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Morphological variation in the speech of Frisian-Dutch bilinguals

(Dis)similarity of linking suffixes and plural endings

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In standard Dutch, the plural suffix *-en* is homographic and homophonic with the linking suffix *-en* (*boek+en* “books”, *boek+en+kast* “bookcase”), both being pronounced as schwa. In Frisian, there is neither homography nor homophony (*boek+en* “books”, pronounced with syllabic nasal; *boek+e+kast* “bookcase”, pronounced with a linking schwa). Seeing that many areas of Frisian grammar are subject to interference from Dutch, we investigated whether Frisian-Dutch bilinguals exhibit interference from Dutch with respect to the linking suffix during Frisian speech production. Two types of Frisian-Dutch bilinguals emerged: Speakers who had Dutch as their first language tended to maintain the Dutch system of homophony between plural and linking suffixes when speaking Frisian, by using the Frisian plural as a linking morpheme. Speakers who had Frisian as their first language often maintained the Frisian system of no homophony when speaking Frisian. The implications for morphological theories are discussed.

Keywords: bilingualism, speech production, Frisian, Dutch, compounds, linking suffixes

1. Introduction

1.1 Goals of this study

Compounding is a very productive means of word formation in Germanic languages (Booij, 1992, 2002; Booij & van Santen, 1998, p. 150; Brisard, Laarman, & Nicoladis, 2008; Jackendoff, 2002, p. 250; Lieber, 2005, p. 375). Compound words may typically

contain a linking suffix.¹ For instance, Dutch *noot+en+kraker* ("nutcracker") contains a linking *-en* while Frisian *nut+e+kreker* ("nutcracker") contains a linking *-e*. In the present study, we investigated how Frisian-Dutch bilinguals (henceforth FD-bilinguals) handle these two systems² of compounding when speaking Frisian.

Frisian and Dutch are two closely related languages. In Dutch, the regular plural suffix *-en* is homographic and homophonic with the linking suffix *-en* (e.g., *noot+en* — *noot+en+kraker*, "nuts — nutcracker"). In standard Dutch, the linking suffix *-en* and plural suffix *-en* are almost always pronounced as [ə], that is, the written *n* is not pronounced (Booij & van Santen, 1998, p. 157–158; Hanssen, Banga, Neijt, & Schreuder, 2012). In Frisian, the orthographic form of the plural suffix *-en* is distinct from the linking suffix *-e*, as illustrated by the pair *nut+en* ("nuts") and *nut+e+kreker* ("nutcracker"). This orthographic difference reflects a phonological difference: the plural suffix is pronounced as [ən] whereas the linking suffix is pronounced as [ə] (E. Hoekstra, 1996, p. 497–498).³ Thus the homophony that occurs in Dutch between the plural suffix *-en* and the linking suffix *-en* generally fails to occur in Frisian, according to the linguistic literature, which is mainly based on written Frisian or on author intuitions about their language.

However, it is well-known that spoken Frisian, like other minority languages which are under pressure from a dominant language, exhibits many interferences

1. In this study, we use the term linking suffix to refer to any instance of a suffix that marks the first noun of a nominal compound. We prefer the term linking suffix to the term linking element. The term linking suffix is more specific and it expresses the fact that the linking morpheme morphologically belongs to the first noun and not to the second one (for Frisian, see J. Hoekstra, 1998, p. 22; for Dutch, see De Haas & Trommelen, 1993, p. 378 on linking suffixes, see also Bauer, 2003, p. 30; Booij, 2007, p. 316).

2. A reviewer asks whether the two languages really have two different "systems" of compounding or whether they just have the same system but different linking suffixes. Our response is that the two languages differ in that one exhibits homophony of linking and plural suffixes, whereas the other does not, and that the presence of a homophony relation has been shown to have consequences for speakers' intuitions about linking morphemes (Banga et al., 2012; Hanssen et al., 2014). From a more general perspective, it is known from the literature that homophony is a driving force in language change, see for example Lehmann, 2002, p. 16 among others. Seeing that homophony may have far-reaching effects, we feel justified in speaking of different systems, though we use this term, perhaps naively, to describe a difference with respect to homophony. Thus we imply that the presence or absence of a homophony relation between two suffixes may imply a "system" difference.

3. There is a limited amount of examples in which nouns forming their plural in [ən] allow this selfsame ending to be used as the first element of a compound alongside the [ə]. The nouns involved are characteristically derived from adjectives. This results in doublets such as *sikehûs* — *sikenhûs* "hospital", based on the noun *sike* "ill person", and *friezetsjerke* — *friezensjerke* "Frisian church", based on the noun *Fries* "Frisian (person)".

from Dutch in many areas of the grammar (see Sjölin, 1976 for an overview of these). Furthermore, even the written language is not free from the influence of Dutch. An example of the influence of Dutch on written Frisian compounds is provided by Slofstra, Hoekstra, and Versloot (2009),⁴ who conclude that the Dutch mental lexicon affects the Frisian mental lexicon. Hence the question arises: Do FD-bilinguals distinguish the plural suffix *-en* from the linking suffix *-e* when they speak Frisian (as claimed by prescriptive grammar), seeing that Frisian compounds, and Frisian grammar in general, are susceptible to interference from Dutch? The present study has therefore the following goals:

- a. to provide experimental evidence about the spoken Frisian system of noun-noun compounding (complementing the claims made in the literature, which were merely based on author intuitions and not on systematic research)
- b. to investigate whether FD-bilinguals show interference from Dutch when speaking Frisian
- c. to investigate a possible relation between the existence of interference and the linguistic background of the speakers.

