Does instruction about phonological correspondences contribute to the intelligibility of a related language?

A study with speakers of Dutch learning Frisian

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This paper investigates whether instruction about phonological correspondences between the native and a closely related language contributes to the intelligibility of this closely related language. Previous research has shown that closely related languages can be mutually intelligible to a certain degree (cf. Gooskens, 2007). Little is known about methods for improving the intelligibility of a closely related language. In this paper we focus on improving the intelligibility of spoken Frisian for Dutch speakers. In a 50-minute instruction session, participants got information about the most frequent sound correspondences between Dutch and Frisian, e.g. /sk/ in Frisian is often /sx/ in Dutch. The results of the intelligibility test show no significant improvement, neither at the text level, nor at the word level. Further research could focus on other language combinations, but also on a longer time span of intervention and other linguistic factors, such as unknown vowels.

Keywords: receptive multilingualism, mutual intelligibility, second language learning, intervention methods, Levenshtein algorithm, Frisian, Dutch, language planning

1. Introduction

In Europe, a large number of languages are spoken, of which 23 are official languages of the European Union (European Commission, 2013). In order to communicate with each other across language borders, several strategies can be chosen. The first option is to use a lingua franca, for instance English. However, when using a lingua franca some problems can be encountered. Firstly because, apart from 13% native speakers of English, only 38% of EU citizens state that they have

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sufficient knowledge of English to have a conversation (European Commission, 2006). Secondly, even if people are able to speak English, most of them cannot express themselves as well in English as they would be able to in their native language (Rogerson-Revell, 2007).

Another strategy that speakers of related languages may choose is receptive multilingualism. This entails that two speakers of related languages interact, each speaking their own language. Receptive multilingualism is commonly used in Scandinavia (Gooskens, 2007). An example is found in the popular television series *The Bridge*, created by Hans Rosenfeldt in 2011, where the Danish and Swedish police work together to solve a crime. Rather than using a lingua franca, they use receptive multilingualism.

However, sometimes communication problems are encountered using this strategy. So far these problems have been explained by extra-linguistic factors such as language attitude (Schüppert & Gooskens, 2011), as well as linguistic factors, such as lexical, phonetic and orthographic distances (Gooskens, 2007). Currently, a large-scale research program targeting both extra-linguistic and linguistic factors is being conducted (Gooskens, 2011). In total, sixteen languages from the three largest European language families, i.e. Germanic, Romance and Slavic, are included. A web-based survey will be done to investigate the mutual intelligibility between the written and spoken forms of the languages within these language families. The results will be correlated with both extra-linguistic and linguistic factors in order to investigate which factors play a role in the intelligibility of a closely related language.

Because the Scandinavian languages are quite closely related, only little instruction may be needed for the speakers of those languages to let them successfully communicate with each other using receptive multilingualism. But not every language pair within a language family is as closely related as the Scandinavian languages. To use receptive multilingualism with less closely related languages, a didactic method has to be applied to improve the mutual intelligibility among the speakers of the languages. Traditional language courses will probably not suit this purpose. In the first place, these courses focus on both production and perception. Since the goal of receptive multilingualism is primarily to teach someone to understand the language, the focus should be on perception. Some knowledge which is important for speaking a language perfectly may not be needed to understand a language. When looking objectively at differences between languages, by using, for example, frequency of token words and grammatical constructions, other differences than those which are described in existing study materials might be retrieved. These linguistic differences can be found in several linguistic categories, for instance phonetics, orthography, morpho-syntax and lexicon. Gooskens (2007) showed for example that phonetic and lexical differences between languages form

two important factors in predicting intelligibility. Instruction in these areas might therefore improve intelligibility.

This paper focuses on improving the intelligibility of spoken Frisian for Dutch speakers. These two languages have been selected, firstly, because of the language situation in Fryslân, a province in the north of the Netherlands. Frisian is the second official language of the Netherlands and it is spoken by approximately 400,000 people. Almost all speakers of Frisian are bilingual in Dutch. Therefore, in a contact situation between a Frisian speaker and a Dutch speaker, the first will tend to switch to Dutch. Frisians who continue speaking Frisian are often considered rude (Lutje Spelberg & Postma, 1995). At this moment the Frisian government strives to encourage people to use more Frisian. In 1970, Frisian gained the status of second official language of the Netherlands. Presently, the Dutch government is planning to determine the status of the Frisian language in the Dutch constitution as well. In this way, the rights of Frisian are increasingly legally protected by the government. The use of Frisian is also promoted, for example by a campaign called *Praat Mar Frysk*, which literally means 'Just Speak Frisian'. One problem with these campaigns is that they are primarily focused on Frisian people. According to Swarte, Hilton and Klinkenberg (2011) the Dutch listeners should also be targeted, since they are the ones with the negative attitude towards (learning) Frisian. If the attitudes of the Dutch listeners towards Frisian change, Frisian speakers might feel free to use Frisian more often.

