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INVESTIGATING THE ROLE OF LANGUAGE ATTITUDES FOR PERCEPTION ABILITIES USING REACTION TIME

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Abstract

Danish and Swedish are mutually intelligible to a certain extent, but it has been shown that adult Danes confronted with spoken Swedish recognise more items than adult Swedes who are confronted with spoken Danish. However, this asymmetry was not confirmed for illiterate Danish and Swedish pre-schoolers, which suggests that the factors that were controlled for in the study with preschoolers, namely literacy, previous exposure and attitude, cause the asymmetry in mutual intelligibility in adults. In this paper, we investigate what attitudes adults and pre-schoolers hold towards the neighbouring language, and whether there is a relationship between attitudes held towards the neighbouring language and abilities to decode it. Attitude elicitation from 45 Danish-speaking and 39 Swedish-speaking participants revealed that attitudes change with age, but individual reaction time measurements towards 50 auditorily presented cognate nouns in a multiple-choice picture-pointing task showed no significant correlation with individual attitudes.

Keywords

attitude, perception, word recognition, Danish, Swedish

INVESTIGANDO EL PAPEL DE LAS ACTITUDES LINGÜÍSTICAS EN LAS HABILIDADES PERCEPTIVAS USANDO EL TIEMPO DE REACCIÓN

Resumen

El danés y el sueco son mutuamente inteligibles hasta cierto punto, pero se ha demostrado que los daneses adultos reconocen más elementos del sueco hablado que los suecos adultos con relación al danés hablado. Sin embargo, esta asimetría no ha sido confirmada por daneses y suecos analfabetos en edad preescolar, lo que sugiere que los factores que fueron controlados en el estudio con niños en edad preescolar, principalmente, la alfabetización, la exposición previa y la actitud, son los causantes la

asimetría en la comprensión mutua en adultos. En este trabajo, investigamos las actitudes que adultos y niños en edad preescolar mantienen hacia la lengua vecina, y si existe una relación entre estas actitudes y las habilidades para decodificarla. Las actitudes obtenidas de 45 hablantes de lengua danesa y de 39 de lengua sueca revelan que estas cambian con la edad, pero la medida temporal de la reacción individual ante 50 cognatos que fueron presentados auditivamente en una tarea de elección múltiple de imágenes muestra que no existe una correlación significativa con las actitudes individuales.

Palabras clave
actitud, percepción, reconocimiento de palabras, danés, sueco

1. Introduction

Within Scandinavia, communicating across linguistic borders using the language of the speaker is a habit strongly encouraged by the authorities. Danes, Norwegians and Swedes are likely to use their native language rather than a lingua franca when speaking to each other. This manner of communication has been called *semicommunication* by Haugen (1966) and *receptive bilingualism* by Hockett (1958). Haugen defined semicommunication as "the trickle of messages through a rather high level of 'code noise'" (Haugen 1966: 281). As Braunmüller (2002) pointed out, Börestam (1997) tracked back the term "code noise" to Hockett (1958), who defined code noise as "divergence between the codes of two people who communicate with each other via speech" (Hockett 1958: 331f). Haugen thus suggests that semicommunication is characterised by the differences between the two varieties employed. It was also Hockett (1958), who defined semi-bilingualism as "receptive bilingualism accompanying productive monolingualism" (Hockett 1958: 327), thereby introducing the term *receptive bilingualism*. While the term *semicommunication* focuses on the problems of this communication mode, *receptive bilingualism* emphasises the benefits rather than the shortcomings.

A lot of research on mutual intelligibility of closely related language varieties has been conducted in Scandinavia over the past decades. Among many other things, it has been shown that mutual intelligibility between the closely related languages Danish and Swedish is asymmetrical in such a way that Danes have fewer difficulties recognizing spoken Swedish words than Swedes have recognizing spoken Danish. This asymmetry