1.2 Frisian-Dutch bilingualism

Frisian is a language spoken in the northern region of the Netherlands, mainly in the province of *Fryslân* (Dutch: “Friesland”). Frisian is spoken alongside Dutch in this region and both languages have an official status. All speakers of Frisian are considered to be bilinguals of Frisian and Dutch. Nowadays, children with Frisian as their first language (Frisian L1) also learn Dutch at a very young age. About 53% of the inhabitants of *Fryslân* speak Frisian as their first language. Of the remaining 47%, almost half learned Frisian as a second language. This means that some 74% of the population in *Fryslân* is at least bilingual.⁵ This study comprises Frisian-Dutch

4. In a corpus study, they compared written Frisian nouns ending in schwa (e.g., *brêge*, “bridge”) to their forms when used as the first member of a nominal compound. Sometimes the schwa was retained (e.g., *brêgeman*, “bridge man”) and sometimes it was dropped (e.g., *bûse* — *bûsjild*, “pocket — pocket money”). Significantly, when a Frisian root (e.g., *planke*, “plank”) has a schwa but its Dutch counterpart does not (*plank*, “plank”), the final schwa more often appears to be omitted in a compound than when the root has no counterpart in Dutch.

5. Regional differences nevertheless exist in the degree to which Frisian is spoken. For instance, speakers from the north (e.g., the municipality of Achtkarspelen) tend to speak Frisian more often than speakers from the south (e.g., the municipality of Heerenveen). Frisian is spoken in Achtkarspelen by 80–90% of the inhabitants; in Heerenveen, it is spoken by 60–70% of the inhabitants (*De Fryske Taalatlas*, 2011, p. 19). Similarly, 70–80% of the inhabitants of Achtkarspelen have Frisian as their native language, while 50–60% of the inhabitants of Heerenveen have

bilinguals from both the northern and southern regions of *Fryslân*. There is a lack of substantial education in Frisian, substantial broadcasting, and so on. As a result, a significant subgroup of Frisians consists of unbalanced bilinguals, who have an inadequate command of Frisian. Even though we expect a significant overlap between balanced bilinguals and L1 speakers of Frisian on the one hand and unbalanced bilinguals and L2 speakers of Frisian on the other, we certainly do not expect these divisions to overlap categorically. A substantial proportion of unbalanced bilinguals is also expected among L1 speakers of Frisian. In our study, we expect them to exhibit interference from Dutch in their Frisian utterances. A subgroup of unbalanced bilinguals with inadequate command of Dutch is virtually non-existent, although there existed such a group in the early twentieth century and before.

1.3 Plural suffix and linking suffix

Earlier studies on Dutch have all tested the relations between the linking suffix and the plural suffix on the basis of written words (Hanssen, Banga, Schreuder, & Neijt, 2013; Neijt, Krebbers, & Fikkert 2002; Neijt, Schreuder, & Baayen, 2004; Schreuder, Neijt, van der Weide, & Baayen 1998). Furthermore, earlier studies have focused on the plural suffix in spoken Dutch and its dialects, by and large disregarding Frisian (Goeman, 2001; Goossens, 1987; de Schutter, 2001; de Schutter, van den Berg, Goeman, & de Jong, 2005; van de Velde & van Hout, 2003; Weijnen, 1966; de Wulf, Goossens, & Taeldeman, 2005; de Wulf & Taeldeman, 2001).

The relation in Dutch, including the Dutch of FD-bilinguals, between the linking suffix and the plural suffix using spoken utterances has been investigated in Hanssen et al. (2012), which is a sister study to the present one. Hanssen et al. (2012) investigated, among other things, the Dutch of FD-bilinguals with respect to the question of the homophony between linking and plural suffix, whereas the present study investigates the same for the Frisian of FD-bilinguals. Hanssen et al. (2012) detected a systematic relation between the pronunciation of the Dutch plural *-en* and the Dutch linking *en*, also for FD-bilinguals. All of the speakers showed a tendency to identically pronounce regular plural nouns occurring in phrases, on the one hand, and nouns occurring as the first element of compounds, on the other. On the basis of these results, Hanssen et al. (2012) concluded that the plural suffix and the linking suffix are usually identical in speech production, not only in standard Dutch, but also in its dialects, although the phonological realization may be subject to regional variation. Thus plural suffix and linking suffix are realized as a schwa in the west of the Netherlands, as a schwa followed by a nasal in the

Frisian as their native language (*De Fryske Taalatlas*, 2011, p. 17). These figures are based on self-report.

north. Crucially, FD-bilinguals do not transfer into their Dutch the Frisian system in which plural suffix and linking suffix have distinct phonological realizations, i.e. there is no homophony in Frisian. As we will see, a subgroup of FD-bilinguals do transfer into their Frisian the Dutch system, in which there is homophony of plural suffix and linking suffix.