The second reason for choosing Frisian and Dutch is that previous research has shown that, although Dutch people have a basis for understanding Frisian, there is still enough room for improvement. Van Bezooijen and Gooskens (2005) conducted a study with 67 native Dutch pupils with a mean age of 16.3 years. These pupils translated on average 45.6% of 19 Frisian words correctly to Dutch, which still leaves 10 words to be translated correctly.

This study focuses on teaching Dutch people how to understand Frisian more easily. Frisian is generally used more often as a spoken language than as a written language. While more than 80% of the population understand Frisian, only 12% state that they can write it well (Provinsje Fryslân, 2011). Therefore, we have decided to include only spoken Frisian in our study. When comparing the Dutch and Frisian lexicons, it appears that Dutch and Frisian only have a few non-cognates, i.e. words that do not share the same etymological background. The two languages do share a large number of cognates with small phonological differences. Combining these two aspects, i.e. the large number of cognates and the mostly oral usage, we decided to focus on the phonological correspondences between Dutch and Frisian.

This paper investigates whether instruction about linguistic correspondences between the native language, Dutch, and a closely related language, Frisian,

contributes to the intelligibility of this closely related language. We have opted for a didactic method which is form-focused rather than content-focused. This entails that language is not used as a means of communication, but as the object of study. The focus is mostly on the code instead of the message and learning is intentional rather than incidental. Form-focused also means that correspondences or rules are not given to the students, but that they have to discover these themselves (Ellis, 2001). A number of experimental studies have shown that form-focused types of instruction are more effective than content-focused types (Norris & Ortega, 2001). In our study we used this form-focused method, which means that the native and the closely related language are considered as objects of study. Furthermore, the focus is on the linguistic correspondences between the native and the related language and retrieving the meaning from the translation rather than emphasizing the meaning itself.

In sum, this paper investigates whether instruction about phonological correspondences between Dutch and Frisian contributes to the intelligibility of Frisian for Dutch listeners with no previous experience with Frisian.

2. Method

2.1 Participants

The participants were 23 children (11 boys and 12 girls), aged 11 or 12 from primary school *De Hoeksteen* in Bussum, a town with about 33,000 inhabitants located in the central part of the Netherlands (Figure 1). We opted for participants from this region, because they have little or no contact with people from Fryslân,

Figure 1. Map of the Netherlands, with the province of Fryslân (shaded)

the shaded province in the north in Figure 1. It is therefore unlikely that they have been exposed to Frisian and the Frisian language. We chose participants from a school for practical reasons, because in a class setting instruction can be given in an efficient way.

2.2 Experiment

Our experiment consisted of two parts, namely an intervention in which our participants were introduced to the most frequent phonological correspondences between Frisian and Dutch on the one hand (described in Section 2.2.1) and tests used to measure the participants' comprehension of Frisian before and after this intervention on the other hand (described in Section 2.2.2).

2.2.1 *The intervention*

In order to find the most frequent phonological correspondences between Dutch and Frisian the most frequent Frisian words from the *Korpus Sprutsen Frysk*[1] were obtained. We omitted abbreviations (for example *www*), words that were not Frisian (for example the Dutch word *eerste* ('first'), which is not in the Frisian dictionary (Spoelstra, Post & Hut, 2007)), interjections (for example *ja*, 'yes'), letters (for example *h*), (geographic) names (for example the Frisian town *Hearrenfean* or a Finnish soccer player called *Väyrynen*) or a merge of two words belonging to different word classes (for example *bisto* 'are you', which is a verb plus a pronoun). All other words were translated into Dutch, if possible using cognates. We thus obtained the 1,000 most frequent words and their translations into Dutch. Those 1,000 word pairs were phonemically transcribed in SAMPA, a computer-readable phonetic script.

