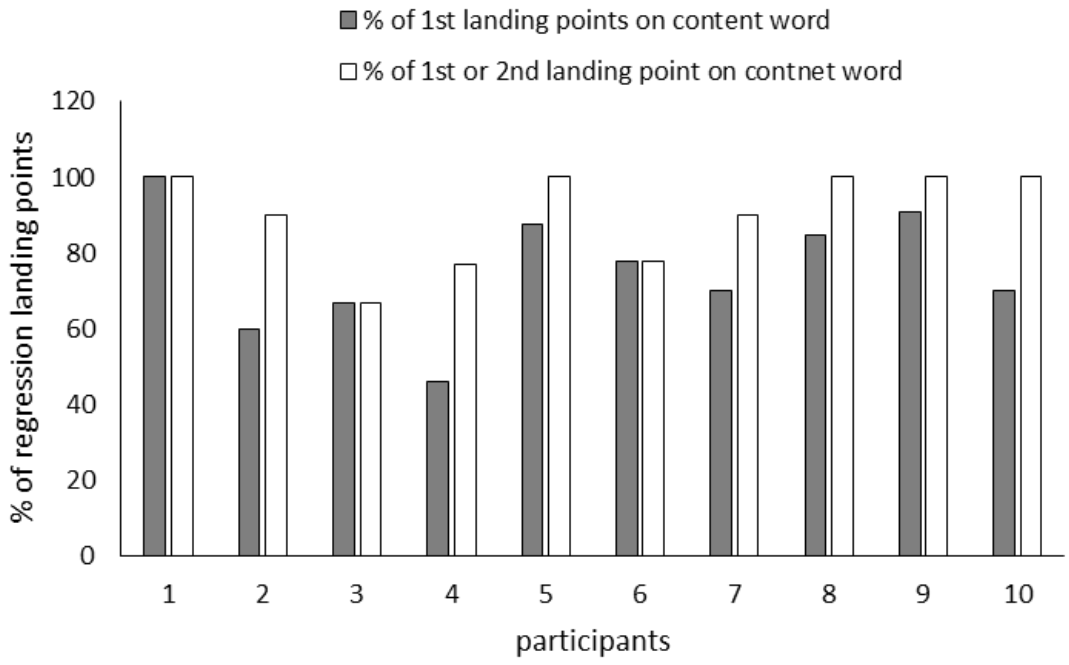
Figure 4 below presents the percentage distributions for first and second landing points involving nouns for all the participants.

Figure 4. Percentages of regression landing points involving nouns



When the first or second landing point was not a noun, it was most likely to be a verb or an adjective. In 90.8% (99) of cases, the first or second landing point was a content word. This is interesting because only 57.1% (89) of the words in the data were content words. Figure 5 presents the distribution of first two regression landing points on content words for all the participants.

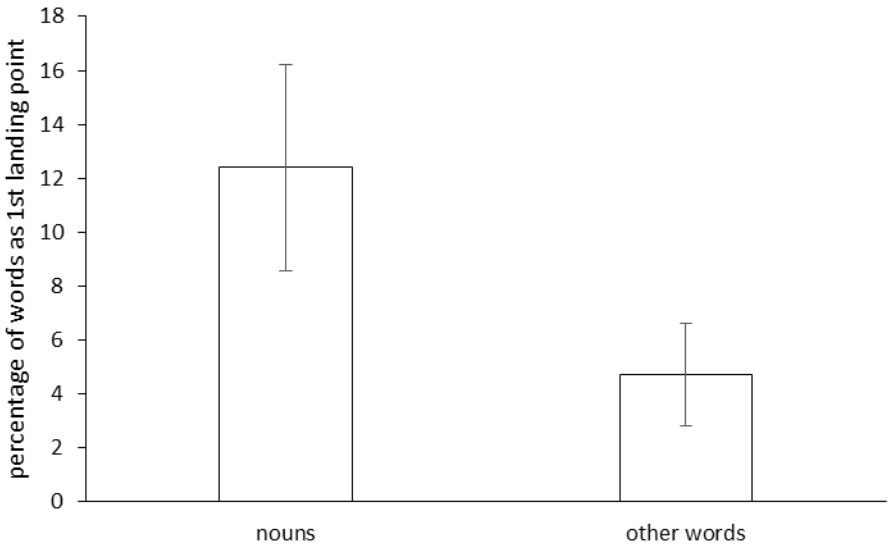
Figure 5. Percentages of regression landing points on content words



Function words, in turn, were rarely regression landing points: the first or the second landing point was a function word in only 9.2% (10) of cases, even though 42.9% (67) of the words in the data were function words.

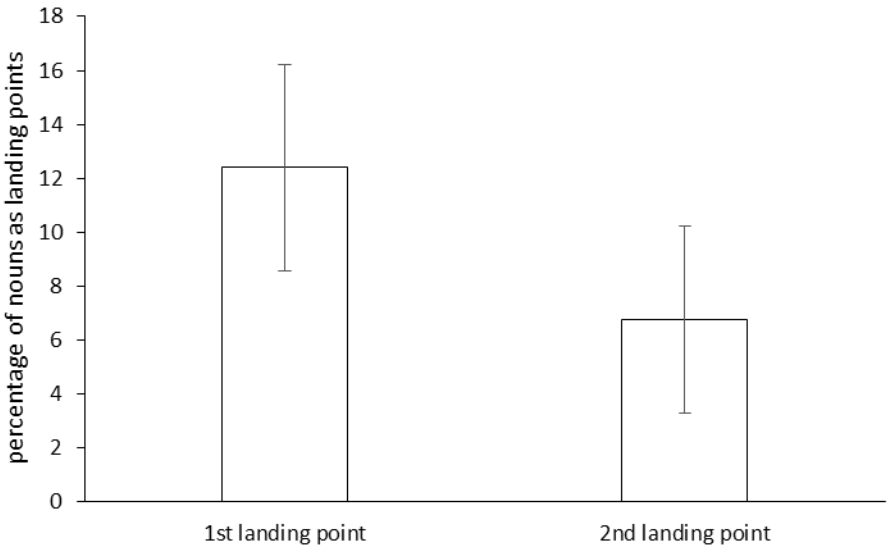
Although less than 30% of the words in the text were nouns, a one-way ANOVA found that the first regression landing point was more likely to occur on a noun than on any other category of words. The finding is significant, with $p < .001$ and $F_{1,19} = 31.937$ (Figure 6). Average percentage number of nouns as a first regression landing point is 12.4 while the number is 4.7 for the other words with variances 14.8 and 3.6 respectively.

Figure 6. Percentage of nouns and other words at the first regression landing points by participant, with standard deviation error bars



In contrast, for the second landing points, nouns were no longer the primary targets, thus demonstrating that in regressive reading the first landing point is more likely to be noun than is the second landing point (Figure 7). This difference was statistically significant ($p < .01$, and $F_{1,19} = 11.929$). Average percentage number of nouns as a second landing point is 6.7 with variance 12. However, if we combine both the first and the second landing points, we still see that nouns are the most significant targeted words as landing points ($p < .001$, and $F_{1,19} = 78.193$).

Figure 7. Percentage of nouns at the first and the second landing points with standard deviation error bars.



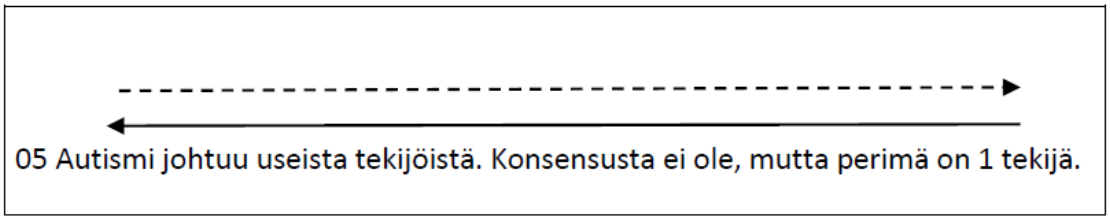
One explanation for the high proportion of nouns as primary landing points could be word length (cf. Vitu et al. 1990). In our data the mean word length of nouns was 9.2 characters, compared to 7.9 characters for other content words and 3.9 characters for function words.

5.3 Linguistic description of regression landing points

We will now present some examples illustrating different situations where regression clusters occur in the whole dataset, including the test results of all ten informants. The situations selected as examples provide a quantitative perspective on the different cases presented in our quantitative analyses. In addition, the aim of the examples is to present a variety of contexts in which regression clusters occur and to find possible explanations for the eye movement. In the linguistic analysis we used both pictures of the regression landing points (cf. Figure 2) and videos showing each participant's eye movements.

In our data, the first landing point of a regression was a noun in 52.3% (57) of cases. For instance, in example 1 (*Autismi johtuu useista tekijöistä. Konsensusta ei ole, mutta perimä on 1 tekijä.* 'Autism is caused by several factors. There is no consensus, but genotype is 1 factor.', line 05), the first landing point was a noun. As the arrow in Figure 8 shows, the gaze first went to the word *autismi* ('autism'), which is a noun. Then it returned to the starting point – that is, to the word *tekijä* ('factor'), which is also a noun.

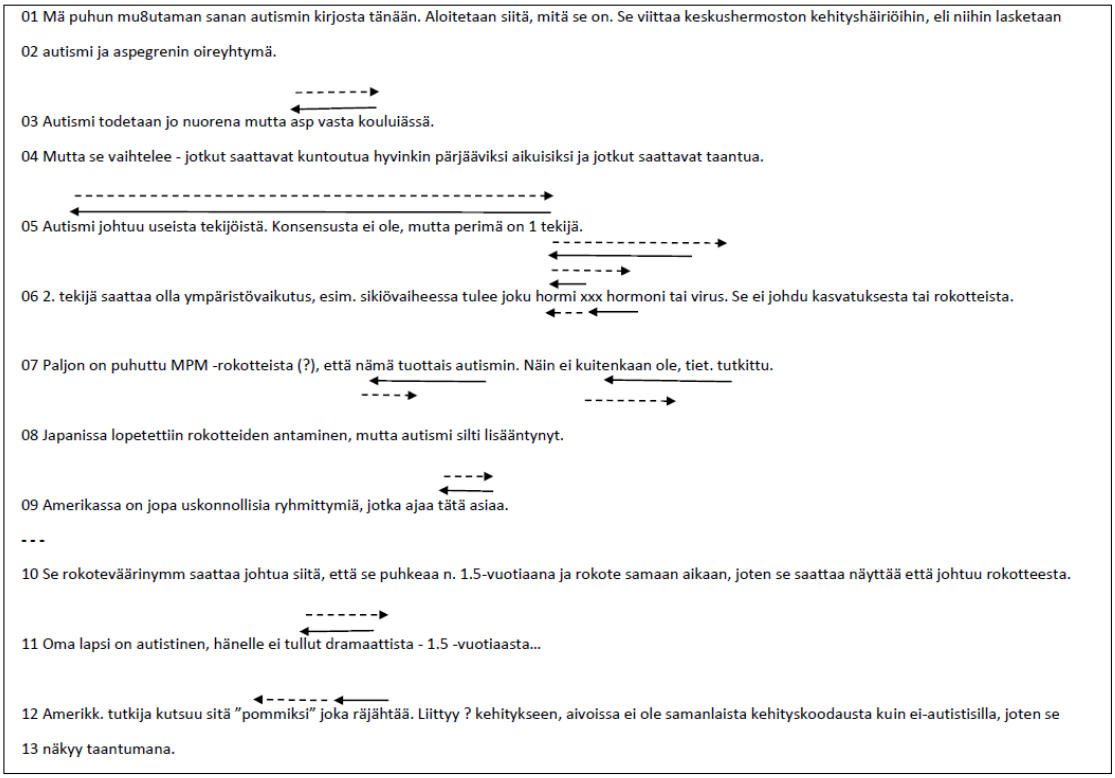
Figure 8. Example 1



The context of Example 1 is given in Figure 9.

After the last word, *tekijä* 'factor', a longer pause occurred, and the test subject stopped reading and fixated on 'factor'. The pause continued, with no new text visible, so the gaze jumped to the beginning of the line, landing on the first word ('autism'), which is a noun as well as the subject of the sentence and the topic of the whole line. From 'autism' the gaze returned to the end of the line, to 'factor'. Here, the reader seemed to be trying to establish a coherent representation or confirm the overall meaning of the sequence in which the missing link must be inferred between the first and the second sentences ('Autism is caused by several factors.' and 'There is no consensus, but the genotype is 1 factor.', line 05). The eye movement from the beginning to the end of the line can, however, have another explanation: the reader may have been checking to see whether the text would continue. However, on the video it can be seen that the text did not continue, and the gaze jumped once more to 'autism' and from there to the beginning of the next line, where new text began to appear.

Figure 9. The context Example 1



The first landing point was the closest noun in 33.0% (36) of cases. In Example 2 (*Aivoissa ei ole samanlaista kehityskoodausta kuin ei-autistisilla.* ‘In the brain there is not the same kind of developmental coding as in the brain of non-autistic individuals.’, line 12), regression began from the word *samanlaista* (‘the same kind of’), and the first landing point was the word *aivoissa* (‘in the brain’), which is the closest noun. After that, the gaze returned towards the starting point of the regression and then passed it (cf. Figure 10). Next, the gaze stopped at the compound *kehityskoodausta* (‘developmental coding’), which is also a noun.