1.4 Regular inflection and word formation

The present study is relevant for theories about compound formation. Some morphological theories such as the level-ordering hypothesis (Kiparsky, 1982) and the words-and-rules theory (Berent & Pinker, 2007; Pinker, 1999) claim that regular plurals cannot be used as the left-hand member of compound formation; only irregular plurals can (Berent & Pinker, 2007; Cunnings & Clahsen, 2008; Kiparsky, 1982; Pinker, 1999). For instance, English compounds like *mice eater* show that irregular plural nouns are allowed as the first (or left) constituent of a nominal compound while examples like **rats eater* show that regularly inflected plural nouns are usually not thus allowed. For ease of exposition, we will refer to this claim as the Irregular-Plurals-In-Compounds hypothesis, abbreviated as IPIC.

IPIC is strengthened by the fact that regular plurals within English nominal compounds are rare, though not absent, while irregular plurals occur more often (Berent & Pinker, 2007). It has been met, though, with extensive criticism (Baayen, Schreuder, de Jong, & Krott, 2002; Banga, Hanssen, Neijt, & Schreuder, 2013; Booij, 1993, 2002; Haskell, MacDonald, & Seidenberg, 2003; Seidenberg, MacDonald, & Haskell, 2007).

Dutch compounding does not support IPIC since regular plural nouns appear as the first constituents in compounds, and, furthermore, there is evidence that they are interpreted as regularly inflected plural forms by Dutch speakers (example: *boeken* “books”, *boeken+kast*, “bookcase”, see Hanssen, Banga, Schreuder, & Neijt, 2014; Schreuder et al., 1998). The results of other experimental studies similarly provide evidence that Dutch linking *-en* is often interpreted as a plural when used in compounds during visual and auditory word recognition tasks (Hanssen et al., 2014; Schreuder et al., 1998).⁶

6. It might be objected that the homophony of plural suffix and linking suffix is accidental, and that the ‘plural’ suffix showing up inside compounds is really nothing more than a linking suffix. However, the theories falsified by Hanssen et al. (2014) crucially assume that irregular plurals can show up in compounds. The falsification referred to in the literature involves the presentation of a suffix inside compounds that (i) looks like a plural suffix (ii) gets interpreted like a plural. Now the burden of proof is on those who claim that regular plurals do not occur inside compounds. Otherwise, their theories could not be falsified, since any example of a regular

In contrast, Frisian compounding appears to provide support for IPIC because regular plural forms by and large do not occur in Frisian compounds (example: *boek+en* “books”, *boek+e+kast* “bookcase”), according to the literature, which is based on written Frisian and author intuitions.⁷ However, it is an open question whether spoken Frisian will support this hypothesis as well, and our research will indeed show that spoken Frisian displays variation in this respect, depending on speakers’ degree of bilingualism, more specifically, depending on their proficiency in Frisian.

The present study is concerned with the pronunciation of plural and linking suffixes by Frisian-Dutch bilinguals during Frisian speech production. As Hanssen et al. (2012) have shown, speakers from the north of the Netherlands (*Fryslân*) pronounce both suffixes identically (both with [ən] or [n]) when speaking Dutch. Many areas of Frisian grammar are subject to interference from Dutch. In this study, we therefore investigated whether Frisian-Dutch bilinguals show interference from Dutch when speaking Frisian. Our study will yield two types of test results for the Frisian speech of Frisian-Dutch bilinguals: balanced bilinguals predominantly exhibit the system reported in the literature, in which regular plural nouns do not usually occur as first nouns in compounds whereas unbalanced bilinguals have a system that seems to be affected by Dutch in that there is homophony of plural and linking suffix.

2. Method

2.1 Participants

A total of 55 Frisian-Dutch bilinguals participated in this study. They were all intermediate vocational education students of agriculture in the Netherlands, with a mean age of 18 years. Two schools from two different regions of Friesland were selected to participate: the region Buitenpost from the north and the region Heerenveen from the south. In Table 1, the characteristics of the participants and their use of Frisian are summarized.

plural inside a compound will be dismissed as a linking suffix, whereas examples of irregular plurals inside compounds are not thus dismissed but taken as evidence in favor of the theory.

7. However, it is not the case that irregular plurals can be freely used in Frisian word formation, contrary to the prediction derived from IPIC, as can be illustrated by the word *ko* ‘cow’. Although the irregular plural of the word *ko* (“cow”) is *kij* (“cows”), the first element in compounds is invariantly *kowe-*, which is neither the irregular plural form nor the hypothetical regular form as it lacks a final *-n*. e.g. in *kowefleis* ‘cow meat, beef’.

Table 1. Characteristics of participants from two regions of Friesland and their use of Frisian as measured along a four-point scale (1 = seldom, 2 = sometimes, 3 = mostly, or 4 = always)

Characteristics	Region	
	North	South
Number of males	12	18
Number of females	13	12
Age range (mean age)	16–22 (18;1)	16–27 (17;10)
Mother tongue Frisian	96% (24)	76% (22)
Mother tongue Dutch	4% (1)	24% (8)
Use of Frisian	3.56	3.17

All of the participants came from the same type of schools as the participants in the study by Hanssen et al. (2012), who investigated the Dutch speech of Frisian-Dutch bilinguals with respect to linking suffix and plural suffix. Furthermore, all of the speakers were born and raised in the region of their birth, were living in the region at the time of data collection, and had not spent more than six months outside the region. The participants were all bilingual: 46 spoke Frisian as their first language (L1) and 8 spoke Frisian as a second language (L2), with Dutch as their first language.⁸

2.2 Stimuli and design

The experiment consisted of a picture naming task and a questionnaire. The picture naming task consisted of two parts: A picture naming task and a sentence completion task. In the first task, the participant learned to name all of the test words in the singular form in response to an accompanying picture. The plural forms of the nouns were only elicited in the second task (i.e., by presenting more than one object in the left picture).