We then looked for the most frequent sound correspondences between Frisian and Dutch. First, the transcriptions of the members of each word pair were aligned, as exemplified in Figure 2, where Frisian *gefallen* and Dutch *gevallen* ('cases') are aligned using the Levenshtein algorithm (Nerbonne & Heeringa, 2010).

Frisian	#	g	ə	f	ɔ	l	0	n	#
Dutch	#	ɣ	ə	v	ɑ	l	ə	n	#

Figure 2. Alignment of the Frisian and Dutch transcriptions of the word 'cases'; '0' indicates that a phoneme in the one language does not correspond with a phoneme in the other language; '#' is a word boundary.

1. The *Korpus Sprutsen Frysk* (obtained from the Fryske Akademy) comprises 650,000 words of transcribed speech. It includes conversations, interviews, discussions, meetings, class interactions, stories, comments, news, speech and reading (Fryske Akademy, 2013).

Next, the sounds on both lines were compared taking Frisian as the point of departure, i.e. /g/ → /ɣ/, /ə/ → /ə/, /f/ → /v/, etc. Not only single sound correspondences, but also correspondences between sequences of sounds were considered, for example /gə/ → /ɣə/, /əf/ → /əv/, /fɔ/ → /va/, etc. Sequences of two, three, four, five and six sounds were analyzed, also called n-grams, where $1 \leq n \leq 6$. The sound correspondences were selected by a computer algorithm. The beginning and end of the words were taken into account (see Figure 2).

Only those sound correspondences were selected where a Frisian n-gram corresponded for more than 50% with one particular different sound or n-gram in Dutch. The n-grams which fulfill this criterion form the basis for the Frisian-Dutch instruction. Two examples of n-gram correspondences are /ə0s#/ → /ərs#/ (which means that /əs/ at the end of a word in Frisian corresponds for more than 50% with /ərs/ at the end of a word in Dutch) and /0t#/ → /rt#/ (which means that /t/ at the end of a word in Frisian corresponds for more than 50% with /rt/ at the end of a word in Dutch). These correspondences can be found in for example Frisian *kers* /kɛs/ corresponding with Dutch *kers* /kɛrs/ ('cherry') and in Frisian *kaart* /kat/ corresponding with Dutch *kaart* /kart/ ('card'). From these correspondences rule 6 in Table 1, the r-insertion, can be derived. The procedure ultimately resulted in the eight most frequent sound correspondences between Frisian and Dutch, which are presented in Table 1.

Table 1. The eight most frequent phonological correspondences between Frisian and Dutch with examples

Correspondence	Frisian	Dutch	English
1. /f/ → /v/	/fɪsk/	/vɪs/	'fish'
2. /g/ → /ɣ/	/grup/	/ɣrup/	'group'
3. /u/ → /ɔ/	/undər/	/ɔndər/	'under'
4. /ɔ/ (preceding /s/, /l/, /d/, /t/ or /n/) → /ɑ/	/mɔn/	/mɑn/	'man'
5. /sk/ → /sx/	/skɪp/	/sxɪp/	'ship'
6. /r/-insertion	/kat/	/kart/	'card'
7. /jə/ → /i/	/ɑksjə/	/ɑksi/	'action'
8. /n/, /ŋ/ and /m/ → /ən/	/tɪntn/ /bukŋ/ /mɑpm/	/tɛntən/ /bukən/ /mɑpən/	'tents' 'books' 'maps'

2.2.2 *The tests*

There were 23 subjects. The test group consisted of 12 participants; they took part in the Frisian instruction on Frisian-Dutch correspondences. The other 11

Table 2. An overview of the design

Group	Test		Control	
	Group A (*N*=6)	**Group B (*N*=6)**	**Group C (*N*=6)**	**Group D (*N*=5)**
Pretest	Version 1	Version 2	Version 1	Version 2
Intervention	Intervention	Intervention	No intervention	No intervention
Posttest	Version 2	Version 1	Version 2	Version 1

participants formed the control group and worked on their own school work while the test group took part in the intervention. We used two tests to measure the participants' comprehension of Frisian. One of these measured comprehension at the text level (Section 2.2.2.1) and the other at the word level (Section 2.2.2.2). The participants' level of Frisian before taking the intervention was measured in a pre-test. Effects of the intervention were measured in a post-test right after the intervention. We used a crossed design (Table 2) in order to counterbalance uncontrolled variables, such as a learning effect and effects due to a loss of concentration. Half of the test group and half of the control group received one version as a pretest and the other as a posttest. The other half of the test and control groups had these tests reversed. These four groups were equally distributed with respect to gender.