Figure 10. Example 2

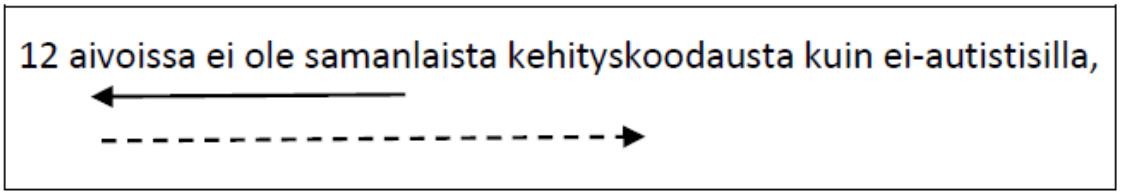
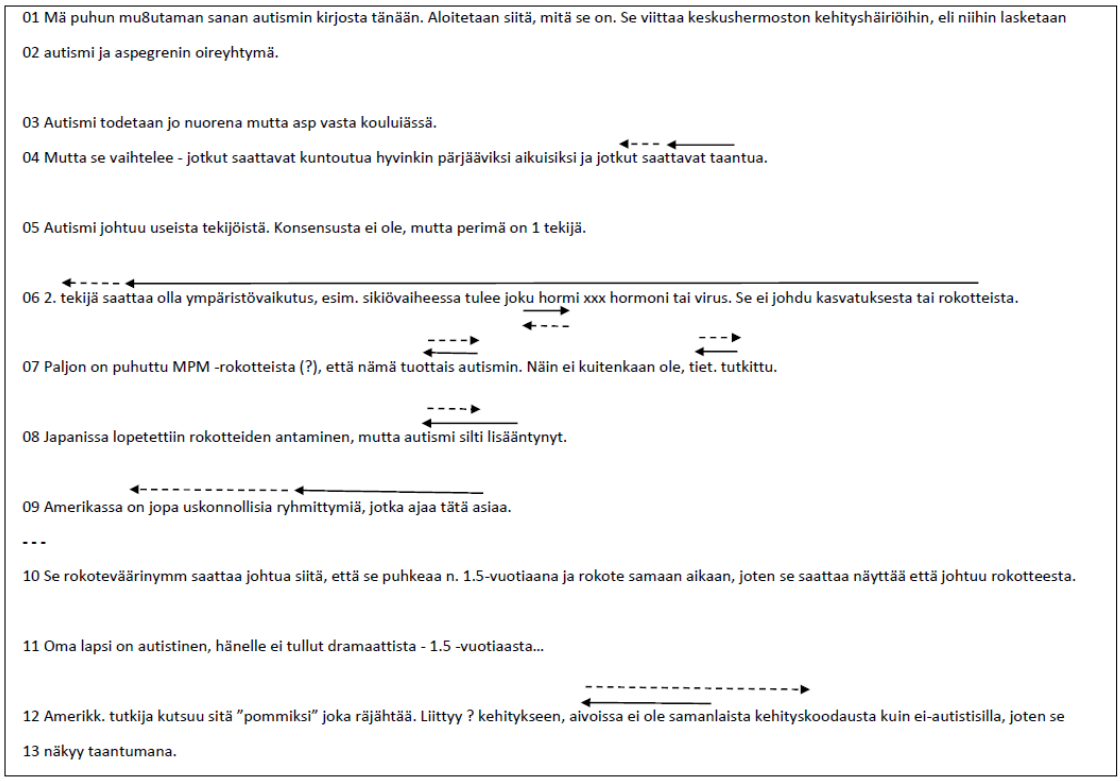


Figure 11 shows the context of Example 2.

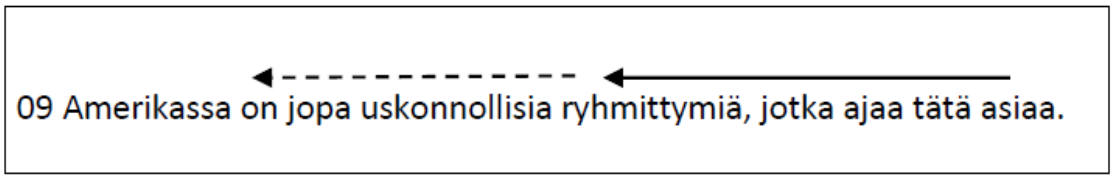
Figure 11. The context Example 2



The word *samanlaista* (‘the same kind’, line 12) needs a head word, which was sought in the nearest preceding noun, *aivoissa* (‘in the brain’, line 12), the landing point of the regression. This noun cannot be the headword because it is in the inessive case, which expresses location. Thus, the gaze returned to the starting point, followed the emerging text, and stopped at the next noun, which is the head word of ‘the same kind’. The difficulty of this sentence is due to its lack of coherence: because of omissions, the previous sentences in the line are neither connected nor linked to the prior text.

In Example 3 (*Amerikassa on jopa uskonnollisia ryhmittymiä, jotka ajaa tätä asiaa.* ‘In America there are even religious groups that champion this cause.’, line 09), the first landing point was the word *ryhmittymiä* (‘groups’), which is also a noun (cf. Figure 12). After the first landing point, the regression continued in the same direction until it reached the auxiliary verb *on* (‘are’), appearing three words earlier.

Figure 12. Example 3



The context of Example 3 is presented above in Figure 11.

At the end of the line, a long pause occurred during which the described eye movements took place. The last words (*tätä asiaa*, 'this cause/issue') are anaphoric, referring to something earlier in the text. The regressive eye movement stopped at the closest noun (*ryhmittymiä*, 'groups'), which is the head word of the relative clause. According to Staub & Rayner (2007), short or frequently occurring words (such as *jotka*, 'that', and *ajaa*, literally 'drive' in the relative clause) can be skipped, whereas unpredictable words are fixated on for longer. The phrase *uskonnollisia ryhmittymiä* ('religious groups') can be regarded as unpredictable in the context of autism, especially because the sentence is not explicitly connected to the prior sentence ('In Japan, vaccinations were stopped, but autism has still increased.'). From this point the gaze regressed further, landing on the auxiliary verb *on* ('are'), which is one of the most frequent words and very short; the long fixation on this place can be explained by the linguistic processing of the overall meaning of the sentence. Even though the meaning of the lexical entities have been processed, constructing a coherent discourse representation can be difficult. The video showed that after this the gaze moved further back to the adverbial phrase *Amerikassa* ('in America'), then returned to the verb of the relative clause ('champion'), where it stopped. The gaze then continued to the end of the sentence and jumped to the beginning of the new line as soon as new text began to appear.

In Example 4 (*Se viittaa keskushermoston kehityshäiriöihin, eli niihin lasketaan autismi ja aspegrenin*[5] *oireyhtymä*. 'It indicates developmental disorders of the central nervous system, that is they include autism and Asperger's syndrome', lines 01–02), the first landing point was the word *aspegrenin* ('aspegren's'), which is the closest noun to the starting point *oireyhtymä* ('syndrome') (cf. Figure 13). (The first landing point was also the closest noun in Examples 2 and 3.) After the word *aspegrenin*, the gaze returned to the starting point of the regression.

[5] Here the interpreter makes a mistake: the speaker said Asperger's, not aspegren's.

Figure 13. Example 4

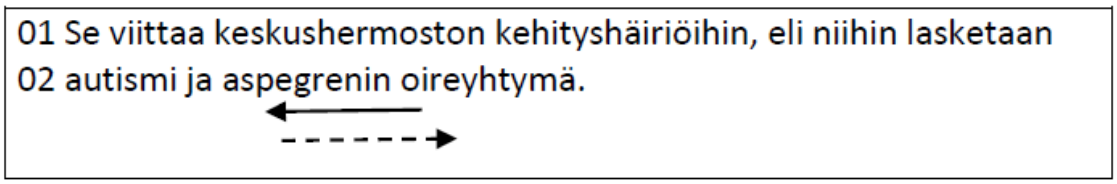
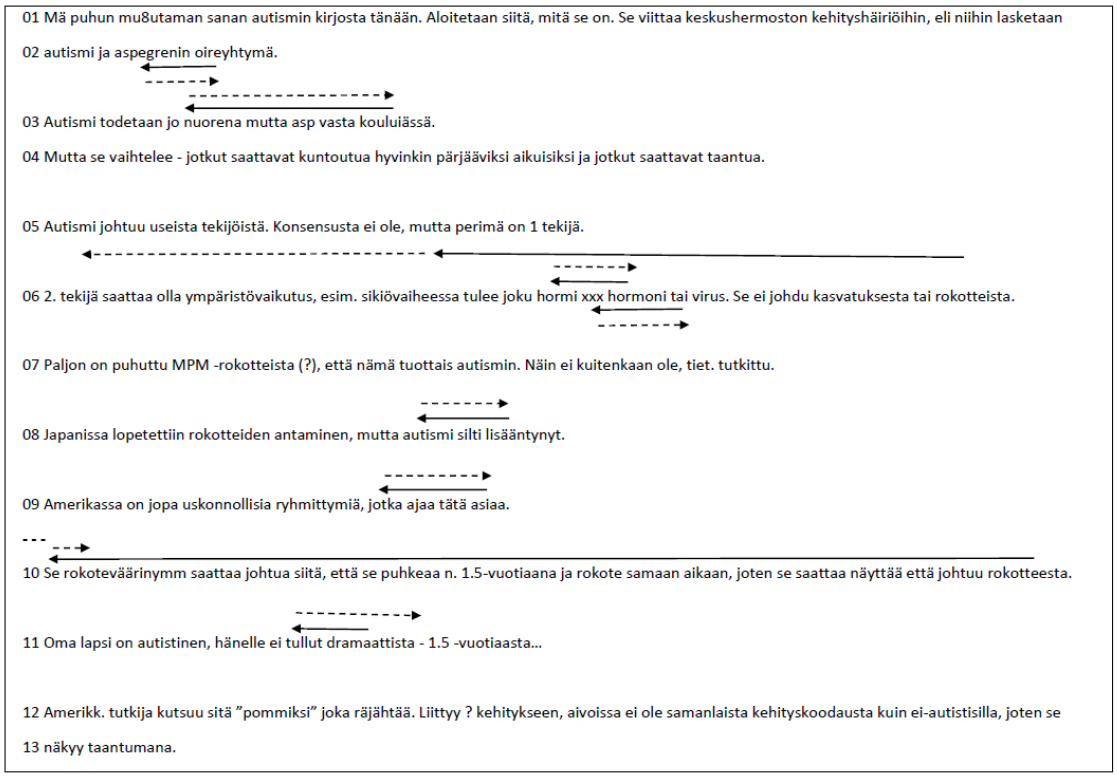


Figure 14 shows the context of Example 4.

Figure 14. The context Example 4

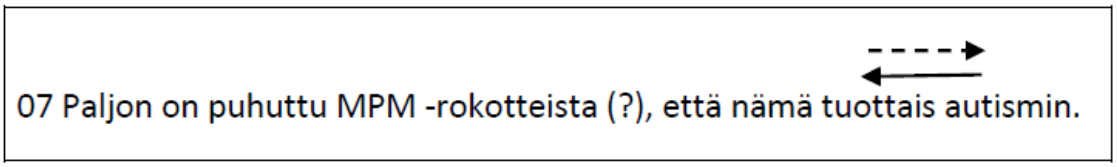


The object of the last clause consists of a noun (‘autism’) and a noun phrase (*aspergrenin oireyhtymä*, ‘aspergren’s syndrome’, line 02). ‘Autism’ is the topic of the talk and part of the theme of the last sentence; accordingly, it should be easy to process, whereas ‘aspergren’s’ seemingly caused difficulties, as it is a medical term, an infrequent word and, additionally, mistyped. The last word, *oireyhtymä* (‘syndrome’), is a compound (‘symptom’ + ‘group’). According to Hyönä & Pollatsek (1998; also Pollatsek & Hyönä 2005), the frequency of the first morpheme influences fixation. In our example, the reader seems to have been able to anticipate the end of the compound, since s/he did not wait for its appearance but

regressed from *oireyh-* to the attribute (‘aspergren’s’), a word which must be understood in order to comprehend the whole noun phrase.

The first landing point was a content word in 76.1% (83) of the cases. In the fifth example (*Paljon on puhuttu MPM -rokotteista (?), että nämä tuottais autismin.* ‘There has been a lot of discussion about MPM vaccines (?) that they would cause autism.’[6], line 07) (cf. Figure 15), the first landing point was the verb *tuottais* (‘would produce’, i.e. ‘cause’), which is a content word as well as the closest word to the starting point of the regression. This is the case in 43.1% (47) of the regressions.

Figure 15. Example 5



The context of Example 5 is presented in Figure 11.

In Example 5, the regressive eye movement took place from the last word of the clause (‘autism’) to the previous verb *tuottais* (‘would produce’). The subject of the clause is *nämä* (‘these’), which refers to vaccines. Vaccine/vaccination less frequently collocates with ‘produces’ than, say, ‘protects’,[7] and thus the clause is less predictable, which perhaps explains the regression.

Example 6 (*Amerikk tutkija kutsuu sitä “pommiksi” joka räjähtää*, ‘An American researcher calls it a “bomb” that will explode’, line 12) presents another instance where the first landing point was the closest content word. Here, the regression started from the word *räjähtää* (‘explode’) and first landed on the noun “*pommiksi*” (‘a “bomb”’), which is the closest content word and also the closest noun. The second landing point was the verb *kutsuu* (‘calls’), appearing two words earlier (cf. Figure 16).

[6] This sentence also contains a small mistake by the interpreter, because the speaker is obviously talking about MPR vaccines and not about MPM vaccines.

[7] E.g., a simple Google search produces 7860 hits for the collocation *rokote suojaa* ‘vaccination protects’, 1120 hits for *rokote aiheuttaa* ‘causes’, and only 137 hits for *rokote tuottaa* ‘produces’.

Figure 16. Example 6

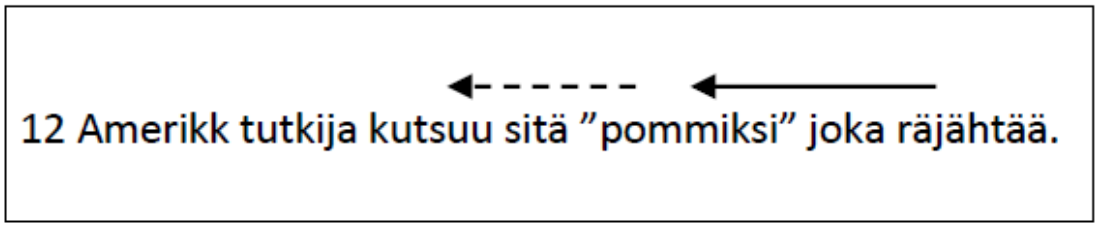
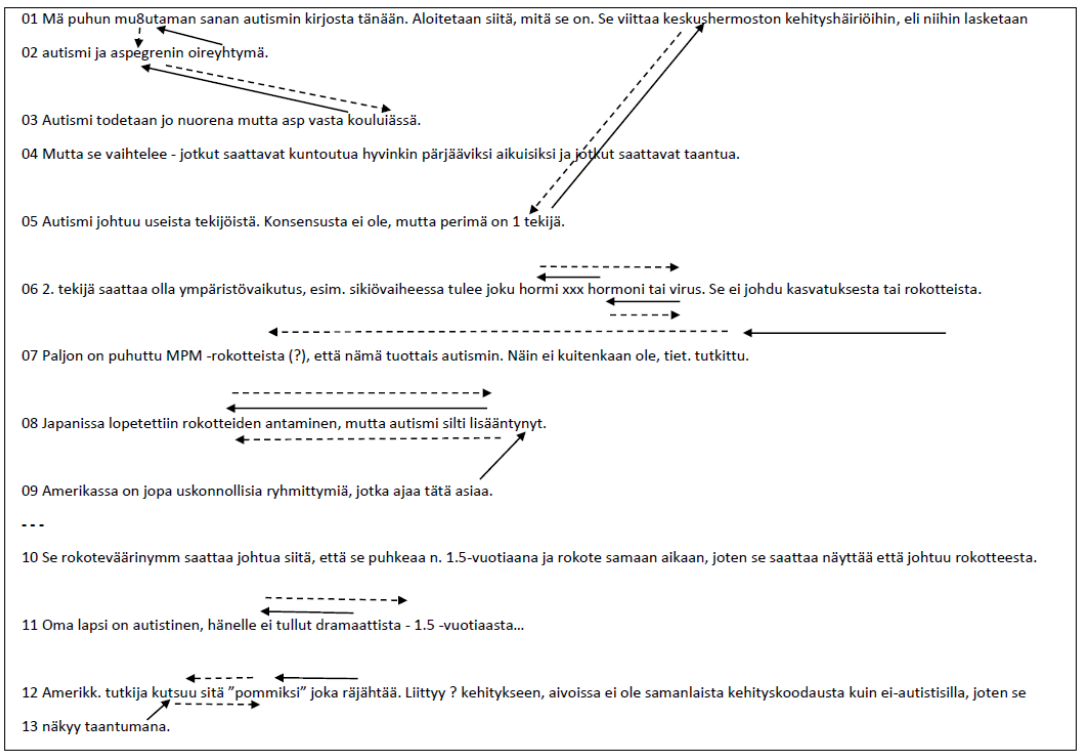


Figure 17 presents the context of Example 6. Prior to the regression, the relative pronoun *joka* (‘that’) was misprinted and corrected, causing a longer fixation on the clause. The end of the predicate was not yet visible (but was presumably predictable) when the regression started. It landed on the head word *pommiksi* (‘a bomb’), the closest content word. Though the noun is in quotation marks, indicating metaphoric use, constructing a coherent discourse meaning can still be difficult, since due to omissions the sentence was not connected with the previous text. From the noun, the regression continued to the verb *kutsuu* (‘calls’), which confirms the metaphoric use of ‘bomb’. At this point, the processing of the sentence seemed to be complete, since, as can be seen on the video, the gaze moved to the beginning of the next sentence.