In the sentence completion task, the participant was presented a combination of two pictures accompanied by an introductory sentence segment (cf. Figure 1). The participant was instructed to think of the right words to end the sentence and then pronounce the entire sentence fluently.

A total of 48 items, 32 experimental items and 16 filler items, similar to Hanssen et al. (2012), were used in this study. The experimental items consisted of pictures

8. One participant in the north spoke a Frisian-Dutch contact variety, that resembles Frisian in many aspects of the grammar (de Haan, Bloemhoff, & Versloot, 2013) and was therefore included in the group of L1-speakers of Frisian.

designed to elicit 16 Frisian compounds with a linking *-e* (*nut+e+kreaker*, “nut-cracker”) and 16 corresponding phrases with a plural *-en* (*nut+en kreakje*, “to crack nuts”). The 16 filler items consisted of pictures designed to elicit 8 novel compounds (e.g., *duvel+jeier*, “devil hunter”) and 8 corresponding novel phrases (e.g., *duvel+s jeie*, “to hunt devils”).

All of the items and the two conditions (compound or phrase) were counter-balanced across two lists, with different randomized orders. From these two lists, a third and fourth list were created that showed every item from the respectively the first and second list in the opposite condition (phrase or compound). Figure 1 gives an example of two pictures and the accompanying sentences used for the two conditions used in the study.

Figure 1. Pictures used to elicit two conditions: (1) a phrase with plural suffix *-en* (*hy wol no de ...nuten kreakje*, “he now wants to ... crack the nuts”) and (2) a compound with linking element (*dat is echt in ... nutekreaker*, “this is really a ...nutcracker”).

For all items, we only placed the verb stem above the picture (*kreak...*, “to crack”). The inflection *e(n)* was never shown in order to preclude an influence of spelling on the participants’ speech. In order to indicate the difference between the target noun *kreaker* “cracker” and the target verb *kreakje* “to crack”, a black puppet or so-called ‘screen bean’ was included in the compound condition. This puppet indicated that subjects should change the verb (i.e., action) into a noun (i.e., actor). The preceding sentence also helped to identify the difference between the phrase and compound conditions.

Nine questions were also presented in the sentence completion task (e.g., “*did you see X in the last picture?*” Some examples of *X*: a table, a bird or an insect). Every question appeared after approximately five items and had to be responded to orally as well. These questions were meant to distract the participants from the repetitive pattern of the test items and thereby make pronunciation as natural as possible.

2.3 Procedure

The procedure was identical to that in the study by Hanssen et al. (2012), except that the participants now received oral as opposed to written instructions. We judged oral instructions to be more appropriate for this study because speakers from Friesland are not accustomed to reading Frisian. Testing was conducted by one of three instructors who were all students of Frisian language and culture at the University of Groningen and spoke Frisian fluently. The participants were tested individually in a quiet room using a laptop.

In a questionnaire administered after completion of the picture naming task, the participants were asked about their native region and use of the Frisian and Dutch language. All responding was recorded using two SONY portable MD-recorders (type MZ-R55 and MZ-NH700) and two SONY ECM-MS907 microphones. The test and questionnaire took about 15 minutes to complete.

3. Results

3.1 Basic results

The pronunciation data were independently coded along a five-point scale by two trained transcribers: one speech therapist and one linguist. The scale ranged from “certainly no [n]” (1) to “certainly an [n]” (5). The midpoint of the scale (3) meant “unclear if an [n] was pronounced or not”. In addition, however, the pronunciation of no ending was coded with a “0” (14% of all cases). The agreement between the two transcribers was very high ($\kappa = .95$).

For comparison of the two transcriptions, three basic categories were used: [ə] (1 and 2), unclear (3), and [(ə)n] (4 and 5). We abstracted from the distinction between [ən] or [n] in these analyses and only take into account the contrast [ə] versus [ən] or [n] because this contrast is most apparent, most reliable for transcription and, moreover, considered to be phonemic in Frisian, while [ən] and [n] are allophones. If the two codings did not involve the same category, they were marked as “in disagreement”. Codings with a difference of one point within the same category were recoded as one (e.g., 1 + 2 as “2”; 4 + 5 as “4”). A third independent transcriber who was a linguist was called in in order to decide those cases on which the two transcribers did not agree (i.e., 5% of the items). For the cases with three codings, we then applied the criteria of “the ayes have it” to decide the final coding, neglecting the minority judgment. Those items on which there was still disagreement (i.e., 0.6% of the items) were coded as “3”.

In Figure 2, the pronunciation distributions (in percentiles) for the phrases and compounds are presented.

Figure 2. Histogram representing the proportion of the mean [n]-realizations along a five-point scale (1 = [ə]; 5 = [(ə)n]) for Frisian Phrases and Compounds.