2.2.2.1 *Text level*

To measure the participants' level of comprehension of Frisian at the text level, the participants answered multiple choice questions about a short children's story recorded in Frisian. The story they listened to was part of an episode of the Frisian children series *Tomke*, which was developed by Afûk in 1996. *Tomke* is a series about a little boy called Tomke and his dog Romke. Together they have all kinds of adventures in and around their house. A female kangaroo called Kornelia takes care of the two little guys. Besides the voices of the three characters, the participants heard a female narrator telling the story.

Although *Tomke* is a television series, the participants only listened to the story, without seeing the video. In this way they could not retrieve information from the images showing the events. A pilot showed that participants could follow the whole story almost perfectly without ever having heard any Frisian. This may be due to the fact that *Tomke* is a children's series with numerous repetitions, simple vocabulary and constructions and a slow speaking style rather than Frisian being in general easy to understand for Dutch listeners. To increase the difficulty of the task we manipulated the stimulus fragments, without affecting their naturalness. Firstly, the voice of the narrator was speeded up with 10% and Kornelia's voice with 5%. Secondly, redundant pieces of spoken text were omitted making sure that it did not affect the propositional content of the story. Finally, long pauses were

shortened in order to put some time pressure on the participants. As a result, the participants listened to a speeded-up audio fragment without repetitions or long pauses.

Ten open questions were asked about the contents of the story. In a 20-second silent interval after each fragment the participants could fill in their answer. The answer to the question could always be found in the text fragment preceding the break. Homophones, having the same phonological structure in Frisian and in Dutch, and non-cognates, with unrelated phonological structures in the two languages, were avoided in this text fragment, since they are either too easy or too difficult to understand.

Before the actual experiment, three pilot experiments were conducted. In all three tests the participants were comparable to the participants of the main experiment. Four different fragments were prepared for these pilot experiments. The goal was to find two equivalent intelligibility tests. In the first place, we wanted to make sure that the questions could not be answered using information from the questions themselves, common logic or world knowledge. Secondly, we wanted to check whether all questions could be answered by subjects who had sufficient knowledge of Frisian. Finally, we wanted to develop two tests with approximately the same level of difficulty.

In the first pilot the minimal score, the score that a member of the target group can get without listening to the audio fragment, was determined. The participants, 17 11- and 12-year old primary school pupils from *De Bekenkampschool* in the city of Groningen (see Figure 1), answered the questions without listening to the audio fragment. They were told that these questions belonged to a story which they would not get to listen to. The instruction was to read the questions carefully and use their imagination finding the answers. Ideally, the participants should answer no question correctly, because questions should not be answerable by using information from the questions, common logic, or world knowledge. The mean scores of the participants for the two selected fragments used in the pilot were 0.12 (SD = 0.03, range = 0 to 0.09) and 0.41 (SD = 0.06, range = 0 to 1.9) correct answers per 10 questions. This indicates that indeed it was virtually impossible to answer the questions without having heard the accompanying texts.

In the second pilot the maximal score, i.e. the score a native Frisian listener would be able to get, was assessed. Twenty 11- and 12-year old primary school children from *De Trije Doarpen Skoalle* in Reduzum (see Figure 1) answered the questions while they listened to the fragments. Ideally, these participants should answer all questions correctly, because they are all native speakers of Frisian. The mean scores for the two selected fragments were 8.9 (SD = 0.07, range = 8.3 to 10) and 9.3 (SD = 0.08, range = 7.7 to 10) correct answers to the 10 questions. So indeed, Frisian-speaking children hardly made any mistakes.

The last experiment was a pilot to select two approximately equally difficult fragments and questions. The 16 participants were 11- and 12-year old pupils from the *De Tweemaster* primary school in Nigtevecht. As Nigtevecht is near Bussum (see Figure 1), these children typically had the same language background as the children in the main experiment. These participants listened to the four audio fragments and answered the questions. They answered on average 5.4 (SD = 0.29, range = 1.5 to 10) and 5.1 (SD = 0.23, range = 1.9 to 8.8) out of 10 questions about the selected fragments correctly. This means both tests were about equally difficult.