Figure 17. The context Example 6



6 General findings and conclusions

Rayner (1998: 375) observed that content words are fixated on more often (85% of the time) than function words. Our present analytical approach, from a linguistic perspective, supports these findings. A study by Sharmin et al. (2015) found three different types of gaze behaviour among the participants in reading dynamic text on the basis of fixation frequency and rereading. Although there exists variation in reading behaviour, we found consistency in regression landing points. We analysed fixated words in rereading, hence regression landing points. Our results demonstrated that in reading speech-to-text interpreted text, the first and second landing points in regressions are mostly content words (in 90.8% cases), even though the proportion of content words in the whole data set was only 57.1%. Therefore, the same lexical hierarchy that concerns fixations seems to apply to the landing points of regressions.

O'Grady's findings on language acquisition (1987) suggest that nouns are 'primary' elements of language because they are characterized by autonomous meaning and function. Their referents are perceptively distinct and coherent, whereas verbs, for instance, have a more fragmented meaning. The referents of verbs are not 'present' in the perceptive field as concretely as the referents of nouns (Gentner 1982; Maratsos 1991; Caselli et al. 1995). Therefore, O'Grady (1987) considers verbs and adjectives to be 'secondary' elements. They depend on a relationship to at least one primary element. Function words, in turn, are 'tertiary' elements, because they depend on a relationship to at least one secondary element. The same lexical hierarchy that characterizes language acquisition seems to apply to our data. Thus, our test subjects sought primary and secondary elements of language in order to construct the meaning of what they had just read. Nouns, which are primary elements, were the most likely landing points of regressions.[8] Nouns were, however, longer words than other content words and function words, which may also have influenced the results. Nevertheless, the landing points of regressions reflect the cognitive processing of language through which meaning is constructed.

Speech-to-text interpreted text is dynamic text which can be displayed through scrolling, as was the case in our experiment. Regressions typically occur during pauses, and pauses enable rereading. Speech-to-text

[8] Furtner's & Sachse's (2007) results are similar to ours concerning the importance of the noun for the improvement of text comprehension.

interpreted text is also a special kind of dynamic text because (depending on the methods and tools) omissions and typing errors frequently occur. Our pilot study shows how this affects reading and impedes processing of the text. Omissions lead to incoherence; in many cases, the connection of an element to the previous text was unclear. Accordingly, lack of coherence seems to be a typical cause of regressions. Further possible causes are difficult concepts, infrequent words and unpredictable collocations. Misspellings and ad-hoc abbreviations may also cause regressions and slow the speed of text processing.

Due to the difference between speech rate and writing speed, speech-to-text interpreters are under the constant pressure of time. Accordingly, condensation of the message is necessary. Consequently, many words are omitted or if not omitted, the interpreter risks finishing sentences with increasing delay. According to our earlier research, omitted words are often particles, connectors and pronouns, that is, omissions tend to follow the lexical hierarchy. The results of our pilot study indicate that this can be a reasonable condensation strategy. By mainly reducing tertiary language elements, the interpreter can speed up typing and try to render the primary elements.

The results may also have implications for other types of dynamic texts used in different forms of translation, media presentations and computer-mediated communication. Consciousness of lexical hierarchy may help text producers improve the presentation of dynamic texts or condense the spoken message. The presentation of dynamic texts could be improved, for example, by highlighting the primary elements and by only reducing tertiary language elements.

Acknowledgements

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Squibs

Babanki negation patterns

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Abstract

There are languages in the world in which the normal negation (NEG) construction includes a discontinuous morpheme or a double negative. In many of such languages with SVO structure, the first NEG morpheme precedes the verb while the second follows it, preferably occupying the end of the clause. Dryer's (2009) survey reports a number of such languages in Central Africa with different characteristics. One of the languages, Hausa, employs double NEG only some of the time. Babanki, a central Ring Grassfields Bantu language of Northwest Cameroon presents a case close to Hausa but different in that the second part of the standard negation construction is optional and can always occur except in negative questions where the question particle occupies the end of the clause preventing it from occurring. In central Ring, Babanki shows a unique pattern using the same discontinuous morpheme *kó`…bwen* for standard negation in all tenses/aspects.

Keywords: Babanki, Grassfields, negation, patterns

1 Introduction

This study describes particles that are used to negate a clause in Babanki, a central Ring Grassfields Bantu language of Northwest Cameroon.[1]

[1] Native speakers prefer to use Kejom when referring both to the language and the two villages where it is spoken but I have chosen to use Babanki, the administrative name by which the language and the people are widely known.

VERTAISARVIOITU
KOLLEGIALT GRANSKAD
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Negation patterns have been described in five of the seven central Ring languages, namely, Kom (Shultz 1997), Mmen (Möller 2012), Oku (Nforbi & Ngum 2009), Bum (Akumbu & Mbong 2007) and Kuk (Kießling 2016), leaving out only Babanki and Kung. The discussion of Babanki negation particles in this paper is therefore meant to contribute to the current typological studies of negation in Grassfields Bantu.

Negation is the act of reversing the truth value of a proposition. According to Payne (1997: 282) the function of negation is to negate the clause which asserts an affirmation of an event, situation, or state of affairs. While many of the world's languages use a single negation marker for this purpose, there are some in which the normal negation construction includes a discontinuous morpheme or a double negative, e.g. Bafut (Chumbow & Tamanji 1994; Tamanji 2002). In many of such languages with SVO structure, the first negation morpheme (NEG1) precedes the verb while the second follows the verb, preferably occupying the end of the clause. Dryer's (2009) extensive survey of negation in some languages of Central Africa identifies many with double negators with some of them, such as Hausa, employing double negation only some of the time. Babanki, not mentioned in Dryer's work, singles out itself in that the second negation morpheme (NEG2) is generally optional unless the question particle *à* or the emphatic marker *lɔ́* occupy the end of a clause, preventing the (optional) negation morpheme from occurring. It appears that the only function of NEG2 is to reinforce negation. In Section 2 of this paper, I present some of the languages of Central Africa with double negators as well as discuss how negation works in other central Ring languages. In Section 3, I describe negation in Babanki and then mention briefly the relationship between negation and the question particle in Section 4. An attempt is made in Section 5 to examine Babanki negation in relation to Jespersen's Cycle and this is followed by a conclusion to the study in Section 6.

2 Negation in neighboring languages

It has been demonstrated that in Central Africa, there are "languages in which the normal construction for negation is a double negative, with one morpheme preceding the verb (possibly prefixed) and one following the verb (possibly suffixed)" (Dryer 2009: 315). This is the case, for example, in Kanakuru, Hausa, Mupun (West Chadic; Nigeria); Ma, Pambia (Adamawa-Ubangi, Niger-Congo; DR Congo); Bongo (Bongo-Bagirmi, Nilo-Saharan; Sudan); Ewe (Kwa, Niger-Congo; Ghana, Togo); Babungo

(Bantu; Cameroon); Amo (Kainji, Niger-Congo; Nigeria) which can be described as SNegVONeg. The following examples from Dryer (2009: 315–316) show the occurrence of double negatives in some of these languages.

(1) Babungo
ŋwə́ kèe gə̀ táa yìwìŋ mə̄
he NEG go.PFV to market NEG
'He did not go to the market.'

(2) Hausa
a. *bàn san sūna-n-sà ba*
NEG.1SG know name-LINK-3SG NEG
'I don't know his name.'

b. *ba nà uwà dà kai*
NEG CONT come with 2SG
'I am not going with you.'

(3) Bongo
a. *ma nja ami a'ji wa*
1SG NEG make thing NEG
'I am not doing anything.'

b. *m-u-yɛ le'ji wa*
1SG-PST-drink beer NEG
'I did not drink beer.'

The data also illustrate that double negation is sometimes obligatory in Hausa (2a) but not always required (2b). In Bongo, double negation is possible (3a) but the first negation morpheme can be left out (3b).

Among central Ring Grassfields Bantu languages of Northwest Cameroon, Babanki appears to be the one with the most reduced system of negation, particularly because tense, aspect and mood (TAM) do not interact with negation. In the other languages of this sub-group, negation is generally influenced by TAM, as illustrated in the following paragraphs.

In Kom, Shultz (1997) identifies four particles that can be used alone or in combination with other negators. One negator, *wi*, is used in present tense (imperfective) constructions, another, *bu*, is used with the past tense (perfect), while a different one, *tɨ́*, is used with the past tense (perfective). In addition, *ka* is used with the future tense to negate imperative

constructions. The negators *bu* and *tɨ* can be used in combination in a past tense construction with present implications conveying the idea of unrealized expectations. Finally, the negators *bu* and *wi* can be used with the morpheme *fi* (which indicates repetition or "do again") and a future tense morpheme to describe a negative finality or certainty.

Mmen has "several different morphemes marking negation", the usage of which "is conditioned by tense, aspect and mood" (Möller 2012: 43). One of the morphemes, *pá'à*, is used with perfective aspect while *và* combines with imperfective aspect. On the other hand, *vàyn* occurs mainly together with the auxiliary *kà'á* 'can' and is used with any tense marker in perfective constructions. *Tà'á* is used to negate optative and conditional sentences while imperatives and hortatives are negated by *kə̀*.

According to Nforbi & Ngum (2009), there are at least eight negation morphemes in Oku. While *bàa* is used in the present and past tenses, covering both perfective and imperfective forms, the interrogative and necessity moods, *jia* is used essentially with the future tenses as well as with possibility and certainty moods. The rest of the negation morphemes in Oku make further subtle distinctions within tense and aspect.

At least three negation morphemes have been found in Bum (Akumbu & Mbong 2007), namely, a discontinuous morpheme *tá…*(*jè*) which combines only with the past tenses to mark negation and *wí*(*jè*) which combines with the present and future tenses. In both cases *jè* is optional because it may occur with *ta* and *wi* or it may be left out completely without changing the meaning of the negative sentence. The third morpheme is *bú* which can combine with present and past tenses to form negative constructions. In other words, negation in the present tense can be achieved by the use of either *wí*(*jè*) or *bú*, in the past tenses by *tá…*(*jè*) or *bú*, and finally, in the future tenses by *wí*(*jè*).

Kießling (2016) illustrates that negation in Kuk is accomplished by a three-way contrast of negators depending on aspect and mood. The verbal proclitic *káʔà ~ kâa* negates the perfective declarative, while the verbal enclitic *wà* negates the imperfective declarative, and the clause initial proclitic *kə̂* marks the prohibitive which is used for the negation of the imperative. Finally, the hortative is negated by *lə̀*.

A common feature of the above central Ring languages is the interaction between negation and TAM. Crosslinguistically, negation is known to interact with TAM and in some languages, e.g. Lamnso (Baertsch 2001) and Mokpe (Tanda & Neba 2006), the use of the negative marker

can even prevent certain tense markers from occurring. The way negation is achieved in Babanki is discussed in the next section.

3 Negation in Babanki

In Babanki, standard negation is expressed by means of a pre-verbal and an optional post-verbal morpheme irrespective of tense and aspect. Babanki can be described as an STVO language because in the verb phrase, the subject marker (S) occurs first, followed by the tense and/or aspect marker (T), the verb root (V), followed by an aspect marker, and then the object (O) as exemplified in (4). It should be noted that Babanki distinguishes eight tenses, namely, an unmarked present tense, four pasts (immediate (P1), hodiernal (P2), distant (P3), and remote (P4)), and three futures (immediate (F1), hodiernal (F2), and distant (F3)).[2]

(4) a. *nyàm tə̀ kùm byí*
nyàm *tə̀ kùm* *byí*
C4.animal P3 touch C9.goat
'An animal touched a goat.'

b. *fə̀nyì fyìfə́ né ↓fáŋ á ŋgə̀ŋ*
fə̀-nyì *fyìfə́* *né`* *fáŋ* *á* *ŋgə̀ŋ*
C19-knife DEM F2 remain PREP C9.house
'That knife will remain in the house.'

Word order in Babanki negative constructions is SNegTVO(Neg). NEG1 comes after the subject marker, is followed by a tense or aspect marker, if present, or by the verb while NEG2 occupies the final position of the clause:

(5) a. *fə̀ɲín fə́ kó ↓fə́ə́* (*bwɛ̀n*)[3]
fə̀-ɲín *fə́* *kó`* *fə́ŋ-ə* *bwen*
C19-bird SM NEG fall-PROG NEG
'The bird is not falling.'

[2] As a native speaker of Babanki, I have provided the data used in this study.