Figure 2 shows a bimodal distribution of the data with thus two peaks: there is a peak at score 1 (= definitely no [n]) for the Frisian compounds and one at score 5 (= definitely an [n]) for phrases. We therefore interpreted the data as categorical for most of our analyses and employed logistic regression analyses, chi-square tests, and Fisher's exact tests to test for significance.⁹ Specifically, the n-realization scores for phrases and compounds were compared for the regions North and South. The influence of the bilingual speaker's mother tongue was examined next.

3.2 Phrases versus compounds

Only the “no [n]” responses (i.e., scores 1 and 2) and “[n]” responses (i.e., scores 4 and 5) were considered in the initial analyses of the pronunciation of the phrases versus compounds by the bilinguals responding in Frisian. The 0 and 3 scores, being 15% of the responses, were thus excluded. More specifically, the percentage scores for the phrases and compounds for the bilinguals from the North and the South were compared in a logistic regression analysis. In Table 2, the mean pronunciation scores along the five-point scale for n-realization are presented according to condition (phrase or compound) and region (North or South).

9. See: <http://www.langsrud.com/fisher.htm>.

Table 2. Mean Rating Scores along a Five-point Scale for n-Realization (1, 2 = [ə]; 3 = Unclear; 4, 5 = [(ə)n]) and Standard Deviations (in parentheses) according to Condition (Phrase or Compound) and Region (North or South)

Region	Condition	
	Phrase	Compound
North	3.58 (2.07)	1.39 (1.34)
South	3.71 (2.08)	1.84 (1.75)

Testing of a Generalized Linear Model (GLM) with a logit link function, Condition and Region as independent variables, and the [n]-realization scores as the dependent variable revealed a significant main effect of Condition ($F(1,1397) = 759.61$, $p < .001$). Phrases had higher n-realization scores than compounds. We also found a significant main effect of Region ($F(1,1396) = 16.09$, $p < .001$) and a significant interaction between Condition and Region ($F(1,1395) = 5.32$, $p < .05$). Speakers from region South had higher n-realization scores in compounds than speakers from region North. The differences between the North and South correlate with the participants’ native language and are therefore discussed under “Influence of mother tongue”.

A one sample t-test was next performed for each region and each condition in order to determine if a significant preference for [n] was present or not. The mean scores for phrases from speakers from the North and the South separately (3.58 and 3.71, respectively) differed significantly from the midpoint of the scale (3) (North: $t(382) = 5.51$, $p < .001$; South: $t(451) = 7.31$, $p < .001$). The same was found for compound scores for the speakers from the North and the South separately (1.39 and 1.84, respectively) (North: $t(382) = 23.58$, $p < .001$; South: $t(451) = 14.12$, $p < .001$). This shows the Frisian-Dutch bilinguals to systematically distinguish between plural and linking suffixes when speaking Frisian: Plurals are mostly pronounced as [(ə)n] while linking suffixes are mostly pronounced as [ə].

3.3 Influence of mother tongue

3.3.1 Introduction

The possible influence of a participant’s mother tongue was next examined, since there are differences in the pronunciation of the noun plural endings in phrases versus linking suffixes in compounds by bilinguals speaking Frisian but not — as shown in previous research (Hanssen et al., 2012) — when speaking Dutch,.

3.3.2 Distribution of individual pronunciation scores

Per participant, the number of instances of each ending per phrase and per compound were counted and the percentage of the responses pronounced $[(\text{ə})\text{n}]$ was computed next. These results were then plotted ($n = 55$) with the percentage of $[(\text{ə})\text{n}]$ pronunciations for compounds along the X-axis and the percentage of $[(\text{ə})\text{n}]$ pronunciations for phrases along the Y-axis (see Figure 3).

Figure 3. Distribution patterns of the mean percentages of $[(\text{ə})\text{n}]$ -realizations (0% = $[\text{ə}]$, 100% = $[(\text{ə})\text{n}]$) in Frisian Phrases and Compounds by individual participants (NE-Dutch = North-Eastern Dutch; Mix = mixed pattern; Holl = Hollandish; Fr = Frisian).

Figure 3 shows two distinct groups with only a few isolated individuals positioned outside these. The first and largest group involved 42 individuals and had few realizations of $[\text{n}]$ in compounds but clear realization in phrases. This pattern corresponds to the Frisian standard grammar and is thus referred to as the “Frisian type” (Fr). The other major group involved 10 individuals and had $[\text{n}]$ realization for most compounds *and* phrases. This pattern was predominantly found in Dutch among speakers in the north-eastern part of the Netherlands (see Hanssen et al., 2012). This pattern is thus referred to as North-Eastern Dutch (NE-Dutch). Typical for the central and especially western parts of the Netherlands (Holland) is non-realization of $[\text{n}]$ in most cases (see Hanssen et al., 2012); one participant showed this pattern of responding, which can be referred to as “Hollandish” (Holl). Finally, two individuals did not clearly fit into any of the groups and are therefore referred

to as “Mix”. Structurally, they are “Frisian” because they produced substantially more [n]-realizations in phrases than in compounds.