2.2.2.2 *Word level*

In addition to the test at the text level, a test at the word level was used to measure the participants' level of comprehension. During this test, the participants translated 50 isolated Frisian words. The participants were instructed to translate the words into Dutch in the 10-second silent interval after each word. A short break was included after 25 words. The 50 words were selected from the 1,000 most frequent Frisian words in the *Korpus Sprutsen Frysk*. All words were nouns and no compounds were selected. Just like we used two versions of the test at the text level, we also used two versions of the test at the word level.

In each version 4 non-cognates (for example Fr. *holle*, Du. *hoofd*, 'head'), 10 homophones (for example Fr. *dochter*, Du. *dochter*, 'daugther') and 36 cognates (for example Fr. *wrâld*, Du. *wereld*, 'world') were included. The non-cognates were included to check whether the participants had any prior knowledge of Frisian. People who do not know any Frisian should not be able to translate non-cognates, since these cannot be derived from Dutch. The 10 homophones were included to give the participants confidence, since it would be easy for them to translate the words and it would remind them that Dutch and Frisian are quite alike. The 36 cognates were included to measure the degree of improvement. Those are the words the participants might be able to improve their performance on after the intervention.

2.2.2.3 *Background questionnaire*

As we also wanted to take extra-linguistic variables into account, the participants were asked to fill out a questionnaire before the pretest and after the posttest. One question pertained to age and language background and two ratings questions, which were asked twice, at the beginning and at the end of the test. The age and language background question were asked to find out whether age correlates with performance or if other languages might affect the test results. In the first rating question, "How well do you think you can understand Frisian?", subjects had to estimate their level of understanding of Frisian, from 1 (nothing) to 5 (everything). This question was included to assess whether there was a subjective change of

knowledge after contact with Frisian. In the second question, "What do you think of Frisian?", they were asked for their opinion of Frisian, from 1 (very ugly) to 5 (very beautiful). The answers to this question could point out whether contact with Frisian leads to a more positive or negative attitude towards the language.

2.3 Procedure

First, the participants filled out the questionnaire. Next, they received the pretest at the text level and then the pretest at the word level. Subsequently, depending on whether the participants were in the test or in the control group, they were taught the eight most frequent phonological correspondences between Frisian and Dutch (see Section 2.2.1) or they worked on their own school tasks. Next, they went outside for a break of a half an hour. They were instructed not to tell each other about the stories they had listened to. When they returned, they first received the posttest at the text level and then the posttest at the word level. Finally, they filled out the questionnaire once more.

2.3.1 *Intervention*

The goal of the intervention was to provide the participants with instruction about frequent phonological correspondences between Dutch and Frisian. To teach the participants the selected phonological correspondences, they participated in a 50-minute interactive lesson. Firstly, an introduction to Frisian and Fryslân was given to provide the children with some context. Next, the phonological correspondences were explained by means of examples.

The phonological correspondences were taught from the perspective of form-focused teaching. The sound correspondences between Frisian and Dutch were the object of study and were formulated as rules. For each rule the participants were given two examples with word pairs so that they could discover the correspondence themselves. Everything was presented orally. An example of a word pair is "*gek* (/gɛk/) means *gek* (/ɣɛk/)" ('crazy'). After the detection of the correspondence, the participants were asked to formulate a rule, in this case: "A /g/-sound in Frisian corresponds with a /ɣ/-sound in Dutch.". Then they were given a Frisian word and they had to apply the rule themselves, for example "What does *grap* (/grɑp/) mean?" "It means *grap* (/ɣrɑp/)." ('joke').

After the first five rules and after all eight rules, two games were played. During the games the participants had to apply the rules again to translate a Frisian word into a Dutch word. The goal was to test the knowledge of the rules. The rules were mixed and also combined in one word. For example, in the Frisian word *gefallen* /gəfɔln/, which means *gevallen* /ɣəvaləŋ/ 'cases', four rules can be applied: /g/ → /ɣ/, /f/ → /v/, /ɔ/ preceding /l/ → /a/ and /n/ → /əŋ/.

2.3.2 *Scoring the data*

A response template was used to rate the scores for the test at the text level. Partly correct answers were given half marks; for example, when the target answer was "a big fish" and the response was "a fish". When the participants were required to make an enumeration of more than two answers, they received parts of the points for every correct element. Correct answers, but answers which were written down in Frisian and not translated into Dutch, were still scored as half correct, because the participants were able to derive from the story what the target answer was.