has been reported in several studies (Maurud 1976; Bø 1978; Delsing & Lundin Åkesson 2005; Gooskens & Kürschner 2010). In a recent study, however, Schüppert & Gooskens (2010) showed that this asymmetry is not found in pre-schoolers. In contrast to previous investigations of mutual intelligibility between Danish and Swedish (Maurud 1976; Bø 1978; Delsing & Lundin Åkesson 2005; Gooskens & Kürschner 2010), the Swedish-speaking participants scored as high as the Danish speaking participants in a word recognition task, indicating that one or several of the factors that were controlled for by Schüppert & Gooskens (2010) cause the asymmetry in mutual intelligibility that is consistently found among adults. The variables that were controlled for were literacy, attitude held towards the neighbouring language, and previous exposure to it. These factors have been shown to have an impact on intelligibility in earlier studies. Maurud (1976) and Delsing & Lundin Åkesson (2005) report that a larger amount of contact to the neighbouring language is linked to better word recognition, and Delsing & Lundin Åkesson (2005) and Gooskens (2006) found that a positive attitude towards the neighbouring language is associated with higher word recognition. Gooskens & Doetjes (2009) suggested that orthographic knowledge serves as an additional cue for Danish listeners, as Danish orthography is more conservative than Swedish orthography and therefore closer to Swedish pronunciation than vice versa.

In the present paper, we investigate the relation between the participants' attitudes and their word recognition abilities. Evidence that these two factors correlate was provided in earlier studies by Wolff (1959), Delsing & Lundin Åkesson (2005) and Gooskens (2006). Wolff (1959) investigated mutual intelligibility between the two closely related Nigerian languages Kalabari and Nembe and found that speakers of Nembe, which is commonly regarded as having a lower status than Kalabari, have fewer difficulties understanding Kalabari, than vice versa. However, Wolff (1959) elicited neither overt nor covert attitudes empirically from his participants and based his conclusion on 'common knowledge' about the two languages.

In contrast to Wolff (1959), Delsing & Lundin Åkesson (2005) elicited their Danish and Swedish-speaking subjects' attitudes by asking them the following two questions: (a) *Would you like to live in Sweden/Denmark?* and (b) *Do you think Swedish/Danish sounds nice or ugly?* The answers to the first question were ternary (*yes*, *perhaps*, *no*), and the answers to the second question were given on a five-point

Semantic Differential scale, ranging from *nice* to *ugly*. The individual attitude scores were correlated with the individual comprehension scores obtained in three different tasks: (i) watching a video sequence in the neighbouring language and answering five open questions about the sequence, (ii) listening to news in the neighbouring language and answering five open questions about its content, and (iii) reading a newspaper article and answering ten multiple-choice questions about it. Delsing & Lundin Åkesson's (2005) results showed that attitudes towards the country (i.e. answers to question (a)) correlated significantly with comprehension scores for the Swedish but not for the Danish participants, while attitudes towards the language (i.e. answers to question (b)) correlated significantly with comprehension scores for the Swedish but not for the Danish participants. In other words, Swedish comprehension of Danish is partially predicted by the participants' attitudes towards the country of Denmark, whereas Danish comprehension of Swedish is partially predicted by the participants' attitude towards the Swedish language. In a re-analysis of Delsing & Lundin Åkesson's (2005) data, Gooskens (2006) correlated intelligiblity scores and language attitudes per site and per test language. She reports a significant correlation between answers to question (b) and comprehension scores, but not between answers to question (a) and comprehension scores. The fact that the effect reported by Delsing & Lundin Åkesson (2005) disappeared under aggregation of the data confirms their finding that the link between language attitudes and intelligibility is not very strong and could only be established for a specific group of participants.

On the basis of Delsing & Lundin Åkesson's (2005) and Gooskens' (2006) results, we hypothesise that there is a link between individual word recognition and attitude towards the sound of the neighbouring language. More specifically, we assume that positive attitudes correlate with good word recognition abilities, but any causal relationship between these two variables will remain unknown in this experiment. It is possible that participants holding a positive attitude towards the neighbouring language make a greater effort understanding it; but it might also be the case that higher comprehension of a language variety leads to a more positive attitude. A third possibility is that attitude and comprehension are not linked directly, but that both variables are interrelated. For example, a positive attitude might not cause higher comprehension, but a higher amount of contact, which, in turn, might lead to higher comprehension.

Dialectologia. **Special issue, II** *(2011), 119-140.*
ISSN: 2013-2247

2. Method

2.1. Participants

Participants were 19 Danish-speaking and 27 Swedish-speaking three to six-year-old preschoolers and 21 Danish-speaking and 19 Swedish-speaking 17 to 20-year-old adults. All subjects lived 200 km from the Swedish-Danish border, the Danish participants in Odense and the Swedish participants in Växjö, and were tested at their day-care. Several day-care institutions in Växjö and Odense had been approached and two at both sites (i.e. four in total) were eventually picked for participation. As the experiment was conducted individually, sessions lasted about 30 minutes per child. To ensure that all children were tested at roughly the same time of the day, testing took place before noon and during several days. All children were part of the study reported in Schüppert & Gooskens (2010).