[3] *Bwen* is shown to be underlyingly toneless and occurs with a polar tone, taking the opposite of the preceding tone-bearing unit. In addition, the underlying /e/ is realized as [ɛ] because in Babanki, /e/ and /o/ are realized as [ɛ] and [ɔ] respectively in closed syllables (Mutaka & Chie 2006: 75).

b. *fə̀ŋín fə́ kô fə́ŋ* (*bwɛ̀n*)
fə̀-ŋín *fə́* *kó`* *fə́ŋ* *bwen*
C19-bird SM NEG fall NEG
'The bird hasn't fallen.'

c. *fə̀ŋín fə́ kó jì fə́ŋ* (*bwɛ̀n*)
fə̀-ŋín *fə́* *kó`* *jì* *fə́ŋ* *bwen*
C19-bird SM NEG P2 fall NEG
'The bird didn't fall.'

d. *fə̀ŋín fə́ kó tà fə́ŋ* (*bwɛ̀n*)
fə̀-ŋín *fə́* *kó`* *tà* *fə́ŋ* *bwen*
C19-bird SM NEG P3 fall NEG
'The bird didn't fall.'

e. *fə̀ŋín fə́ kô mfə́ŋ* (*bwɛ̀n*)
fə̀-ŋín *fə́* *kó`* *N-fə́ŋ* *bwen*
C19-bird SM NEG P4-fall NEG
'The bird didn't fall.'

f. *fə̀ŋín fə́ ↓kɔ́ fə́ŋ* (*bwɛ́n*)
fə̀-ŋín *fə́* *kó`* *á* *fə́ŋ* *bwen*
C19-bird SM NEG F1 fall NEG
'The bird won't fall.'

g. *fə̀ŋín fə́ kó ↓né fə́ŋ* (*bwɛ́n*)
fə̀-ŋín *fə́* *kó`* *né`* *fə́ŋ* *bwen*
C19-bird SM NEG F2 fall NEG
'The bird won't fall.'

h. *fə̀ŋín fə́ kó ↓lú fə́ŋ* (*bwɛ́n*)
fə̀-ŋín *fə́* *kó`* *lú`* *fə́ŋ* *bwen*
C19-bird SM NEG F3 fall NEG
'The bird won't fall.'

As seen, the second negation marker is optional. Apparently, it is only used to reinforce negation because even when left out, the sentences still have negative semantics. This is similar to Bum where the negation morpheme *jè* is optional both in the discontinous marker *tá…*(*jè*) and in *wí*(*jè*). The data in (5) also show that unlike in other central Ring languages where the markers change depending on tense or aspect, the same discontinuous morpheme is used to mark standard negation in all Babanki tenses/aspects.

Apart from *kó`...bwen* (6b), *bwén* (6c) and *kèn* (7c–e) can be used as negative predicative markers (Storch 1999) to express non-existence/unavailability.

(6) a. *fəŋín fə́ díʔ á shə̀*
fə̀-ŋín *fə́* *dìʔ* *á* *shə̀*
C19-bird SM COP PREP here
'There is a bird here.'

b. *fəŋín fə́ kó díʔ á shə̀* (*bwén*)
fə̀-ŋín *fə́* *kó`* *dìʔ* *á* *shə̀* *bwen*
C19-bird SM NEG COP PREP here NEG
'There is no bird here.'

c. *fəŋín fə́ bwén á shə̀*
fə̀-ŋín *fə́* *bwén á* *shə̀*
C19-bird SM NEG PREP here
'There is no bird here.'

It is unclear whether *bwén* (6c) is the same optional NEG2 morpheme that occurs in previous examples. This is so because it does not occupy clause final position and has a high tone irrespective of the preceding tone (see footnote 3 above). However, the fact that it is not repeated as NEG2 suggests that it is the same morpheme that moves to ensure that negation is marked morphologically in the locality of the verb since *kó`* is absent. The data also show that *bwén* is used only with the present tense and that there is no verb involved.

On the other hand, the morpheme *kèn* combines with *bwen* (7c–e) irrespective of tense/aspect.

(7) a. *tsɔ̀ŋ tə̀ vì wù bʉ́nə̀*
tsɔ̀ŋ *tə̀ vì* *wù* *bʉ́n-ə*
C1.thief P3 come 2SG sleep-PROG
'The thief came when you were sleeping.'

b. *tsòŋ jì vì kô ndíʔ lá wù bʉ́nà* (*bwén*)
tsòŋ *jì* *vì* *kó`* *ǹ-díʔ* *lá* *wù* *bʉ́n-ə* *bwen*
C1.thief P2 come NEG N[4]-COP COMP 2SG sleep-PROG NEG
'The thief came when you were not sleeping.'

c. *tsòŋá vìà kèn lá wù bʉ́nà* (*bwén*)
tsòŋ *á* *vì-ə* *kèn* *lá* *wù* *bʉ́n-ə* *bwen*
C1.thief SM come-PROG NEG COMP 2SG sleep-PROG NEG
'The thief is coming whereas you are not sleeping.'

d. *tsòŋ tà vì kèn lá wù bʉ́nà* (*bwén*)
tsòŋ *tà* *vì* *kèn* *lá* *wù* *bʉ́n-ə* *bwen*
C1.thief P3 come NEG COMP 2SG sleep-PROG NEG
'The thief came when you were not sleeping.'

e. *tsòŋá né vì kèn lá wù bʉ́nà* (*bwén*)
tsòŋ *á* *né* *vì* *kèn* *lá* *wù* *bʉ́n-ə* *bwen*
C1.thief SM F2 come NEG COMP 2SG sleep-PROG NEG
'The thief will come when you are not sleeping.'

It is worth noting that it is the subordinate clause that is negated and again the negation marker occurs before the verb but this time also before the complementizer and the subject, that is, at the initial position of the subordinate clause. This suggests that Babanki has only sentence negation, not constituent negation. The data also illustrate that to negate the subject, the negative marker leaves the pre-verbal position and the copula structure is introduced with pre-clausal negation (7b). As also seen (7c–e), the copula verb can be omitted, though the complementizer remains.

Negation of the imperative is achieved by the use of an identical clause initial prohibitive proclitic in most of Central Ring: *kə̂* in Mmen and Kuk, and *ká* in Kom while Babanki uses *kə́*…(*bwen*):

(8) a. *kə́ kùm* (*bwén*)
kə́ *kùm* *bwen*
NEG touch NEG
'Don't touch!'

[4] The nasal has simply been glossed 'N' because its origin and function remain unclear not only in Babanki (Akumbu & Chibaka 2012) but also in Kom (Shultz 1997) where it has been analyzed as induced by the verb.

b. *ká ɣəŋ kúm* (*bwèn*)
ká *ɣəŋ* *kùm* *bwen*
NEG 2PL touch NEG
'You shouldn't touch!'

Ká occupies the initial position of the clause and is followed by the subject, if present, then the verb and finally *bwen.*

4 Negation and question formation

Questions are formed in Babanki by adding a question marker at the end of a statement:

(9) a. *wùə́ kúmə̀ lí à*
wù *ə́* *kùm-ə̀* *lí* *à*
2SG SM touch-FV PFV Q
'Have you touched?'

b. *wùə́ né kùm à*
wù *ə́* *né`* *kùm* *à*
2SG SM F2 touch Q
'Will you touch?'

So far it has been shown that *bwen* occupies the final position of negative clauses. However, it loses that position to the question particle in negative questions:

(10) a. *fə̀ɲín fə́ kó ↓tsɨ́fə́ à*
fə̀-ɲín *fə́* *kó`* *tsɨ́f-ə* *à*
C19-bird SM NEG peck-PROG Q
'Is the bird not pecking?'

b. *fə̀ɲín fə́ kô jì tsɨ̀f á↓sáŋ à*
fə̀-ɲín *fə́* *kó`* *jì* *tsɨ́f* *à-sáŋ* *à*
C19-bird SM NEG P2 peck C6-corn Q
'Did the bird not peck?'

c. *fə̀ɲín fə́ kó ↓né ↓tsɨ́f à*
fə̀-ɲín *fə́* *kó`* *né`* *tsɨ́f* *à*
C19-bird SM NEG F2 peck Q
'Will the bird not peck?'

The occurrence of the Babanki question particle in (10) confirms the previous finding that it is crosslinguistically common for question markers to occur in sentence-final position, and that "final question particles are especially common in Africa" (Dryer 2009). It is further observed that in this construction type, NEG2 is not allowed in Babanki. Since both the question and negation markers prefer the final position but that slot is available only for one, the negation morpheme can drop because *kó`* is already used and the absence of *bwen,* which is needed only for emphasis, will not affect the semantics.

The incompatibility of negation and the question marker is also seen in embedded questions where only *kó`* is allowed:

(11) a. *mà bèm lá wùə́ kó tə̀ vì byìghɔ̀ lɔ́*
mà bèm lá wù ə́ kó` tə̀ vì byìghɔ̀ lɔ́
1SG ask COMP 2SG SM NEG P3 come why EMPH
'I asked why you didn't come.'

b. *mà kí lá wùə́ kó tə̀ vì byìghɔ̀ lɔ́*
mà kí lá wù ə́ kó` tə̀ vì byìghɔ̀ lɔ́
1SG know COMP 2SG SM NEG P3 come why EMPH
'I knew why you didn't come.'

An additional observation to be made from (11) is that the emphasis marker functions similarly to the question marker, replacing NEG2 as well.

5 Babanki negation and Jespersen's Cycle

There has been a historical development of the expression of negation in a variety of languages, from a simple pre-verbal marker of negation, through a discontinuous marker and in some cases through subsequent loss of the original pre-verbal marker. This cyclic process of morpho-phonological weakening and strengthening known as Jespersen's Cycle (Jespersen 1917; Dahl 1979) is stated as follows:

> the original negative adverb is first weakened, then found insufficient and therefore strengthened, generally through some additional word, and this in turn may be felt as the negative proper and may then in the course of time be subject to the same development as the original word (Jespersen 1917: 4).

The cyclical process of weakening, strengthening, and replacement has been widely exemplified in the literature with data from French and many

other languages. To illustrate the diachrony of the change, a general schema of four basic structural stages for the French negative cycle has been offered (Schwenter 2006):

Stage 1. NEG + VERB	*Je ne sais*. 'I don't know.'
Stage 2. NEG + VERB + EMPHATIC NEG	*Je ne sais* (*pas*).
Stage 3. NEG + VERB + OBLIGATORY NEG	*Je ne sais pas*.
Stage 4. VERB + NEG	*Je sais pas*.

At Stage 1, negation is expressed by a pre-verbal negative marker while at Stage 2, a post-verbal emphatic negative element is introduced which may or may not be required. At Stage 3, the post-verbal element becomes obligatory and negation is expressed by a bipartite negative marker. At this stage, the grammaticalization process of the reinforcing element has begun. At Stage 4, the original pre-verbal marker is dropped and the post-verbal negative marker is completely grammaticalized, and functions as the sole negative marker.

In Babanki, the post-verbal negative element which adds emphasis to the pre-verbal sentential negative is gradually being lost because, due to its optional status, many speakers tend to drop it altogether leaving only pre-verbal *kó`* as the marker of negation. In other words, the post-verbal element is undergoing weakening while the pre-verbal marker is undergoing strengthening. Without diachronic evidence, it is not possible to tell if Babanki is indeed on Jespersen's Cycle nor to determine the stage of development at which it is. The hypothetical claim made in this paper, based entirely on introspective data, is that the grammaticalization process is towards the pre-verbal element becoming the sole marker of negation. This might suggest that at some point in the history of Babanki, negation was marked solely by the post-verbal *bwen* which does not have any other known meaning in the language today. As the language developed, the post-verbal marker began to weaken and there was need to introduce a pre-verbal marker to reinforce negative semantics. Today, this pre-verbal element has been strengthened and can be used as the only marker of negation while the weaker post-verbal *bwen* is there only for emphasis.

6 Conclusion

A language with a double negative, the second being optional, has not previously been identified or described in Central Africa (Dryer 2009). It has been shown in this paper that Babanki makes use of *kó`...*(*bwen*) in standard negation. Contrary to what obtains in other Grassfields Bantu languages, Babanki uses this discontinuous morpheme to negate sentences in all tenses/aspects. It has also been hypothesized in this paper that at some point in the history of the language, negation was marked by the post-verbal marker *bwen* which is now undergoing weakening and gradually giving way to the pre-verbal marker *kó`* to be the sole marker of negation.

The only other language in the central Ring sub-group with a discontinuous negation morpheme is Bum. However, the two languages differ slightly in that unlike Babanki, Bum selects the tenses with which to use specific morphemes in standard negation. This study has been meant to add to the descriptive knowledge of negation patterns in Grassfields Bantu and, hopefully, it will increase the drive to further linguistic work on these languages.

Symbols and abbreviations

↓	Downstep
C1…19	Noun Class
CONT	Continuous
EMPH	Emphatic
F1	Immediate Future Tense
F2	Hodiernal Future Tense
F3	Remote Future Tense
FV	Final Vowel
N	Nasal
P1	Immediate Past Tense
P2	Hodiernal Past Tense
P3	Distant Past Tense
P4	Remote Past Tense
PREP	Preposition
SM	Subject Marker

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Evolutionary viewpoints on quantal vowels: A review of arguments for and against the existence of quantal vowels in *H. neanderthalensis*

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Abstract

During the past two decades, there has been considerable discussion on the existence of quantal vowels (as described by quantal theory) in the speech of an extinct hominin species, *H. neanderthalensis*. To put it simply, the argument is focussed on whether or not this species produced the kind of speech characteristic of *H. sapiens* today. In this article, the discussion is reviewed in detail, taking into account arguments for and against the notion. Finally, it is concluded that although the evidence is not conclusive enough to decide the matter once and for all, it seems likely that the *H. sapiens* -type vocal tract is a prerequisite for producing quantal vowels.

Keywords: speech, evolution, quantal theory, vocal tract

1 Introduction

This article is a review of the arguments for and against the existence of the capacity to produce quantal vowels in an extinct hominin species, *H. neanderthalensis* (hereafter HN). In order to keep this paper manageable, this article reviews only the material that is of direct relevance to the discussion at hand; exploring all the digressions would fill a small book. The first modelling attempt by P. Lieberman & Crelin was published in 1971. This view, though it had been challenged unsuccessfully by publications that did not include modelling attempts (for example, by Houghton 1993, which was rejected by P. Lieberman 1994), was challenged by another modelling attempt only three decades later (Boë et al. 2002). As P. Lieberman and Crelin had done before, Boë et al. (2002)

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modelled the vocal tract of the same HN individual, La Ferrassie 1, but reached a very different conclusion. This is when the discussion became heated. The beginning of this century has brought with it a profusion of new papers on the topic. Despite the considerable length of the discussion, the core arguments of the proponents and opponents have remained essentially unchanged throughout, including the views P. Lieberman has defended the whole time.

The discussion is focussed around the three quantal vowels [i u ɑ], as originally described by Stevens (1972; 1989), which actually makes the quantal theory younger than the beginning of the discussion on HN's speech capabilities, when point vowels were modelled (P. Lieberman & Crelin 1971). However, quantal vowels seem to have been established as the main topic in the following discussion (see below). The questions of how, when and why the kind of speech that exists in modern humans today evolved are central to the discussion, since the answers offered by the proponents and opponents differ radically. Quantal vowels are important to *H. sapiens* speech because they make speech more robust (on error rates, see Peterson & Barney 1952; for a recent replication of Peterson & Barney's study, see Hillenbrand et al. 1995; for a description of quantal theory, see Stevens 1972; 1989; Stevens & Keyser 2010; for a recent review of the applicability of quantal theory to predicting whole vowel inventories, see, for instance, Diehl 2008).