In the test at the word level the words were rated as correct, incorrect or half correct. Half correct words were plural forms which were translated as singular or vice versa.

3. Results

3.1 Correlations

The participants took part in four different tests: two linguistic tests and two extra-linguistic tests. The two linguistic tests measured the intelligibility of Frisian on both text and word level. We also looked specifically at the words in the test on word level in which solely the rules from the intervention had to be applied to get a correct answer. In the extra-linguistic tests, the participants were asked how well they thought they could understand Frisian and how beautiful they thought the language was. We ran a correlation analysis to determine whether correlations between any linguistic and extra linguistic test could be found.

No correlation can be found for all combinations of tests, which indicates that every test can provide information independently. One exception is the combination of the test on text level and the text on word level with solely the rules. This correlation is significant at a level of 0.01 and can be considered strong ($r = -0.670$). This means that about 45% of the variance is explained by the other variable, which still leaves 55% of the variance to be explained.

Table 3. Correlation matrix between dependent variables

		Linguistic test			**Extra-linguistic test**
		Text	**Word**	**Word (rules)**	**Understanding**
Linguistic test	Word	0.369			
	Word (only rules)	−0.670*	−0.314		
Extra-linguistic test	Understanding	−0.127	−0.166	−0.096	
	Beauty	0.248	0.008	−0.045	0.370

3.2 Linguistic tests

The linguistic pre- and posttest measured the intelligibility of Frisian among the participants on both text and word level. For both levels and for both the test group (the group that received an intervention) and the control group (the group that did not take part in the intervention) we examined if they improved their performance significantly on the posttest compared to their performance on the pretest. Furthermore, we assessed whether the test group improved significantly more than the control group to determine whether the intervention was effective. The results for both groups and the groups taken together on the linguistic pre- and posttest are shown in Table 4.

Table 4. The results for both groups and the groups taken together on the linguistic pre- and posttest (in which the p's are p-values from paired samples t-tests of both groups separately and taken together between the pre- and posttest)

Test level		**Test group ($N=12$)**			**Control group ($N=11$)**			**Both groups ($N=23$)**		
		Mean	**SD**	***p***	**Mean**	**SD**	***p***	**Mean**	**SD**	***p***
Text	Pretest	3.9	1.69	0.377	4.2	1.43	0.185	4.1	1.55	0.121
(max.=10)	Posttest	4.6	1.52		5.1	1.64		4.8	1.56	
Word	Pretest	23.8	1.88	0.490	23.4	2.07	0.320	23.6	1.97	0.287
(max.=40)	Posttest	24.4	1.95		24.3	1.79		24.3	1.82	
Word (only rules)	Pretest	8.4	2.14	0.737	7.6	2.86	0.445	8.0	2.48	0.407
(max.=12.5)	Posttest	8.8	2.29		8.9	2.44		8.9	2.31	

For each group and for each test no significant difference between the pre- and posttest was found. On the test at the text level, two paired samples t-tests, based on the absolute scores per subject, indicated that neither the test group nor the control group performed significantly better on the posttest than on the pretest (respectively $t(11) = -0.921$, $p = 0.377$ and $t(10) = -1.425$, $p = 0.185$). A third paired samples t-test indicated that the two groups taken together also did not perform significantly better ($t(22) = -1.614$, $p = 0.121$). On the test at the word level both groups translated almost half of the words correctly both on the pre- and the posttest. The three paired samples t-tests showed no significant differences ($t(11) = -0.714$, $p = 0.490$, $t(10) = -1.046$, $p = 0.320$ and $t(22) = -1.090$ $p = 0.287$). Next, we looked specifically at the words in which solely the rules from the intervention had to be applied to get a correct answer, which were on average 12.5 words (11 in version 1 and 14 and in version 2). The paired samples t-tests showed

Table 5. Mean differences between the pre- and posttest and standard deviations of the two subject groups on the linguistic tests (in which p is the p-value from an independent samples t-test comparing the differences between pre- and posttests of both groups per test)

Test level	Test group		Control group		*p*
	Mean	SD	Mean	SD	
Text	0.68	1.94	0.83	1.94	0.879
Word	0.50	3.27	0.86	2.74	0.776
Word (only rules)	0.42	4.19	1.23	5.12	0.684

no significant differences (respectively $t(11) = -0.345$, $p = 0.737$, $t(10) = -0.795$, $p = 0.445$ and $t(22) = -0.845$ $p = 0.407$).