A questionnaire was used to exclude participants with previous high exposure to the neighbouring language. The children's parents were asked if their children were monolingual, and the adult participants were asked the same question and, in addition, which foreign languages they had acquired. In the same way, all children's parents and all adult participants were asked if they had been to the neighbouring country, how often they had heard the neighbouring language, and if they had watched undubbed TV in the neighbouring language. After questionnaire evaluation, one Swedish child was excluded due to extensive contact with the Danish language through his Danish father, and one Danish adult was excluded due to L2 acquisition of Swedish. Eighty-four participants remained for the analysis. No participants were excluded on the basis of previous exposure due to occasional TV watching or short visits to the neighbouring country. An independent t-test revealed that neither the children nor the adult participants had had a significantly different amount of previous exposure to the other language.

Table 1 gives an overview of how age and sex were distributed in the four groups. The two groups of children did not differ significantly in these respects. Neither did the two groups of adults. The adult Danes, however, were predominantly female (80 percent), while the adult Swedes were predominantly male (74 percent).

	Danish		Swedish	
	children	**adults**	**children**	**adults**
N	19	20	26	19
Age ($\bar{x}$; *S*)	5.7 ; 0.6	18.6 ; 1.2	5.3 ; 1.0	18.1 ; 0.2
Age range (years)	4.5 - 6.6	17 - 20	4.0 - 6.7	18 - 19
Males (%)	47	20	38	74

Table 1. Age and sex distribution for the four groups of participants.

2.2 Stimulus material

The auditory stimulus material consisted of 50 Swedish-Danish cognate nouns. The target material consisted of 200 pictures, of which 50 were target pictures and 150 were distracters. In order to find appropriate labels for the target pictures, and in order to make sure that target pictures would be clearly labelled with a cognate word even by the youngest children in the experiment, 112 pictures from the picture database developed by the Max-Planck-Institute for Psycholinguistics were shown to five Danish and five Swedish four-year-old children in a pre-test. The children participating in the pre-test were asked to label these pictures spontaneously, i.e. to name the object on the picture with one single word. To be included in the stimulus material, a picture had to meet two criteria. The intra-group criterion was a labelling consistency of at least 80 percent: only pictures that were labelled the same by at least four out of five children per language group were included in the stimulus material. If several labels were given by a child, only the first label was used for the calculation of the labelling consistency of every picture. The inter-group criterion was a cognate label. For example, the picture of a girl was consistently labelled *pige* by the Danish children and *flicka* by the Swedish children. These two words are not cognates; therefore, this criterion was not met and the picture was excluded. 53 pictures met both the intra-group and the inter-group criterion.

The 106 labellings (53 Danish and 53 Swedish) were used as auditory stimulus material. They formed pairs of cognates with different degrees of phonetic distances, as indicated in Table 2. To calculate phonetic distances, the Levenshtein algorithm was employed, which identifies the 'cheapest' way to transform one string into another and counts the number of 'costs', i.e. operations (substitutions, insertions and deletions) needed for this transformation. Neither the Danish suprasegmental feature of laryngealisation ('*stød*') nor differences in phoneme quantity were counted as a

deviating phoneme when calculating phonetic distances between Danish and Swedish. For a detailed discussion of the application of the Levenshtein algorithm for measuring phonetic distances, see Nerbonne & Heeringa (2010). Figure 1 illustrates the distribution of phonetic distances across the stimulus material.

Danish		Swedish		Phonetic distance (%)
spelling	pronunciation	spelling	pronunciation	
måne	/moːnə/	måne	/moːnə/	0
båd	/boːʔð/	båt	/boːt/	33
æble	/eblə/	äpple	/ɛpːle/	50
hoved	/hoː(ʊ)əð/	huvud	/hʉvəd/	80
abe	/ɛːbə/	apa	/ɑːpa/	100

Table 2. Examples of phonetic distances between Danish and Swedish stimuli.

The stimuli were produced by two female native speakers who had grown up and still lived in Odense and Växjö, respectively. Three of the 53 stimuli were used for a training session that was shown in advance to every participant, leaving 50 stimuli for the experiment.