The proponents and opponents can be divided into three rough categories: those who argue that HN could produce all three quantal vowels (Boë et al. 2002; Boë et al. 2007; Boë et al. 2013), those who argue against the existence of quantal speech in HN (P. Lieberman 2006a; 2007a; 2007b; 2012), and those who argue that HN could produce some quantal vowels (Barney et al. 2012). In addition, there exist other views, such as that the ear and vocal tract of modern humans is optimized for speech, as expressed by Martínez et al. (2013), who lean on the modelling studies done by Boë et al. (2002) when they claim that *H. heidelbergensis* was capable of producing quantal vowels (see below).

On the whole, the divide between proponents and opponents is quite clear-cut, which is rather unexpected since all of the arguments put forward are based on modelling the vocal tracts of extinct hominins. Where the arguments differ are the articulatory and acoustic results produced by these modelling attempts. The point of disagreement is described by de Boer (2009a: 257) as one concerning the limitations imposed by the vocal tract: the opponents see these limitations as the deciding factor, whereas the

proponents regard them as something that can be overridden by neural mechanisms. In previously published review literature, which is too vast to go through in this paper, reactions to the different arguments range from unanimous agreement with one party or another to cautious "wait and see" attitudes (for a short overview, see Hopponen 2014).

This paper is divided into three main sections. The first offers a short review of the discussion itself, focussing on the core arguments of the opponents and proponents. The second discusses the evolutionary explanations proposed for quantal vowels (and, to some extent, speech in general). The third and final section offers a few tentative conclusions. Although laid out in the papers reviewed in the first section, the argument over the possible vocal repertoire of *H. sapiens* infants is omitted. This is because its content is essentially identical to the HN discussion and because its inclusion would take up too much room (a review of it can be found in Hopponen 2014: 55–81).

For a detailed account on human evolution in general and HN in particular, the reader is referred to Cela-Conde & Ayala (2007). For a detailed account of the evolution of the human head and neck, the reader is referred to D. Lieberman (2011). For a slightly outdated but sharp in-depth critique of the proponents' modelling attempts, see de Boer & Fitch (2010). For a paleontologically rather than linguistically oriented review of the modelling attempts, see Martínez et al. (2009). For an anthropological review on hominin vocal tracts, see Clegg (2012), and for a review focusing on the archeological side of the evolution of language and speech, see Lavento (2012). On the issue of whether language and/or speech are exclusive to humans or whether aspects of them can be found in other species, see, among others, Fitch (2010) for a review, and, in particular, Pepperberg (2002) for a detailed account of language and speech in African grey parrots.

2 The discussion so far

The different views are presented so that proponents (Boë et al. 2002; Boë et al. 2007; Boë et al. 2013) are followed by the opponents (P. Lieberman & Crelin 1971; P. Lieberman 2006a; 2007a; 2007b; 2012). They are then followed by the one publication whose results support the existence of a few quantal vowels (Barney et al. 2012), and Martínez et al. (2013), who reconstructed a *H. heidelbergensis* vocal tract but did not model any

vowels. Criticisms made by other researchers are scattered where appropriate.

Both proponents (Boë et al. 2002; Boë et al. 2007; Boë et al. 2013) and opponents (P. Lieberman & Crelin 1971; P. Lieberman 2006a; 2007a; 2007b; 2012) used the La Chapelle-aux-Saints skull (presumably, the individual number 1), but they resorted to different reconstructions of it. There is some minor disagreement over the significance of the different reconstructions; P. Lieberman (2007a: 556) denies that it has any significance, on the basis that the shape of the cranial base is not indicative of the shape of the vocal tract (the source he refers to is Fitch & Giedd 1999). Moreover, Boë et al. do not give any data or reasons in any of their publications regarding why the new reconstruction would be superior to the older one (on the ontogeny of *H. sapiens* cranial base, see Fitch & Giedd 1999 and D. Lieberman & McCarthy 1999; on the evolution of the cranial base, see, for instance, Bastir & Rosas 2016). The vertebrae of La Ferrassie were used to determine the length of the cervical and thoracic spine (P. Lieberman 2006a; 2007a: 466). Boë et al. (2007) specify that it was La Ferrassie 1's spine and the Kebara hyoid that were used. This illustrates the fact that the starting points for the different modelling attempts were rather similar, even though their results proved to be vastly different.

The existence of quantal vowels in HN has been explored by defining the maximal vowel space (e.g. Boë et al. 2002; Boë et al. 2007). This was done by mapping out three formants (F1, F2 and F3) (Boë et al. 2002), which are vitally important to quantal vowels (see, for instance, Stevens 1972; 1989). It is the view of Boë et al., expressed neatly in the title of their 2002 article, that "[t]he potential Neandertal vowel space was as large as that of modern humans". Their view, which has remained unchanged throughout the discussion, is that HN could have used neural mechanisms to compensate for its long oral cavity (they assume this was neurally possible), and this compensation could have allowed enough manoeuvrability for quantal vowels to be produced (Boë et al. 2002). In a newer publication (Boë et al. 2007), they hold the view that neural mechanisms could compensate for a very ape-like vocal tract with a long oral cavity and a short pharynx. Strangely enough, Boë et al. (2013: 385), who do not model consonants in any of their studies, later attack their opponents for not taking consonants into account. In fact, consonants were modelled by P. Lieberman & Crelin (1971) in their original study, which concluded that HN may have been unable to produce velar plosives but might have been able to produce dental and labial plosives (P. Lieberman

& Crelin 1971: 216–217; on modelling consonants, see also Carré & Chennoukh 1995). The latest publication of the proponents is Badin et al. (2014), whose main conclusion is that so long as lips are included in the model, the height of the larynx is more irrelevant than de Boer (2010a; 2010b) claims (see below).

The assumption made by Boë et al. (2002), according to which neural mechanisms can override anatomical limitations, could be called *the compensation hypothesis*. This view has been sharply criticized by de Boer & Fitch (2010: 40–43), who reviewed the modelling attempts of Boë et al. as a case study. De Boer and Fitch (2010) write that since the model used by Boë et al. has *H. sapiens* -like vocal tract manoeuvrability built into it, of course the results then match the built-in capacities (see P. Lieberman 2012: 610 for similar criticism). De Boer & Fitch (2010: 43) conclude that this is a case of logical circularity. In addition, it has to be noted that the compensation hypothesis is close to being a null hypothesis since it appears to be unchallengeable; at present (and perhaps in the future as well), it is impossible to determine if HN had the neural capacity for fine motor control of the vocal tract.

There is one recent study that purports to support Boë et al.'s (2002) position. Martínez et al. (2013) claim that the proportions of the *H. heidelbergensis* vocal tract that they reconstructed are similar to those reconstructed by Boë et al. (2002). This conclusion Martínez et al. (2013: 96) reach just by reconstructing the vocal tract of Individual XXI of Sima de los Huesos and concluding that its proportions closely match the HN vocal tract that Boë et al. (2002) reconstructed and modelled. Martínez et al. do not model any sounds with their *H. heidelbergensis* vocal tract, and yet they claim that their results support Boë et al.'s (2002) results. Despite the fact that the ear modelling done by Martínez et al. (2013: 98–99) supports the notion that *H. heidelbergensis*' hearing was more similar to *H. sapiens*' rather than a chimpanzee's, merely the twin facts that the reconstructed bandwidth does not reach as high as *H. sapiens*' and that there is a considerable time differential between *H. heidelbergensis* and HN (on the possible family trees of these species, see, for instance, Mounier & Mirazón Lahr 2016) render Martínez et al.'s (2013) conclusion suspect. Further, as is the case with HN, we have no means by which to determine whether or not *H. heidelbergensis* possessed the neural compensation mechanisms proposed for HN by Boë et al. (2002).

The proponents' view is opposed by P. Lieberman and others (P. Lieberman & Crelin 1971; P. Lieberman 2006a; 2007a; 2007b; 2012), who

take the view that a vocal tract with 1:1 proportions is the *sine qua non* of quantal vowels. This is shown by the first publication (P. Lieberman & Crelin 1971: 209), in which the vocal tract of HN was modelled. They went so far as to skew the starting points, such as the position of the larynx, in favour of HN by giving it more *H. sapiens* -like characteristics. Despite this, the modelling showed that it is impossible to produce the full repertoire of sounds found in modern languages (P. Lieberman & Crelin 1971: 211–215). In much later studies, Carré & Chennoukh (1995) and Carré (2004) modelled the sounds produced by a *H. sapiens* vocal tract. In the latest study, Carré (2004: 238–239) came to the conclusion that the shape of the vocal tract that may be the limiting factor.

Further, it is impossible for HN to have a vocal tract with *H. sapiens* -like proportions (male or female) since attaining these proportions would place the larynx behind the sternum, which in turn would make it unique among hominins as well as unable to swallow (P. Lieberman 2006a: 301; 2007a: 557–558; P. Lieberman & McCarthy 2015). When discussing the standard shape of the mammalian tongue, P. Lieberman (2012: 613) writes that a flat tongue located in the oral cavity cannot descend far enough down the pharynx in order to produce [ɑ]. Since the only kind of vocal tract that we know to be capable of producing all three quantal vowels is the *H. sapiens* -type vocal tract, P. Lieberman's position is rather strong. In a much earlier study that focused on oral cavities only, Duchin (1990: 694) found that the oral cavities of HN, *H. sapiens* and *H. erectus* are similar – and thus differ from *Pan* – but it has to be noted that the study did not address the problem posed by the pharyngeal cavity. Thus, despite the fact that there are similarities in the shape of the oral cavity, the question of how an [ɑ] could be produced with a high larynx remains unsolved. At this point, it seems reasonable to suggest that the burden of proof rests on those who would claim that a high larynx is not an impediment to producing an [ɑ], since the only vocal tract that we know is certainly capable of it has a low larynx. Therefore, in light of the evidence put forward by P. Lieberman, Duchin and others, the claim made by Boë et al. rests largely on the compensation hypothesis, and therefore they have yet to produce overwhelming evidence to support their views.

There are others who share P. Lieberman's reservations, of course. De Boer & Fitch (2010) and de Boer (2010b; 2010a) have challenged Boë et al.'s (see above) conclusions. De Boer (2010a) modelled vocal tracts of different depths to determine the larynx height that bestows the greatest articulatory abilities, and found that the vocal tract of a female *H. sapiens*

to be optimal. The said modelling attempt has been accused by Badin et al. (2014) of oversimplifying things because the model does not include lips (which, in fact, it does include; see Section 5 of de Boer's paper for details). Badin et al.'s criticism seems to miss the mark slightly as it does not demonstrate that the stumbling block of neural mechanisms is removed from the path to quantal vowels. First, Badin et al. (2014) only modelled one lip aperture, and they did not take into account the enhancing gestures (described in Stevens & Keyser 2010), thus leaving it unsaid whether or not their model is able to distinguish between [i] and [y] or [u] and [ɯ], respectively. Second, they do not model the articulatory manoeuvres that are characteristic of quantal vowels (for a detailed account of these movements, see Stevens 1972; 1989; Stevens & Keyser 2010). Strangely, after making no mention of these rather important details, Badin et al. (2014: 167) explicitly claim that adding lips to the model validates what the proponents have been saying all along (they cite Boë et al. 2002; Boë et al. 2007; Boë et al. 2013). While Badin et al.'s (2014) criticisms are rather interesting and important, some clarification on the details is required.

The partially positive view is represented by Barney et al. (2012), who made their own (3-D) reconstruction of the vocal tract of HN. The only remarkable difference is that they used the spine of a modern human (a large man's) instead of a HN spine (Barney et al. 2012: 92) and that they used both female and male modern humans when they modelled the vocal tract they used for reference (Barney et al. 2012: 91). When they had built the HN vocal tract, they modeled the vowel space with F1 and F2 (Barney et al. 2012: 92), leaving out the rather important F3 (see, for example, Stevens 1972; 1989). The result of Barney et al.'s modelling attempt is that their HN could not produce an [a] – which, it has to be pointed out, is not a quantal vowel – with an F1 that is comparable to data collected from modern humans (Barney et al. 2012: 98). Further, they opine that their results are not comparable with previous studies (Barney et al. 2012: 97). They are very cautious in their conclusions and write that their attempt should be regarded as hypotheses testing (Barney et al. 2012: 100). This sort of caution seems reasonable enough, especially when compared to the – at times – aggressive manner in which the proponents and opponents have put forth their views. Further, it is interesting and refreshing that Barney et al. (2012) did not approach the matter from the point of view of any of the existing modelling attempts but attempted to redo the modelling from scratch.

Barney et al.'s attempt at modelling is problematic in a few ways, however. The fact that the cartilages of the larynx have to fit into the neck (P. Lieberman 2006a: 301; 2007a: 557; in addition, see P. Lieberman & McCarthy 2007 and P. Lieberman & McCarthy 2015 for details on relative vocal tract lengths) is not mentioned by Barney et al. (2012). Since they used the spine of a large *H. sapiens* male (large in terms of weight or height? They mention no numbers), it is likely that the cartilages fit into the neck despite the longer oral cavity. Because in *H. sapiens* the cervical spine is rather long (P. Lieberman 2013: 144–145; P. Lieberman & McCarthy 2015), it is unclear whether or not the cartilages would fit into a HN neck. It might have been better that Barney et al. (2012) had used a HN spine, such as the La Ferrassie spine (according to D. Lieberman 2011: 538, La Ferrassie 1 consists of both a skull and a spine; further, P. Lieberman 2013: 145 writes that there exist well-established methods for measuring fossil spines; see P. Lieberman & McCarthy 2015: Table 2 on ventral heights of cervical vertebrae; see also D. Lieberman 2011: 588–589 on palate lengths and vocal tract proportions in both HN and *H. heidelbergensis*; see also Bastir & Rosas 2016 on the changes in the cranial base and face during the evolution of *Homo*).

Another point that Barney et al. (2012) do not address is that in order to enable swallowing, the tongue has to fill the oral cavity (D. Lieberman 2011: 297). However, there are no established methods to estimate the size of an extinct hominin's tongue because it is not clear if the relationship between body size and tongue size is isometric or not (D. Lieberman 2011: 335–336), and therefore the omission in Barney et al. (2012) is understandable. Nevertheless, together these points leave one wondering how realistic the vocal tract of HN modelled by Barney et al. (2012) actually is. Further, it seems that this model (Barney et al. 2012) might suffer from similar logical circularity as Boë et al.'s (described above), since the vocal tract that was used as reference was constructed using modern humans – although in this case, the possible circularity follows from the materials used rather than the assumed flexibility of the vocal tract.