An overview of the improvement between the pre- and posttest of the test and control group is shown in Table 5. To test whether the test group scored better than the control group, difference scores between the pre- and posttest were determined per subject. Three independent t-tests comparing the difference scores show that the differences between the test group and the control group were not significant on all three tests ($t(21) = 0.154$, $p = 0.879$, $t(21) = 0.290$ $p = 0.776$ and $t(21) = 0.417$ $p = 0.684$).

3.3 Background variables

In a questionnaire before the pretest and after the posttest the participants were asked how well they thought they could understand Frisian and how beautiful they thought the language was. For both questions we assessed if there was a difference between the scores at the beginning or at the end of the test. Additionally, we examined if there was a difference in change of opinion between the test and control group to determine whether the intervention had an effect. The results for

Table 6. The results for both groups and the groups taken together on the extra-linguistic pre- and posttest (in which the p's are p-values from paired samples t-tests of both groups separately and taken together between the pre- and posttest)

Scale	Test	Test group ($N = 12$)			Control group ($N = 11$)			Both groups ($N = 23$)		
		Mean	SD	*p*	Mean	SD	*p*	Mean	SD	*p*
Understanding	Pretest	1.9	0.79	0.058	1.9	0.70	0.046	1.9	0.73	0.005
	Posttest	2.5	0.58		2.5	0.82		2.5	0.69	
Beauty	Pretest	2.9	0.67	0.166	2.7	0.61	0.082	2.9	0.63	0.665
	Posttest	3.1	0.51		2.5	0.92		2.8	0.78	

Table 7. Mean differences between the pre- and posttest and standard deviations of the two subject groups on the extra-linguistic tests (in which p is the p-value from an independent samples t-test comparing the improvement between pre- and posttests of both groups per test)

Scale	Test group		Control group		*p*
	Mean	SD	Mean	SD	
Understanding	0.63	1.03	0.64	0.92	0.978
Beauty	0.17	0.39	−0.27	0.47	0.023

both groups and the groups taken together on the extra-linguistic pre- and posttest are shown in Table 6.

The results suggest that both groups of subjects believed they could understand Frisian better on the posttest than on the pretest. For the control group this difference was significant ($t(10) = -2.283$, $p = 0.046$), but for the test group it was not ($t(11) = -2.112$, $p = 0.058$). The difference is also significant for the two group together $t(22) = -3.162$, $p = 0.005$). As for the question about beauty, for both groups separately and for the groups together the difference between the pre- and posttest was not significant ($t(11) = 1.483$, $p = 0.166$, $t(10) = -1.936$, $p = 0.082$ and $t(22) = 0.439$, $p = 0.665$).

An overview of the opinion changes between the pre- and posttest of the test and control group on the extra-linguistic tests is shown in Table 7. The difference scores show that the opinions of the test group and control group did not differ significantly from each other regarding how much they believed they were able to understand Frisian ($t(21) = -0.028$, $p = 0.978$). However, a difference was found between both groups concerning the beauty of Frisian. The test group believed Frisian was more beautiful on the posttest than they thought on the pretest, while the control group believed Frisian was less beautiful than they thought before. This difference is significant: $t(21) = 2.459$, $p = 0.023$.

4. Conclusion and discussion

In this paper one possible method to improve the intelligibility of a closely related language is described, namely providing specific information about frequent phonological correspondences between language pairs. In a 50-minute instruction session, speakers of Dutch were taught the most frequent phonological correspondences between Frisian and Dutch. As expected, the control group did not perform significantly better on the posttest than on the pretest at the text and word level. But, somewhat disappointingly, the test group did not perform significantly better

either. Both groups of subjects thought they understood more Frisian after the posttest compared to before the pretest and this was, taking both groups together, significant. The only significant difference between the two groups was that the test group thought Frisian was more beautiful and the control group thought it was less beautiful after the posttest compared to what they thought before the pretest. To conclude, the conducted intervention was not suitable for improving intelligibility of a related language, the necessary condition for receptive multilingualism.