The 59 pictures that had not met either of the two selection criteria were used as distracters. In addition, another 100 distracter pictures from the same picture database were chosen, so that three distracter pictures could be assigned to every pretested stimulus-picture pair. This resulted in a set of four pictures per auditory stimulus. Auditory or visual similarities between the pictures and the stimulus were avoided to ensure that the trials were equally difficult. The experiment was programmed and run in E-Prime 2.0 (Psychology Software Tools, Inc.).

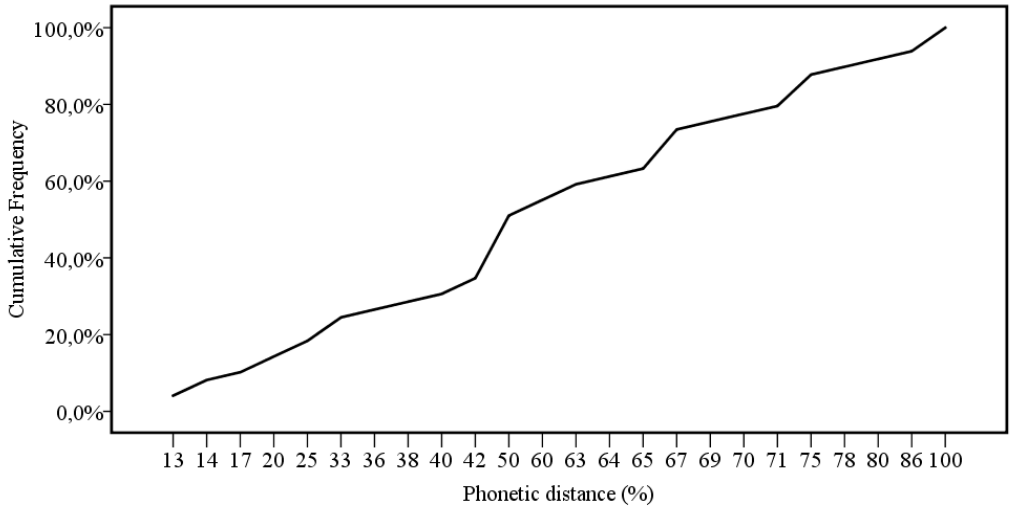

Figure 1. Distribution of phonetic distances between Danish and Swedish in the stimulus material.

2.3 Procedure

The testing session consisted of a stimulus-response experiment followed by a short interview with the participant. Both parts were conducted by a native speaker of the language spoken by the participant. The participant sat in front of the touch screen wearing ear-phones and was told that he or she would be presented with words from the neighbouring language, i.e. Danish participants were informed that they would hear Swedish and vice versa. The 50 stimuli were presented auditorily and, simultaneously to stimulus onset, four pictures per stimulus (i.e. 200 pictures in total) appeared on a touch screen (LG L1510SF). The pictures remained on the screen from the onset of the first presentation of the spoken word until the participant touched the screen, or until a time-out occurred after 10 sec. The subjects' task was to match every auditory stimulus to a picture by touching it on the screen. The stimulus material was presented in random order, but the same four pictures were assigned to every stimulus across participants and across languages. An example is given in Figure 2. One session lasted between one and four minutes, depending on how quickly the participants responded. Prior to the experiment, every participant was familiarised with the task by being presented with a training session: two native language stimuli were presented first, followed by a stimulus in the neighbouring language. When the training session was completed, the participants were asked whether their task was clear, and, if necessary, further instructions were given before the experiment started.

***Dialectologia.* Special issue, II** *(2011), 119-140.*
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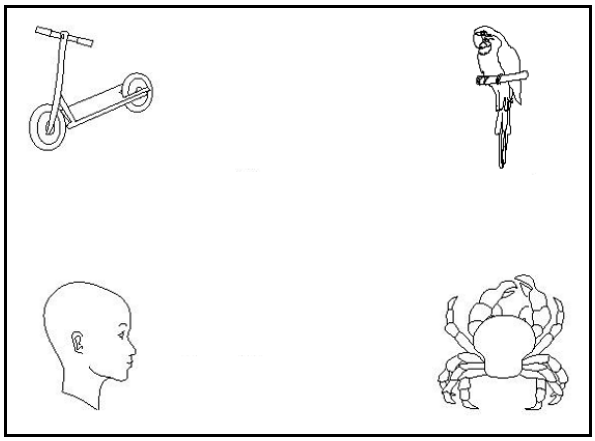

Figure 2. Four pictures presented simultaneously with the Danish stimulus *hoved* /hoːˀ(ʊ)əð/ 'head' to Swedish participants and the Swedish cognate *huvud* /hʉvʊd/ to Danish participants.