Further, it might be beneficial to keep in mind the criticisms presented in other publications. For instance, de Boer (2009a) is of the opinion that, at least in modern humans, a female vocal tract is capable of producing a greater range of formants than the male one. He also writes that since other evolutionary pressures, such as size exaggeration, may have influenced the male vocal tract, it might be wiser to use the female vocal tract as a

template when modelling extinct hominins (de Boer 2009a: 264–265) (on the ontogeny of female and male vocal tract, see, for instance, Fitch & Giedd 1999). On discussing the historical aspect of this, Clegg (2012: 65) writes that the reason that a male vocal tract was originally used has to do with the weight of history and accepted practice. In light of this, one cannot help but wonder what kind of results the modelling attempts of P. Lieberman and Boë et al. would produce if they used the remains of female hominins instead of males (and if Barney et al. had used only females in the construction of the reference vocal tract). In addition, it remains to be seen how much anatomy can ultimately tell of the function(s) of different structures, including the different parts of the vocal tract (see, for instance, D. Lieberman 2008).

There exist two recent reviews of the evolution of speech that, from a linguistic point of view, miss the mark rather widely. Lavento (2012) is an archeological review that practically rules out linguistics as a central participant in the discussion and, judging from its references section, does not seem to be aware of the last four decades of discussion between the proponents and opponents. An equally recent anthropological review of the speech capabilities of HN is Clegg (2012: 66, 73), which does not review the linguistic side of the matter beyond circa 1992 but which nevertheless claims that HN did not "have a restricted range of speech sounds" because the overall length of the HN vocal tract was within the range observed in the modern human females. She does not specify which sounds – consonants, vowels or just quantal vowels – she means. Clegg (2012: 66) even admits that she has not modelled the sounds that the HN vocal tract might have produced. Her argument, though cogent and likely supported by the anthropological evidence that she cites, misses the mark by a wide margin. The debate on the linguistics side of the divide between disciplines has not been about vocal tract length itself but about vocal tract shape and manoeuvrability.

It is very problematic that similar modelling methods produce contradictory results (de Boer 2009a: 256), especially since all of the studies used nearly the same set of HN fossils. This probably is the result of faulty or inadequate modelling methods, but it also could be the result of not having established methods for estimating the proportions and shape of vocal tracts on the basis of bony landmarks alone. Or, indeed, this state of affairs could well be the result of not having satisfactory methods with which to determine the range of movements that those modelled vocal tracts are capable of performing. Therefore, it seems reasonable to assume

that individual muscles – and their insertions and shapes – will need to be modelled in order to determine the range of movements that any given hominin would have been able to execute (on the differences in tongue musculature in chimpanzees (*Pan*) and humans, see Duchin 1990; among others, Takemoto 2001 has already attempted to describe musculature of the human tongue in the context of modelling it). It may be that much more data from extant apes is required, since at least *Australopithecus afarensis* had the hyoid bulla (Alemseged et al. 2006: 298), if the vocal tracts of even earlier hominins are to be modelled in the future. Additional modelling attempts, focussed on more hominin species than is currently the case, might shed more light on the emergence of quantal vowels and, indeed, speech itself.

3 Evolutionary explanations

When discussing the evolution of language, it is important to steer clear of unfalsifiable (null) hypotheses (see, for instance, D. Lieberman 2011: 587–588). Happily, if one leaves aside the possible logical circularities, this kind of unproductive argumentation has largely been avoided in the arguments for and against the existence of quantal vowels in the speech of HN.

The obvious difference between the explanations offered by the proponents and the opponents in the argument over speech capacities of HN is that the opponent, P. Lieberman (2007b: 52) can offer an evolutionary reason for the life-threatening shape of the human vocal tract: in his view, the risk is offset by the benefits of modern human speech. This view has been countered by Clegg (2012: 68–69), who is of the opinion that the risk of choking on food is minimal. It is unfortunate that the issue has not yet been looked at from a cross-species perspective, since there might be something to be gained by looking at the rate of death by choking, for example, in either of the chimpanzee species or in other apes. It is obvious, however, that such data would not be easy to collect, and therefore data from other mammalian species with high larynges might serve.

Further, P. Lieberman (2013: 144–145) proposes that since it is difficult to fit a vocal tract with 1:1 proportions into a short neck, the longer neck of modern humans contributes to our ability to produce quantal vowels. De Boer (2009a: 256) makes a similar point when he writes that, in the case of the vocal tract of modern humans, the benefits counterbalance the drawbacks (for a similar view, see de Boer 2010a).

In addition, de Boer (2012) opines that vocal communication was the reason why hominins lost the hyoid bulla and the air sacs (on modelling the effects of air sacs in conjunction with a *H. sapiens* vocal tract, see de Boer 2009b). This is supported by a histological study, which analyzed the Kebara 2 hyoid (from a male HN), that comes to the conclusion that some measurements, but not all, of the hyoid fell within the range documented for modern humans (D'Anastasio et al. 2013). Cautiously, they conclude that their results mean that the hyoid participated in similar activities as the hyoid of a *H. sapiens*, but they also point out that this does not mean that HN was able to speak (D'Anastasio et al. 2013: 6). At least once, it has been suggested that the shape of the hyoid dates back to the origins of the genus *Homo* (Clegg 2012: 71–72), which would, in Clegg's opinion, imply that the human-like vocal tract is equally old. On a more cautious note, she does write (Clegg 2012: 71) that more data (i.e. more hyoids) is needed. Thus, there are no cast-iron certainties to be found on the hyoid front either, yet.

At a glance, all of the studies and hypotheses described in section 2 seem to be within the realm of possibility, and it is easy to assume that the development and/or emergence of speech may have played a significant role in the evolution of the vocal tract. It has to be noted, however, that other (possibly complementary) explanations, some from outside the domain of linguistics, have also been proposed; D. Lieberman et al. (2001: 124–125) suggest that it is possible that swallowing sets more restrictions on the shape of the vocal tract than quantal speech does (for additional explanations and caveats, see, for instance, D. Lieberman 2011: 415). In a similar vein, Nishimura (2005: 202) writes that the most basic functions of the vocal tract, namely eating and breathing, can set limits to the optimization of the vocal tract for speech. An identical point is made by Carré (2004: 239). Recently, it has been suggested by Coquerelle et al. (2013: 4–7) that the protrusion of the chin seen in modern humans could be the result of how, among other things, the larynx descends and the facial block rotates during early infancy. Further, they suggest that the need to swallow and breathe safely could act as a driving force for change (Coquerelle et al. 2013: 2). It has also been suggested by Clegg (2012: 66–69, 74) that the particulars of human speech sounds are the product of accident and that there is little reason to assume that the shape of the human vocal tract is dangerous enough to exact a price, contra the opponents' views. Because these questions fall outside linguistics proper,

they are best left for other disciplines to answer, but it seems reasonable to assume that linguistic input may be required at some point.

The lack of evolutionary explanations in the publications of Boë et al. (Boë et al. 2002; Boë et al. 2007; Boë et al. 2013) is obvious. If they continue to insist that a vocal tract with 1:1 proportions is not necessary for quantal speech and that articulatory compensation (together with neural mechanisms) could have overcome anatomical obstacles for quantal vowels, it would be interesting if they could offer an alternative evolutionary explanation for the curiously shaped vocal tract of *H. sapiens*. In fact, they insist that the modifications to the vocal tract need not have preceded speech (Boë et al. 2002: 481). This is slightly confusing, but in keeping with their view. Needless to say, the complementary explanations offered by D. Lieberman and Nishimura (see above) do not mesh with the views of Boë et al. as well as they do with P. Lieberman's.

However, any account of the evolution of human language and speech will need to take into account the fact that other species seem to share parts of these abilities (for the abilities of, for instance, African grey parrots, see Pepperberg 2002; for a review of the language and speech capacities of other nonhuman species, see Fitch 2010). At least one other primate species, the Diana monkey (*Cercopithecus diana*) has been the topic of a disagreement over attempts at vocal tract modelling; in chronological order, the publications that discuss it in detail are Riede et al. (2005), P. Lieberman (2006b), Riede et al. (2006), P. Lieberman (2007b) and P. Lieberman (2013). There is relatively little novelty in this argument, and participants, with the opponents' side taken again by P. Lieberman and Riede enacting the part of the proponents, argue for the same things as in the HN debate. The only thing missing from it are the quantal vowels. However, since *Cercopithecus diana* is only distantly related to modern humans and our ancestors, this discussion seems more like a sidetrack than anything else, especially since the quantal vowels are absent. Its importance to the discussion at hand is that it shows that there is something to be gained from studying extant species, even if the only result that comes out of it is yet another disagreement.

4 Conclusions

Given the content of the discussion, it might be better to dub the discussion *Arguments for and against quantal vowels in extinct hominins*, since, at present, neither the proponents nor the opponents support the notion that

extinct hominins were incapable of producing some kind of speech (which would, presumably, include a vowel or vowels). Aside from P. Lieberman & Crelin (1971), there have been no attempts to define what sort of consonants were possible; de Boer (2009a: 260) writes that the methods used in exploring vowels are insufficient to determine possible consonants. Further, evolutionary explanations for what caused the shape of the vocal tract to change so dramatically in the hominin lineage remain elusive.

It is troubling that previous modelling attempts (described in section 2) have reached such different conclusions. Based on their results, it seems reasonable to assume that quantal vowels were out of the reach of HN, but the question cannot, at least not without further modelling attempts and a synthesis of additional supporting evidence (outlined in Section 3), be considered as settled. As mentioned above, it is problematic that modelling attempts with very similar starting points – and even the same fossils – have reached different conclusions. From this, it would be very tempting to draw the conclusion that all modelling attempts have somehow failed, but surely such a sweeping conclusion would not only be wrong but also do injustice to the researchers involved. Regardless, the problem of contradictory results persists, and until further modelling attempts are made, there are no grounds for declaring the issue settled once and for all.

There is nothing to suggest that quantal vowels are a necessary feature of speech (P. Lieberman 2007b: 41) or, indeed, (proto)language. It is conceivable, although strictly hypothetical, that the number of vowels could have been very low indeed, perhaps so low as to comprise only a front–back or low–high dichotomy (Jussi Niemi, p.c. 2013-03-27; cf. Stevens' description of these dichotomies 1989: 15). Further, there is no reason to assume that quantal vowels had to develop simultaneously (which would yield some kind of 'partial quantality'). Therefore, results similar to those of Barney et al. (2012) might be expected. Aside from the results of the modelling studies described above, it is far from certain that a specific set of (quantal or other) vowels existed at some point in the distant past. However, P. Lieberman (2007b: 41) considers quantal vowels to be an innovation. The fact that HN and *H. sapiens* coexisted for a long time (Cela-Conde & Ayala 2007) does complicate matters somewhat. It is possible that a) one species had quantal vowels, b) both had them, or c) neither had them. The first two alternatives are supported by the modelling studies described above, while the third, although logically possible, is supported by no empirical evidence at all. The matter is complicated

further if 'partial quantality' is thrown into the mix. In the end, it is all about timing.

It is noteworthy that the current trend is not to specify a point in time when a particular feature of language or speech emerged (cf., for instance, Bickerton 1990). The more branches the human family tree sprouts, the wiser this seems; at present, there is limited certainty as to which species leads to which (on family trees and how to attempt to draw them, see, among others, Mounier et al. 2009; Cela-Conde & Ayala 2007). Thus, it seems prudent to avoid drawing conclusions on the capabilities of any particular species on the basis of (preliminary) studies done on other species (see above).

The fact that quantal vowels are so ubiquitous in the languages spoken by modern humans does require an explanation, however. The shape of the vocal tract is a very likely explanation, but the structure of the ear has most likely played a role as well (Martínez et al. 2013). It would be entirely speculative to ponder the exact point in time when hominins were neurally capable of producing and perceiving quantal vowels – in other words, when they could reap the benefits offered by these vowels.

It is clear that the disagreement over the existence of quantal vowels in the speech of extinct hominins cannot be resolved satisfactorily by resorting to linguistic methods only. That any discipline could, by itself and without needing input from others, solve the puzzle seems unlikely, and therefore the problem remains a multidisciplinary one. That the attempts to resolve the issue have drawn on many disciplines is heartening and has generated much discussion. Any future modelling attempts would probably greatly benefit from the expertise that, for instance, paleontology, archeology, computer science and evolutionary biology can offer. Hopefully, in the future, some light can be shed on the emergence and development of quantal vowels. One such possible avenue of research could be offered by optimality theory (for a review, see Parker & Maynard Smith 1990), but attempting such an explanation is far beyond the scope of this review.

Finally, it can be concluded that although both the proponents and the opponents of the core argument have put forward much evidence, the balance of evidence suggests that it might be wise to err on the side of caution and conclude that there is no conclusive evidence in favour of the existence of quantal vowels in HN. One can only hope that future attempts at solving the issue will be more successful in mapping the articulatory

capacities of extinct hominins, shedding light on evolution of the human vocal tract and finding out how and why quantal vowels emerged.

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Metaphors below the sentence level: The case of appositives

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Abstract

This squib sketches an analysis of the contribution of appositive constructions to metaphoric readings (*Australia, the country with a passion for rugby*). It is suggested that optional constructions can contribute the emergence of underlying metaphoric readings of sentences, depending on how they interact with other phrases and constituents. This analysis is based on a simple variant of the *Type-Logical Syntax* framework, enriched with a simple semantic algorithm that computes "local" source and target domains. As a test case, a discussion of a sub-set of appositives labelled as "spatial" appositives (*Australia, the land where dreams come true*) is discussed and accounted for.

Keywords: appositives, compositional metaphors, spatial prepositions, generative lexicon

1 Introduction

In recent work based on the Metaphor Identification Procedure (Steen et al. 2010) the role of lexical items in the emergence of metaphors has been discussed in detail. A general observation is that a single lexical item, in virtue of having a non-literal interpretation within the context of a sentence, can license a metaphoric reading for a sentence (e.g. the noun *sun* in the classic *Juliet is the sun*).[1] However, little is known about whether such contribution can emerge from constituents and constructions larger than single lexical items. Although some works suggest that noun *phrases* can

[1] We use the term *metaphoric reading* to capture the fact that phrasal and/or sentential meanings can express underlying metaphors, or can contribute to such readings by introducing opportune source domains.

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license metaphoric readings (e.g. Asher & Lascarides 2001; Asher 2011: 61–87), a fuller assessment of the role of syntactic structure in metaphors is still outstanding.