To sum up, apart from three outliers, there were two patterns of [n]-realization in spoken Frisian: A ‘Frisian’ type with contrasting pronunciations for phrases versus compounds and a North-Eastern Dutch type with realization of [n] across the board.

3.3.3 *Associations of pronunciation types with mother tongue*

In the next step in our analyses, the distribution of the 55 individuals according to mother tongue was examined. The figures are presented in Table 3.

Table 3. Mother tongue and distribution types

Mother tongue	Distribution type			
	FR	NE-Dutch	Mix	Holl
Frisian	40	6	0	0
Dutch	2	4	2	1

Chi-square test results show the impact of the mother tongue to be highly significant (χ^2 (3, $N=55$) = 23.55, $p < .001$). The Frisian pronunciation type is almost exclusively found for those participants with Frisian as their mother tongue (L1). Only 13% of these participants showed the NE-Dutch type of pronunciation and none of them showed the western Dutch (“Holl”) or mixed types of pronunciation.

Two of the participants with a Dutch L1 showed a Frisian pronunciation type as can be seen in Table 3. Their realization of [n] was nevertheless far from perfect, as explained below. The group of participants with a Frisian L1 and a Frisian pattern of pronunciation produced an average of 92% [n]-realizations for phrases and 9% for compounds. The latter is fairly easy for L1-Dutch speakers to learn, particularly when they follow the dominant western pattern of omission. And, indeed, the two Dutch L1 participants who had apparently mastered Frisian quite well showed a 3% [n]-realization in compounds but only 68% in phrases, presumably due to the influence of western Dutch (“Holl”).

One of the two participants showing a “Mix” pattern for pronunciation produced a similar pattern with 6% [n]-realization in compounds and 46% in phrases. The other “Mix” participant clearly deviated from the NE-Dutch type with 100% [n]-realization in phrases and 47% in compounds.

In sum: The Frisian pattern of pronunciation is predominantly found for mother tongue speakers of Frisian while the NE-Dutch pattern is predominantly found for mother tongue speakers of Dutch.

3.4 Geographical contrast

As already mentioned, the patterns of pronunciation for phrases versus compounds differed for the North versus South (cf. Table 2). The overall level of [n]-realization was lower in Buitenpost (i.e., the North) than in Heerenveen (i.e., the South) but lowest for compounds as opposed to phrases. This is because the realization of [n] in phrases was common for both groups. Mother tongue was also found to influence the exact patterns of pronunciation and thus gave rise to a further hypothesis about the causes of the pronunciation differences between the North and South. Given that the prototypical Frisian speaker has 50% [n]-realizations and the prototypical NE-Dutch speaker has 100% [n]-realizations, more participants of the NE-Dutch type within a region should lead to a higher level of [n]-realizations for compounds in particular.

As can be seen from Table 4, it turns out that Heerenveen (i.e., the South) had significantly more L1-Dutch participants than Buitenpost (i.e., the North) (8 vs. 1) (two-tailed Fisher's Exact Test, $p = .031$). And when examined in greater detail, Heerenveen *also* contained a marginally significant greater number of participants of the NE-Dutch type ($n = 8$) than Buitenpost ($n = 2$) (two-tailed Fisher's Exact Test, $p = .091$). In other words, the overrepresentation of L1-Dutch speakers in Heerenveen (i.e., the South) explains the higher level of [n]-realizations here.

Table 4. Mother tongue and regional origin, with special focus on the distribution of NE-Dutch type speakers

Region	Mother tongue			
	L1-Frisian	of which uses the NE-Dutch pronunciation	L1-Dutch	of which uses the NE-Dutch pronunciation
North (Buitenpost)	24	2	1	0
South (Heerenveen)	22	4	8	4

4. General discussion of bilingual speech processing

Frisian and Dutch, two closely related languages, show a discrepancy in morphology of compounds. In Dutch, the plural suffix *-en* is homophonous to the linking suffix *-en* (*boek+en* 'books', *boek+en+kast* 'bookcase'); in Frisian, such homophony between plural and linking suffixes does not generally exist (*boek+en*, *boek+e+kast*). The present study investigated whether Frisian-Dutch bilinguals keep these two systems of nominal compounding separate during Frisian speech production, that is, it was investigated whether there is transfer from Dutch to Frisian.

Our results showed two main types of grammars for Frisian speech production: The Frisian type and the north-eastern Dutch (NE-Dutch) type. Most mother tongue speakers of Frisian used the originally Frisian type in line with what was reported in the linguistic literature: Plural endings came out mainly as [(ə)n] and linking suffixes mainly as [ə]. This is also the distribution as stated in the standard grammar of Frisian (cf. Popkema, 2006). Alongside this dominant pattern, a minority of the bilingual Frisian-Dutch, both speakers with Frisian and Dutch as mother tongue, showed a dominant NE-Dutch type of grammar while speaking Frisian. They thus tended to pronounce [(ə)n] for *both* plural and linking suffixes. This finding reflects the pattern of speech found for bilingual Frisian-Dutch speakers from the northern (i.e., Friesland) and eastern parts of the Netherlands when asked to speak Dutch in a study parallel to the present study (Hanssen et al., 2012).¹⁰ The finding of higher [n]-realization for BOTH plural and linking suffixes in the South of Friesland (i.e., Heerenveen) than in the North (i.e., Buitenpost) reflects the overrepresentation of L1-Dutch speakers in the southern region.