After the experiment, the participants' attitudes towards the neighbouring language were assessed by asking whether the language they had heard during the experiment sounded (1) less nice than, (2) as nice as, or (3) nicer than their native language. The participants could also refrain from making a decision by choosing a fourth option, 'no opinion'.

3. Results and discussion

3.1. Word recognition experiment

Figure 3 shows word recognition frequencies for all participants. The word recognition scores are non-normally distributed, which is confirmed by a Kolmogorov-Smirnov test with Lilliefors Significance Correction ($D(84) = 0.19$, $p < .001$). The scores are negatively skewed ($z_{skewness} = -2.86$, $p = .01$).

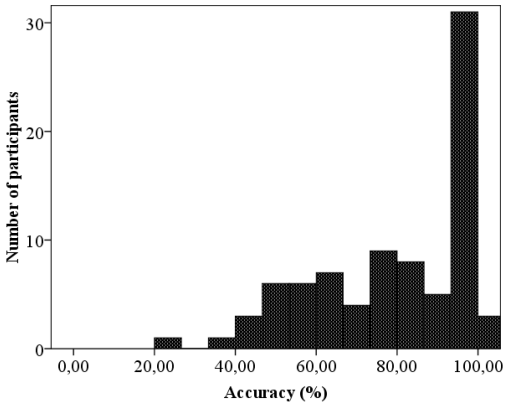

Figure 3. Frequency distribution of word recognition scores for all participants (N = 84).

To investigate whether this is a tendency that is found to an equal extent in all four groups of participants or whether it is restricted to one or several of them, we split up the word recognition scores into the four sub-groups. Figure 4 displays word recognition frequencies for all participants per sub-group.