The goal of this squib is to sketch an analysis of how complex nominal-like constructions known as *appositive phrases* or simply *appositives* can contribute to the emergence of metaphoric readings. Our reason for focusing on this category is that, given their distribution as optional constructions, they allow us to easily test how syntactic structure and constructions constrain the emergence of metaphoric readings. For space reasons, we concentrate on appositives in subject position, although we believe that our analysis can be extended to other positions. Our plan is as follows. We first identify a sub-set of appositives for our analysis, and explain how we have collected the data (Section 2). We then explain why previous accounts seem to stumble on these data (Section 3), and sketch our preliminary account (Section 4). We offer a concise discussion of the results (Section 5), before concluding.

2 Method and results

Before we discuss the data, some methodological clarifications are necessary. The type of constructions we discuss are seldom if ever attested in corpora (e.g. *The Corpus of Contemporary American English*: Davies 2008–). Therefore, the examples were designed with the feedback of a native speaker, and then tested with a small group of participants, also native speakers (N = 10). The test involved a simple written questionnaire, in which participants had to read a set of sentences and offer their judgment about their content (i.e. examples (1)–(14)). Participants were all native speakers of British English, and were contacted via e-mail and/or social media. Given the nature of the test, participants received the test via e-mail, as an attachment to be filled in. Participants' data were strictly confidential, although age, gender and level of education were required. The data we analyse in this section, then, double as results of this small-scale preliminary study.

The instructions were as follows. Participants were asked to evaluate a set of sentences offering descriptions of Australia. The choice of a proper name was based on the fact that proper names may be polysemous, in the sense that they can refer to entities conceived as having different types of properties (cf. Evans 2009: 88–96). The dictionary entries for *Australia* report its meaning as a name for a physical location and a continent (i.e. a

'place') as its first and central meaning. The sense used to refer to the institutions that govern this continent and its inhabitants and institutions ("Australia", Oxford Dictionary 2016) is reported as less central and marked as 'abstract', since it is offered as its third possible sense. We thus consider its central, concrete sense as triggering a literal reading (i.e. a phrasal sense), and its (more) abstract sense as triggering a metaphoric reading.

For each sentence, the participants were asked to evaluate whether the sentence was about Australia 'as a place' (literal reading), or 'as an abstract entity' (metaphoric reading), or 'as both' (co-existing readings). Participants were asked to type their evaluation below each sentence, filling either comment in a gap (e.g. either 'place' or 'abstract entity' for the example in (1)). Participants would then send the completed questionnaire to the researcher, who analysed the answers. The answers were overall homogenous: for examples (1)–(2) and (4), all participants offered 'place' as an answer (i.e. a literal reading was accessed). For examples (3) and (5), 9 out of 10 participants offered 'abstract entity' as an answer, with different single answering 'place' for each example. All the other examples we analyse followed this pattern, as we will discuss in the remainder of the section. The appendix contains a sample of the questionnaire used in the study.

Let us now briefly discuss our data and their properties. Appositives usually include two juxtaposed *Noun Phrases* (henceforth NPs), possibly a proper name and an NP or other phrase as constituents (Huddleston & Pullum 2002: 445–446). Appositives also tend to involve a certain type of semantic relation. The sense of the first NP/name, the *specifier*, refers to a specific entity. The sense of the second phrase, the *modifier*, refers to a property of this entity (Huddleston & Pullum 2002: 447–448). Modifiers can be in turn complex phrases. Often, appositives have a *non-restrictive* semantics, since they are optional phrases that usually occur within parenthetical markers (Bianchi 2000b; 2002a). They add more information about the entity that the specifier NP refers to. Some examples are (1)–(5):

(1) *Australia, the country with ten deserts, is scarcely populated*
(2) *Australia, a country with a passion for rugby, is scarcely populated*
(3) *Australia, a country with a passion for rugby, is getting ready for the world cup*
(4) *Australia is scarcely populated*
(5) *Australia is getting ready for the world cup*

The appositives in (1)–(3) are formed via the juxtaposition of the name *Australia* with the complex NPs *the country with ten deserts* and *a country with a passion for rugby*. *Australia* denotes an entity, in its literal interpretation: a specific geographic location governed via a certain set of institutions. A literal reading emerges in (1), since this sentence describes a property of Australia as a geographic location and country.

In (2), the appositive *a country with a passion for rugby* describes Australia as an agent-like entity with emotions, licensing a metaphoric reading. However, when the copula combines this complex subject with a VP, the VP adds a primary literal reading.[2] According to speakers' intuitions, *is scarcely populated* and *a country with a passion for rugby* describe concrete and abstract properties of Australia, co-existing in the same sentence.

Instead, *getting ready for the world cup* in (3) describes a property of Australia as a human-like rugby fan. The appositive-less versions of (1)–(3) are offered in (4)–(5), and show that metaphoric readings can also emerge via the contribution of a VP (i.e. *getting ready for the world cup* in (5)). Appositives may thus add information that Australia, as the (unique) entity defining the target domain, is connected to a *secondary* source domain (Kövecses 2002: 17–32), distinct from the *primary* source domain that VP can introduce. Overall, it seems that literal and metaphoric readings can co-exist, when appositives are involved.

Although the syntax of appositives is well-known, their semantic properties are still understudied. Most works focus on their literal readings (Bianchi 2002a; 2002b; Nouwen 2007; 2014; see Goatly 1997 for a partial exception). Thus, an account that captures the patterns underpinning (1)–(3), as well as other types of appositives we discuss below, is outstanding. We label this group of appositives *spatial* appositives, since in their literal interpretation they usually denote a spatial property that can be ascribed to a specific referent. Interestingly, these constructions have apparently never been discussed jointly, especially with respect to their semantics. Hence, our discussion also acts as a basic typological survey of these constructions, at least for English.

[2] Copular constructions come in four types: specificational, equative, identificational, predicative (Pustet 2003; Mikkelsen 2005). However, Classical Metaphor Theory (e.g. Lakoff 1980; 1987) implicitly focuses on the predicative type, as we do in our examples.

A first sub-set consists of spatial partitive constructions as modifier phrases (Hoeksema 1996; LeBruyn 2010). Partitives usually include their respective specifier NPs, whose senses individuate types of locations, examples being *place*, *land*, and *country* (Jackendoff 1983: 57–76; 1990: 43–55; Emonds 1985: 159–165). A second sub-set consists of relative NPs, which may be free or bound[3] (Caponigro & Pearl 2008; 2009). A third sub-set consists of *Prepositional Phrases* (PPs), which may act as non-restrictive phrases, possibly with a spatial sense (Svenonius 2010: 134–136). Examples (6)–(14) illustrate how these readings emerge in the first (viz. 6–8), second sub-set (viz. 9–11), and third sub-set (viz. 12–14):

(6) *Australia, the land of many deserts, is scarcely populated*
(7) *Australia, the land of broken hopes, is scarcely populated*
(8) *Australia, the land of broken hopes, is waiting for the world cup*
(9) *Australia, the land that hosts Ululu, is scarcely populated*
(10) *Australia, the land that dreams of victory, is scarcely populated*
(11) *Australia, the land that dreams of victory, is waiting for the world cup*
(12) *Australia, West of New Zealand, is scarcely populated*
(13) *Australia, across cultures, represents a distant land*
(14) *Australia, through the decades, has been passionate about rugby*

Examples (6)–(8) include the partitives *the land of many deserts* and *the land of broken hopes*. *Australia* is the specifier of the corresponding subject appositive in each sentence. In turn, the definite NP *the land* is the specifier of each partitive construction, and the NPs *many deserts* and *broken hopes* are the modifiers of their respective partitives. In both cases, the preposition *of* acts as the head of each partitive construction. The juxtaposition of this partitive construction with the NP *Australia* determines the reading for the appositive subject NP. If Australia is the land of broken hopes, then it is identified via one emotional "state" that can be ascribed to its inhabitants, rather than the location or body of institutions. The combination of this subject NP with a verb may add a literal or secondary metaphoric reading. Australia as a location having many deserts and as an agent-like entity "feeling" broken hopes can be scarcely populated (viz. (6)–(7)). As an agent, it can also be waiting for the world cup (viz. (8)).

[3] Free relative NPs involve relative pronouns that can occur without an antecedent, while bound relative NPs involve antecedents. For simplicity, we only use bound antecedents in (9)–(11).

The examples in (9)–(11) display equivalent structures and interpretive patterns, although *that* becomes the head of each free relative acting as a modifier. The patterns in (12)–(14) involve the prepositions *West of, across* and *through*, which introduce a spatial/literal property of Australia in (12) (viz. *West of New Zealand*), and non-literal ones in (13)–(14) (viz. *across cultures* and *through the decades*). These prepositional phrases lack a specifier, but nevertheless act as modifiers within their respective appositives. Crucially, these examples also show that the optional nature of appositive has a precise semantic effect. Appositives may add a property of an entity (here, Australia) not standardly associated to this entity. The VP in a sentence containing this appositive may either contribute a distinct metaphoric reading, or a literal reading (cf. the contribution of *scarcely populated* vs. *passionate about rugby*).

Two observations are necessary, before we continue. First, all informants considered (6)–(7), (9)–(10) and (12) as having literal readings, since they describe properties of Australia as a place. Second, most participants considered the other examples as describing properties of Australia as an abstract entity (N=9), but with some nuances. Some participants observed that (7)–(14) could also entail that Australia was conceived as a collective entity, a 'population', having broken hopes or other emotional states. In other words, these readings were seen as possibly involving metonymy. The analysis we pursue in this paper is consistent with the emerging consensus on the strong connection between metaphors and metonymies (Barcelona 2003; Evans 2010; Bergler 2013). However, we assume that our examples pin-point (at least) metaphoric readings, since the properties ascribed to Australia are seen as abstract, whether they involve a more concrete population or a more abstract institution. Since teasing apart these sense layers would bring us too far afield, we leave a more thorough discussion aside.

Overall, the data suggest that spatial appositives *qua* appositives can contribute a secondary source domain for a metaphoric reading. This reading can co-exist with other literal or metaphoric readings that other parts of speech (e.g. VPs) can contribute. In other words, appositives can contribute a secondary source domain for metaphoric readings, intended as domain co-existing with the primary source domain. Target domains, then, can be connected with the appositives' source domain *and* the sentential domain (i.e. a full VP). Our goal is to sketch an account of these differences, thereby shedding light on how metaphoric readings may or may not emerge via the contribution of certain phrases and constructions.

3 Previous studies

Classical and contemporary accounts of metaphors have mostly focused on specific constructions, such as copular constructions and similes (e.g. Lakoff & Johnson 1980; Lakoff 1987; 1993; Goatly 1997; Langacker 1999; Talmy 2000). However, the role of lexical items and constructions has been intensely investigated in many recent works (Steen 2007; Panther, Thornburg & Barcelona 2009; Steen et al. 2010). Two facts have emerged as crucial. First, most words belonging to lexical categories (nouns, verbs, adjectives, prepositions) can be richly polysemous. Second, their literal/metaphoric readings depend on the syntactic and discourse context they occur in. Nevertheless, these works do not investigate constructions defined at a phrasal level.

One recent account that has analysed appositives is the *Lexical Cognitive Conceptual Model* (henceforth: LCCM, Evans 2006; 2009; 2010). In LCCM, words can convey conceptual information by tapping onto possibly complex conceptual domains or *models*. For instance, our model of Australia involves an entity that can be conceived as a land mass but also as a political institution, and that can have a rugby team. However, possibly only one specific concept is selected and expressed in a minimal linguistic (syntactic and semantic) context, viz. (15)–(16):

(15) *Australia, the country*
(16) *Australia, the rugby team*

As in (1)–(14), while *the country* triggers a literal reading, *the rugby team* triggers a metaphoric reading: a continent cannot be a rugby team, since a rugby team is composed of fifteen rugby players. In LCCM, this fact is explained by assuming that the senses of the two NPs are integrated via a sequence of processes. A first process is *lexical concept selection*. A second process is *fusion*, which is further segmented into *lexical concept integration* and *interpretation* processes. For instance, the models for *Australia*, *country*, and *rugby team* are selected for each sentence. Two concepts from each model are first integrated into one model; then, the shared concept is selected. For instance, *Australia* gives access to a model that includes the sense ‘physical location’ amongst its many senses, and so does *country*. Once the two models are integrated, the shared concept *physical location* is selected, the appositive *Australia, the rugby team* in (16).

A similar analysis is offered in *Generative Lexicon* (henceforth GL: Pustejovsky 1995; 2013; Asher & Pustejovsky 2013). In GL, the senses of NPs and other parts of speech are associated to *types*, formal conceptual domains that partition the ontological space of a model of discourse. For instance, NPs are usually associated to the universal type of *entities*, logical *referents* that represent our conceptual representations of "things" in the world. Differently from classical formal theories, GL assumes that types can have a rich internal structure known as *qualia structure*; they can thus have *sub-types*. The type *e* of entities includes the type *phys* of physical objects, the type *hum* of human entities, and similar others (Pustejovsky 2013: 14–18). NPs can have combinations of types, known as "dot types". The NP *Australia* denotes a referent belonging to a sub-type of the type *e*. This sub-type is *phys•org*, the dot connective "•" representing that a referent can be conceived as both a physical entity and an organization. When two constituents are combined, the operation of *co-composition* combines their senses and types. If the composed types do not perfectly match, then *type coercion* occurs: the "shared" sub-type(s) between two constituents is selected.

Our compact review of previous analyses already hints at one key problem with these works, with respect to our data. Although these accounts offer rich semantic analyses of metaphors and metaphoric readings, they invariably leave aside a thorough discussion of which constructions and sentences can carry these readings. A partial exception is found in LCCM, although this framework does not explore the contribution of appositives to sentential readings. Thus, a fuller account of the contribution of appositives to sentential readings is still outstanding. We sketch our account of this contribution in the next section.

4 Analysis: Syntax and semantics

The goal of this section is to present the tools that we employ in our analysis. For the syntax, we use a very simplified version of *Type Logical Syntax*, a formal framework used for the analysis of syntactic structures (TLS, e.g. Moortgat 2010; Ursini & Akagi 2013; Ursini 2015a; 2015b; 2016). For the semantics, we implement an analysis based on GL and LCCM insights (Evans 2010; Asher & Pustejovsky 2013: 50–60; Bergler 2013). From TLS, we import the use of the *forward application* operation to represent how lexical items and phrases are combined into larger

constructions. From GL and LCCM, we import the insight that the types of senses/readings associated to lexical items are determined in context, when an item combines with other items.

One further preliminary assumption concerns the notions of source and target, which we connect to the structures involving appositives. Since we use the syntactic notions of "specifier" and modifier" phrase, we need to establish a relation between these pairs of notions. For this purpose, we assume that a specifier phrase can denote the target domain of the syntactic structure that contains this phrase. A modifier phrase, instead, can denote the source domain of its respective syntactic structure. Thus, in an appositive construction such as *Australia, the land of broken dreams*, the specifier *Australia* provides the target domain. The modifier *the land of broken dreams* provides the source domain, the secondary one if a VP also offers a source domain.