The lack of significant differences between the groups and between the pre- and posttest on the linguistic tests can be due to several factors. Firstly, the intervention lasted for only 50 minutes, which is far less than Hedquist (1985) suggested. He showed that a time span of ten hours of instruction is sufficient to improve intelligibility considerably. He tested the spoken and written intelligibility of Swedish among Dutch students. The students had no prior knowledge of Swedish, but after the intervention they were able to translate a substantial part of a Swedish text. In his instruction he provided information about lexical and phonological or orthographic differences between the languages. Secondly, the participants were only 11 or 12 years old. They might not be used to this way of learning with detecting, formulating and applying rules. Students or older participants are possibly more appropriate subjects for this manner of teaching. Thirdly, the children had little motivation. They participated in the tests because they were told to, but they did not have an internal motivation to learn Frisian. Additionally, because Frisian and Dutch are so closely related, the most frequent correspondences were sometimes predictable (/g/ → /ɣ/) or even hard to detect (/f/ → /v/). As a result, learning these rules might not add to the intelligibility of Frisian. Furthermore, we excluded word combinations like *bisto* 'are you', but they might have been important and should therefore be taken into account in future research.

Having obtained the data, some additional analyses were conducted with the results from the test at the word level. Firstly, an independent samples t-test shows that participants performed significantly worse at translating the 8 non-cognates ($x = 0.01$, $SD = 0.02$) than at the 92 cognates ($x = 0.52$, $SD = 0.42$) ($t(98) = 3.412$, $p = 0.001$). According to another independent sample t-test, the 20 words ($x = 0.96$, $SD = 0.10$) that are identical in Frisian and Dutch were translated significantly better than the 80 words ($x = 0.36$, $SD = 0.38$) that are non-identical ($t(98) = 6.994$, $p = 0.000$). A third important intelligibility factor seems to be an unknown vowel. Frisian has a few vowels which do not exist in Dutch. On the pre- and posttest 27 of the 100 words include an unknown vowel, which are: /ju/, /ɛ:/, /öə/, /uɑ/, /ɔ:/, /uɔ/, /uə/, /ɪə/, /ɔ~/, /oə/, /i:/, /ʏə/ and /ai/. An independent samples t-test indicates that the participants perform significantly worse on words with an unknown sound than on words with only known sounds ($t(98) = -3.235$, $p = 0.002$). A fourth factor is phonological distance, which was calculated with the Levenshtein algorithm

(Nerbonne & Heeringa, 2010). A significant negative correlation ($r = -0.654$, $p < 0.001$) was found between phonological distance and the proportion of correct translations of a word, leaving the non-cognates out of consideration. This means that the larger the phonological distance between the Frisian and Dutch version of a word, the lower the participants score and vice versa. Lastly, a positive correlation was detected between the number of sounds in a word (ranging from 3 to 10) and the proportion of correct translations ($r = 0.187$, $p = 0.037$). This suggests that the longer the word, the easier it is to recognize and translate. The same tendency was found in research on first language recognition (Luce & Pisoni, 1998).

In future research the intervention should be longer and more appropriate subjects could be chosen. Besides, in preparing an intervention, including other factors like unknown vowels, phonological distance, and word length might be useful. Moreover, unpredictable sound correspondences might be taken into consideration, i.e. /iə/ → /a/ in *hier* → *haar* ('hair'), in which the highest vowel corresponds with the lowest vowel. Or maybe a lexical intervention might be more useful, presenting the most frequent non-cognates (i.e. Fr. *hynder*, Du. *paard*, 'horse' or Fr. *heit*, Du. *vader*, 'father'), or false friends, which are not deducible from the context (i.e. Fr. *net*, Du. *niet*, 'not' and not Du. *net*, 'almost').

Looking back, the choice for the combination of the Frisian and Dutch language might not be suitable for finding a useful method for teaching how to understand a language. This study sheds light on a whole different area, namely how confrontation with the Frisian language influences attitudes towards it. Twenty-three children, of whom 11 worked with Frisian for about one hour and 12 for almost two hours, believed they understood significantly more Frisian than before (while the objective data is not in line with their observations). Furthermore, children who took part in the intervention, and thus were introduced to the language in more detail, thought Frisian was more beautiful. This is in line with the suggestions made by Swarte et al. (2011): saving Frisian starts with targeting the Dutch people, not the Frisians. To conclude, this intervention may not be useful for improving understanding Frisian, but it changes the attitude towards the language.

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