We conclude that most Frisian-Dutch bilinguals with Frisian as their mother tongue employ a phonological distinction between the plural suffix *-en* and the linking suffix *-e* when speaking Frisian but not when speaking Dutch (Hanssen et al., 2012). For those speakers, there is no transfer from Dutch to Frisian. This observed switch by bilingual speakers depending on the language to be spoken is in agreement with the findings of other studies that show the (balanced) bilingual speaker to use two language systems separately (de Bot, 1992; Costa & Santesteban, 2004).

For speakers with Dutch as their mother tongue, the present findings show that speaker's native language plays an important role in their speech production. Speakers with L1-Dutch often maintained Dutch grammar when speaking Frisian while speakers with L1-Frisian did in general not maintain Frisian grammar when speaking Dutch. Thus, for L1-speakers of Dutch, their native language (Dutch) influences their second language production (Frisian). It is possible that this interference effect stems from proficiency level as the L1-Dutch speakers rarely spoke Frisian and were thus less proficient in Frisian than the L1-Frisian speakers who frequently used both Frisian and Dutch in daily life.

The present results can be explained by combining two hypotheses regarding bilingual speech processing. On the one hand, the target-language specific

10. In that study, there are 20 informants from Fryslân, 10 with Frisian as their first language. One of them transfers the Frisian type of grammar into Dutch. This informant was also in the current study and shows the Frisian type of grammar there as well. Among the other of in total 8 personally overlapping informants in the two studies, there are two who distinguish between the two types of grammar in their Dutch and Frisian speech.

hypothesis argues that a non-response language (i.e. the language that is supposed to be not activated) does NOT influence target language responding; on the other hand, the target-language non-specific hypothesis argues that a non-response language *can* influence target language responding (Costa, 2004, p. 206). A tentative explanation for our results is that less proficient bilinguals (i.e., most of the L1-Dutch bilinguals responding in Frisian) show less target-specific language processing than more proficient bilinguals (i.e., most of the L1-Frisian bilinguals speaking Frisian) who can be expected to show more language-specific speech processing (Costa, 2005, p. 322). As reported by Costa (2004, p. 206), current models of speech production and bilingualism assume that the two lexicons of the bilingual are simultaneously activated during speech production (e.g., Costa & Caramazza, 1999; de Bot, 1992, 2000; Green, 1986, 1998; Hermans, Bongaerts, de Bot, & Schreuder, 1998; Poullisse & Bongaerts, 1994; Schoonbaert, Hartsuiker, & Pickering, 2007). However, our findings show such general activation to not affect the pronunciation of linking suffixes by proficient Frisian-Dutch bilinguals with Frisian as their mother tongue as they appear to effectively keep the Dutch and Frisian language systems separate in speech production; they distinguish plural endings from linking suffixes when they speak Frisian but not when they speak Dutch (Hanssen et al., 2012). We consider this to be a remarkable outcome, given the overwhelming manifestations of interference from Dutch in present-day Frisian (e.g., Breuker, 1993; Hoekstra & Slofstra, 2008; Sjölin, 1976; Slofstra et al., 2009).¹¹

The results of the present study lend further support for the study by Hanssen et al. (2012), who argued against the claim that regular morphological plurals cannot be input for noun-noun compounding. The present study shows that regular morphological plurals can be found as left-hand members of nominal compounds even in Frisian, more specifically, with unbalanced bilingual speakers of Frisian. Apparently, it is not difficult for these speakers to transfer the Dutch system of homophony of plural and linking suffix to Frisian. Furthermore, it is interesting that they choose a form of homophony in which the Frisian plural suffix (pronounced with a final nasal) is used as a linking suffix. The opposite is hardly ever found: use of the linking suffix (a schwa) as the plural suffix.

11. There may be a difference between L1-speakers of Dutch and L1-speakers of Frisian, when it comes to exhibiting interference from the other language. Six out of 46 L1-speakers of Frisian (13%) applied Dutch grammar in their Frisian utterances (see Table 3), against zero out of 10 L1-speakers of Dutch (0%) in the Dutch version of the test (Hanssen et al., 2012). While this is consistent with the expected direction of interference, i.e. from dominant language to minority language, the observed contrast is not statistically significant (one-tailed Fisher's Exact Test, $p=0.29$).

5. Concluding remarks

Our results show that the plural suffix is distinguished from the linking suffix by most Frisian-Dutch bilinguals during Frisian speech production. Two types of Frisian-Dutch bilinguals could be distinguished: Those with L1-Dutch who predominantly maintained the Dutch system when speaking Frisian, illustrating interference from Dutch on Frisian, and those speakers with L1-Frisian who mostly maintained the Frisian system when speaking Frisian. In general, Frisian-Dutch bilinguals distinguish plural endings from linking suffixes when they speak Frisian but not when they speak Dutch (Hanssen et al., 2012). Hence it must also be concluded that bilinguals are able to apply two distinctive systems of compound formation in their speech production.

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Appendix A

Items used in this study are provided here, accompanied their Dutch and English translations. The items are intended as spoken Frisian, so we avoided book language and hypercorrection. The context “He now wants to ...” is used for phrases (a) and the context “This is really a ...” is used for compounds (b). When deemed relevant, a less literal translation for the Frisian compound is also provided.