Let us make these assumptions precise. First, we implement a simple type language that involves four types: the type *s* for "source", the type *t* for "target", the type *m* for "metaphor", and the type *l* for "literal". With the first type, we represent a lexical item that provides the source domain within the syntactic domain of a phrase. With the second type, we represent the lexical item that provides the target domain. With the third and fourth types, we represent the reading that a phrase/sentence can receive, when a source and target domains are connected via some functional element (e.g. the copula, relative heads), or simply via juxtaposition (in appositives). Second, we define an algorithm that assigns these semantic types to syntactic phrases, based on the following steps. First, each specifier is assigned the type *t*, and each modifier is assigned the type *s*. Second, either the type *m* (metaphoric reading) or *l* (literal reading) is assigned to each phrase/construction that includes a source and a target domain. When source and target domains coincide (e.g. *Australia* and *the land of many deserts* referring to physical locations), a literal reading arises. When not, a metaphoric reading does.

We now make precise our syntactic assumptions. According to analyses such as Bianchi (2002a; 2002b), appositives involve a phonologically null head belonging to the so-called *Complementizer* category of heads ("C"). This head, then, takes a specifier and a modifier as its argument phrases. We take a similar stance to free relative clauses, as we assume that *that* is a lexically more specific instance of a C head (cf. also *where*, Caponigro & Pearl 2008; 2009). Note that we treat all NPs as lacking internal structure. The proper name *Australia* and the definite NPs

the land, *the place*, the modified NP *broken dreams* are all "simple" NPs. We then follow standard analyses of partitives and treat *of* as a prepositional head that takes two phrases as its arguments (Hoeksema 1996; Zamparelli 1998). We also treat SPs, here *in front of*, as including a head P, *of*, and a second SP in its specifier position (the "P-within-P" hypothesis, Hale & Keyser 2002). In doing so, we take a much simplified but still accurate stance on the syntactic structure of this category (cf. Emonds 1985; Svenonius 2010).

We can thus implement our assumptions. First, we represent forward application via the symbol "•"[4], and each consecutive step in a syntactic derivation via an *index set* (i.e. *t*, *t*+1, *t*+2, etc.). We also assume that merge combines lexical items in a top-down ("left-to-right") manner (Phillips 2006; Ursini 2015b). We label *lexical selection* (LS) the operation that selects a lexical item and adds it to a derivation, and *Forward Application* as FA.

In order to make our derivations easier to read, we first derive the modifier phrases, and then we merge them with a specifier NP (*Australia* in our examples). Furthermore, phonologically null elements are marked within round brackets, while longer lexical items are abbreviated when necessary. We write these types as sub-scripts on the right (external) side of phrases, while syntactic categories' sub-scripts are written on the left (internal) side. We start by first deriving the structure for our example (6) in (17):

(17)	*t*.	$[_{NP}$ Australia $]_t$	(LS)
	t+1.	$[_{NP}$ the land $]_t$	(LS)
	t+2.	$[_{P}$ of $]$	(LS)
	t+3.	$[_{NP}$ the land $]_t$•$[_{P}$ (of) $]$ = $[_{P'}[_{NP}$ the land $]_t$ of $]$	(FA)
	t+4.	$[_{NP}$ many deserts $]_s$	(LS)
	t+5.	$[_{P'}[_{NP}$ the land $]_t$ of $]$•$[_{NP}$ many deserts $]_s$ = $[_{PP}[_{NP}$ the land $]_t$ of $[_{NP}$ many deserts $]_s]_l$	(FA)
	t+6.	$[_{C}$ (C) $]$	(LS)
	t+7.	$[_{NP}$ Australia $]_t$•$[$ (C) $]$ = $[_{C'}$ $[_{NP}$ Australia $]_t$ (C) $]$	(FA)
	t+8.	$[_{C'}[_{NP}$ Australia $]_t$(C)$]$•$[_{PP}[_{NP}$ the land $]_t$ of $[_{NP}$ many deserts $]_s]_l$ = $[_{CP}[_{NP}$ Australia $]_t$ (C)$[_{PP}[_{NP}$ the land $]_t$ of $[_{NP}$ many deserts $]_s]_l]_l$	(FA)
	t+9.	$[_{V}$ is $]$	(LS)

[4] We opt to use this symbol as it is commonly used to represent application as a syntactic schema in the literature (Ursini 2015a; 2015b). No confusion should arise with the "dot" type connective of GL.

t+10. $[_{CP}[_{NP}$ Australia $]_t$ (C) $[_{PP}[_{NP}$ the land $]_t$ of $[_{NP}$ many deserts $]_s]_l]_l \bullet [_V$ is $]$ =
$[_{V'}[_{CP}[_{NP}$ Australia $]$ (C) $[_{PP}[_{NP}$ the land $]_t$ of $[_{NP}$ many deserts $]_s]_l]_l$ is $]$
t+11. $[_{VP}$ scarcely populated $]_s$ (LS)
t+12. $[_{V'}[_{CP}[_{NP}$ Australia $]$ (C) $[_{PP}[_{NP}$ the land $]$ of $[_{NP}$ many deserts $]]]$ is $] \bullet$
$[_{VP}$ scarcely…$]$ =
$[_{VP}[_{CP}[_{NP}$ Australia $]_t$ (C) $[_{PP}[_{NP}$ the land $]_t$ of $[_{NP}$ many deserts $]_s]_l]_l$ is $[_{VP}\ldots]_s]_l$ (FA)

First, a specifier NP, *Australia*, is first selected and typed as a target *t* domain (step *t*). The modifier phrase *the land of broken dreams* is then derived as a distinct unit (steps *t*+1 to *t*+5). The NP *the land* is the specifier of a prepositional phrase (PP) headed by *of*, while the NP *broken dreams* is its modifier. They are respectively assigned the type *t* and *s*, as target and source domain of the appositive. The PP *the land of broken dreams* receives the type *m* given its inherent metaphoric reading, which is also assigned to the whole appositive phrase (steps *t*+6 to *t*+8). Thus, the whole appositive "inherits" the type *l*. Once the appositive is merged as the subject of the copular construction, it is "re-interpreted" as contributing the target domain of this construction (steps *t*+9 to *t*+12). The net result is that the sentence *Australia, the land of many deserts, is scarcely populated* has a literal reading.

The minimal difference in interpretation with (8), which has a sentential metaphoric reading, can be captured via the partial derivation in (18). We omit the *LS* and *FA* labels in the subsequent derivations, as it should be clear which operations occur at each step:

(18) *t*+11. $[_{AP}$ getting ready for the world cup $]_s$
t+12. $[_{V'}[_{CP}[_{NP}$ Australia $]$ (C) $[_{PP}[_{NP}$ the land $]$ of $[_{NP}$ many deserts $]]]$ is $] \bullet$
$[_{VP}$ getting…$]$ =
$[_{VP}[_{CP}[_{NP}$ Australia $]_t$ (C) $[_{PP}[_{NP}$ the land $]_t$ of $[_{NP}$ many deserts $]_s]_l]_t$ is
$[_{VP}\ldots]_s]_m$

Furthermore, the minimal difference between (17) and (18) is the contribution of the VP to a sentential reading. Since the VP *getting ready for the world cup* describes a property that can be ascribed to an agent-like entity, it introduces a source domain licensing a metaphoric reading. Australia is conceived as an agent. In both examples, also, we can see that the scope of the metaphoric reading for the appositive phrase is the CP that forms the complex subject. Thus, we can mark the two source domains

licensing the two co-existing metaphoric readings in an explicit manner, and connect them to the syntactic structure of appositives and sentences.

We now turn our attention to the second and third sub-set of appositives. The derivations in (19)–(20) show how these sub-types of appositives are derived:

(19) *t*. $[_{NP}$ Australia $]_t$
t+1. $[_{NP}$ the land $]_t$
t+2. $[_{P}$ that $]$
t+3. $[_{NP}$ the land $]_t$•$[_{P}$ that $]$ = $[_{P'}[_{NP}$ the land $]_t$ that $]$
t+4. $[_{VP}$ hosts Ulurlu $]_s$
t+5. $[_{P'}[_{NP}$ the land $]_t$ that $]$•$[_{VP}$ hosts Ulurlu $]_s$=
$[_{PP}[_{NP}$ the land $]_t$ that $[_{VP}$ hosts Ulurlu $]_s]_l$
t+6. $[_{C}$ (C) $]$
t+7. $[_{NP}$ Australia $]_t$•[(C)]=$[_{C'}$ $[_{NP}$ Australia $]_t$ (C) $]$
t+8. $[_{C'}[_{NP}$ Australia$]_t$ (C) $]$•$[_{PP}[_{NP}$ the land $]_t$ that $[_{VP}$ hosts Ulurlu $]_s]_s$ =
$[_{CP}[_{NP}$ Australia $]_t$ (C) $[_{PP}[_{NP}$ the land $]_t$ that $[_{VP}$ hosts Ulurlu $]_s]_l]_l$

(20) *t*. $[_{NP}$ Australia $]_t$
t+1. $[_{SP}$ West $]_t$
t+2. $[_{P}$ of $]$
t+3. $[_{SP}$ West $]$•$[_{P}$ of $]$ = $[_{P'}[_{SP}$ West $]_t$ of $]$
t+4. $[_{NP}$ New Zealand $]_s$
t+5. $[_{P'}[_{SP}$ West $]_t$ of $]$•$[_{NP}$ Zealand $]_s$ = $[_{PP}[_{NP}$ West $]_t$ of $[_{NP}$ New Zealand $]_s]_l$
t+6. $[_{C}$ (C) $]$
t+7. $[_{NP}$ Australia $]_t$•[(C)] = $[_{C'}$ $[_{NP}$ Australia $]_t$ (C) $]$
t+8. $[_{C'}[_{NP}$ Australia $]_t$ (C) $]$•$[_{PP}[_{SP}$ West $]_t$ of $[_{NP}$ New Zealand $]_s]_s$ =
$[_{CP}[_{NP}$ Australia $]_t$ (C), $[_{PP}[_{SP}$ West $]_t$ of $[_{NP}$ New Zealand $]_s]_l]_l$

These derivations are based on the appositives in (9) and (12), respectively. In them, the NP *Australia* is selected as the specifier, hence the target domain of the full appositive (step *t*). The modifiers *the land that hosts Ulurlu* and *West of New Zealand*, a CP and a PP respectively, are successively derived (*t*+2 to *t*+5). The full appositives are derived next, respectively forming *Australia, the land that hosts Ulurlu* and *Australia, West of New Zealand* (steps *t*+6 to *t*+8). These appositives describe physical properties of Australia as a landmass, hence they can certainly be assigned a literal type of interpretation. A metaphoric reading would arise when the modifier contributes a distinct type of property (e.g. *the land that dreams of victory* in (10)), and the contribution of the VP can contribute a sentential-level reading, as in (18).

If no appositive construction is added, then our algorithm can also compute the reading arising at a sentential level, as shown in (21), a partial derivation of (5):

(21) t+12. $[_{V'}[_{NP}$ Australia $]_t$ is $]\bullet[_{VP}$ getting ready for the world cup $]$ =
$[_{VP}[_{NP}$ Australia $]_t$ is $[$ getting ready for the world cup $]]_m$

This derivation shows that our system can correctly capture the scope and emergence of metaphoric readings, and how primary and secondary source domains are computed.

5 Discussion

Let us briefly discuss the results of our analysis. Overall, this formal analysis captures the contribution of appositives to the reading of a whole sentence by pin-pointing how modifiers in appositives (e.g. *West of New Zealand* in (12)/(20)) select a given reading for the specifier they merge with (i.e. the proper name *Australia*). Since the analysis assumes that the emergence of a metaphoric reading for a phrase can affect the reading assigned to the sentence it belongs to, it correctly captures the relation between phrasal and sentential readings. Thus, the principles and mechanisms that our analysis proposes seem to be on the right track.

It is worth noting that the analysis may not be as nuanced as needed, since it does not directly account inter-speaker variation. Recall from our discussion in Section 2 that, for examples such as (2) and (6), at least one speaker assigned a literal rather than metaphoric reading to these sentences. We believe that the difference, in these cases, lies in the reading type that speakers unconsciously assign to each lexical item. For at least one speaker, a phrase such as *the land of broken dreams* has a literal sense, perhaps assigned via metonymy. We also believe that offering a more fine-grained account of inter-speaker variation would be possible, but beyond the scope of this squib. A similar reasoning applies for a more thorough account of the role of metonymy which we also believe to warrant a more thorough investigation.

Nevertheless, thanks to our analysis, we can capture the fact that the presence of a spatial appositive with a metaphoric reading triggers a metaphoric reading for the whole sentence it occurs in. A similar analysis can be applied to the appositives in (7)–(12), too, with the *proviso* that different lexical items are merged in their respective derivations. Although

we do not offer a thorough derivation, we can also account the literal readings of (1) and (5)–(6), because of *Australia* and *scarcely populated, mostly desert* denoting related conceptual domains. Thus, our analysis seems to offer a principled account on how "local" phrasal metaphoric readings can percolate at a sentential level. This result is obtained by defining the percolating effect of merge, and a precise mapping between syntactic structures and their literal or metaphoric (semantic) readings.

6 Conclusions

In this squib, we have sketched a compositional account of the emergence of metaphoric readings in spatial appositives (*Australia, the land of broken dreams*). We have shown that metaphoric readings can be recursively defined via a simple algorithm that maps syntactic structures (specifiers, modifiers) to semantic domains (targets, sources). This analysis is consistent with the discussions on the roles of lexical items and other parts of speech (e.g. Panther et al. 2009; Steen et al. 2010) in the licensing of metaphors. We acknowledge that our analysis is rather limited in scope. After all, we only sketch a unified but still preliminary account of a small sub-set of appositives, based on a rather novel proposal. We think, however, that our analysis may be successfully extended to other constructions.

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Abbreviations

C	Complementizer
CP	Complementizer Phrase
FA	Forward Application
GL	Generative Lexicon

LCCM	Lexical Conceptual Cognitive Model
LS	Lexical Selection
NP	Noun Phrase
P	Preposition
PP	Prepositional Phrase
SP	Subordinator Phrase
TLS	Type Logical Syntax
VP	Verb Phrase

Appendix A

Sample questionnaire

"Thank you for participating in this study. Below you will find a set of sentences that offer descriptions about Australia. We would like to ask your opinion about the type of information they convey. Please read each sentence, and then write either "place" or "abstract entity" in the gap at the end of the comment below each sentence.

(1) *Australia, the country with ten deserts, is scarcely populated*

C: The sentence is about Australia as a___

(2) *Australia, a country with a passion for rugby, is scarcely populated*

C: The sentence is about Australia as a___

…"

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