Experimental items	Frisian phrase a. or compound b.	Dutch equivalent	English translation (literal)
1a	bannen plakken	banden plakken	stick tires
1b	bânplakker	bandenplakker	tire sticker
2a	bellen blaze	bellen blazen	blow bubbles
2b	belleblazer	bellenblazer	bubble blower

3a	boeken lizze	boeken leggen	lay books
3b	boekelizzer	boekenlegger	book layer
4a	bonken brekke	botten breken	break bones
4b	bonkebrekker	bottenbreker	bone breaker
5a	brieven skriuwe	brieven schrijven	write letters
5b	brieveskriuwer	brievenschrijver	letter writer
6a	druven plukke	druiven plukken	pluck grapes
6b	druveplukker	druivenplukker	grape plucker
7a	flessen trekke	flessen trekken	pull bottles
7b	flessetrekker	flessentrekker	bottle puller
8a	kamielen driuwe	kamelen drijven	drive camels
8b	kameledriuwer	kamelendrijver	camel driver
9a	liuwen temmen	leeuwen temmen	tame lions
9b	liuwetemmer	leeuwentemmer	lion tamer
10a	muzen jeie	muizen jagen	hunt mice
10b	mûzejager / mûzejeier	muizenjager	mice hunter
11a	nuten kreakje	noten kraken	crack nuts
11b	nutekreaker	notenkraker	nutcracker
12a	poppen spylje	poppen spelen	play (with) dolls
12b	poppespiler	poppenspeler	doll player
13a	skroeven draaie	schroeven draaien	turn screws
13b	skroevendraaier	schroevendraaier	screw turner
14a	miggen meppe	vliegen meppen	swat flies
14b	miggemepper	vliegenmepper	fly swatter
15a	fuotten feie	voeten vegen	wipe feet
15b	fuotfeger	voetenveger	feet wiper
16a	fragen stelle	vragen stellen	ask questions
16b	fragesteller	vragensteller	question asker
17a	lúsjefer brekke	lucifers breken	break matches
17b	lúsjeferbrekker	lucifersbreker	match breaker
18a	duvels jeie	duivels jagen	hunt devils
18b	duveljeier	duivelsjager	devil hunter
19a	húskes kreakje	huisjes kraken	squat houses
19b	húskekreaker	huisjeskraker	house squatter
20a	famkes boartsje	meisjes spelen	play girls

20b	famkeboarter	meisjesspeler	girl player
21a	froulju lûke / frouwen lûke	dames trekken	pull ladies
21b	frouljuslûker / frou- welûker	damestrekker	lady puller
22a	lietsjes skriuwe	liedjes schrijven	write songs
22b	lietsjeskriuwer	liedjesschrijver	songwriter
23a	kaartsjes lizze	kaartjes leggen	lay (little) cards
23b	kaartsjelizzer	kaartjeslegger	(little) cards layer
24a	ezels temme	ezels temmen	tame donkey
24b	ezeltemmer	ezelstemmer	donkey tamer

Appendix B

Experimental items used in the study plus mean [n]-realization scores along the five-point scale (1 = definitely no [n]; 5 = definitely an [n]) for speakers from the North and South regions.

Experimental item	Frisian phrase (a) or compound (b)	English (literal)	Region	
			North	South
1a	bannen plakke	stick tires	2.67	1.63
1b	bânplakker	tire sticker	0.88	1.48
2a	bellen blaze	blow bubbles	3.16	4.10
2b	belleblazer	bubble blower	1.20	1.55
3a	boeken lizze	lay books	4.42	4.75
3b	boekelizzer	book layer	1.29	2.63
4a	bonken brekke	break bones	3.92	4.13
4b	bonkebrekker	bone breaker	1.60	1.50
5a	brieven skriuwe	write letters	2.04	2.60
5b	brieveskriuwer	letter writer	1.35	2.07
6a	druven plukke	pluck grapes	4.32	4.50
6b	druveplukker	grape plucker	1.92	2.19
7a	flessen trekke	pull bottles	3.96	4.16
7b	flessetrekker	bottle puller	1.25	2.42
8a	kamielen driuwe	drive camels	3.20	3.34
8b	kamiedriuwer	camel driver	0.80	1.55
9a	liuwen temmen	tame lions	3.56	4.00

9b	liuwetemmer	lion tamer	1.60	2.06
10a	muzen jeie	hunt mice	4.04	4.40
10b	mûzejager/mûzejeier	mice hunter	1.58	2.63
11a	nuten kreakje	crack nuts	4.60	4.84
11b	nutekreaker	nutcracker	1.70	1.97
12a	poppen spylje	play (with) dolls	3.95	2.66
12b	poppespiler	doll player	1.13	2.03
13a	skroeven draaie	turn screws	4.36	4.43
13b	skroevedraaier	screw turner	1.08	1.97
14a	miggen meppe	swat flies	2.96	3.47
14b	miggemepper	fly swatter	1.40	1.78
15a	fuotten feie	wipe feet	4.48	4.72
15b	fuotfeger	feet wiper	2.21	2.13
16a	fragen stelle	ask questions	1.25	1.87
16b	fragesteller	question asker	1.21	1.29

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