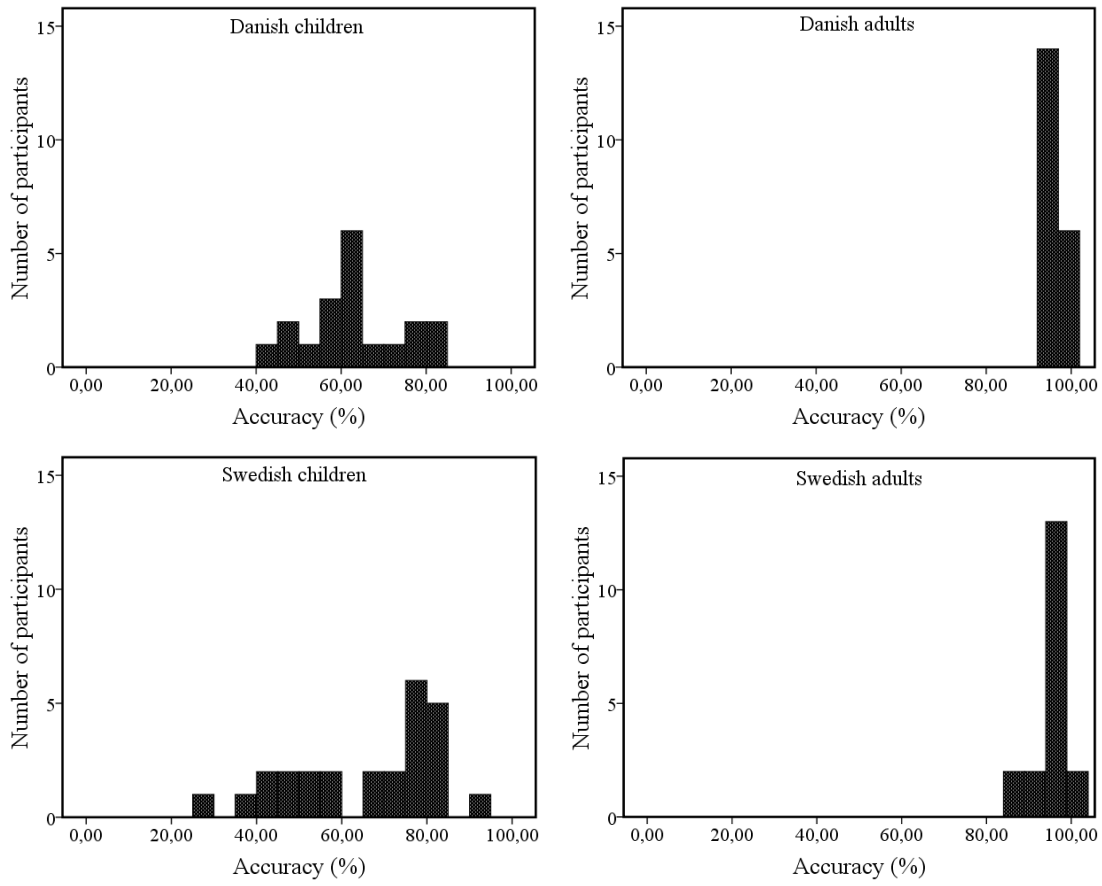

Figure 4. Word recognition frequencies for all four groups of participants. Danish participants are displayed on the left, Swedish participants on the right. Children are displayed above, adults below.

It can clearly be seen in Figure 4 that the distribution of word recognition scores differs across the two age groups (children vs. adults). Whereas the distribution of scores is near-normal or normal in the two groups of children, the scores of the adult group of participants are at ceiling, as all Danish and 89 percent of the Swedish participants recognise more than 90 percent of the stimuli correctly. This effect is presumably due to the fact that the experiment was designed in such a way that even four-year-old children should be able to complete it. The ceiling effect suggests that adults use more cues than their native language to recognise the stimuli. These cues could be foreign-language knowledge, dialect knowledge, or their native language orthography.

In addition to word recognition scores, we measured reaction times (RTs) per participant and per stimulus. Whereas word recognition scores were obtained by counting the number of correct identifications per participant and dividing this number by 50 (the number of stimuli presented) and multiplying it by 100, the mean RT was calculated on basis of correct identifications only. RTs were originally measured from word onset. RT distribution was normal, as indicated by a Kolmogorov-Smirnov test with Lilliefors Significance Correction ($D(84) = 0.09$, $p = .07$). It was crucial, however, to normalise for the fact that the stimuli differed with respect to the number of phonemes and speech rate, across stimuli as well as across trials. Specifically, the Danish stimuli generally had a shorter duration ($\bar{x}$ = 478 ms) than the Swedish stimuli had ($\bar{x}$ = 719 ms), which is likely to yield shorter RTs for the Swedish participants listening to Danish than for Danish participants listening to Swedish, if RTs are measured from word onset. Therefore, word duration was subtracted from every obtained RT per word before individual RT scores were calculated on the basis of correctly decoded stimuli. This means that RTs were measured from word offset. Figure 5 shows a box plot of reaction times per age group. An independent t-test revealed that the children's RTs differed significantly from the adult RTs ($t(82) = 5.44$, $p < .001$). Therefore, in order to be able to correlate children's and adults' RTs with attitudes in one analysis, we normalised for the differences in age by calculating *z*-scores for both groups of participants (children and adults). These normalised RTs are displayed in Figure 6.

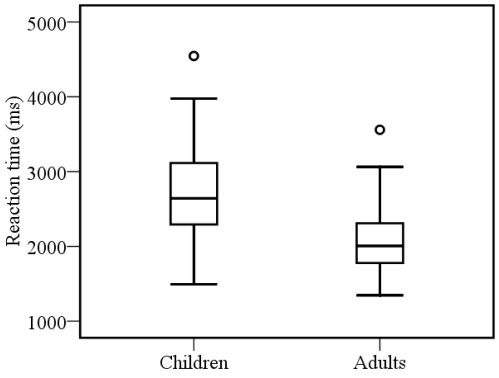

Figure 5. Distribution of RTs in both age groups.

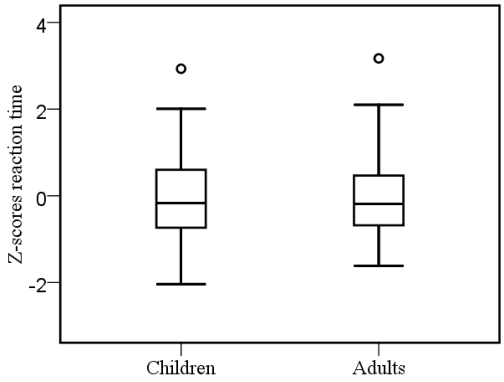

Figure 6. Distribution of age-group specific *z*-scores of RTs in both age groups.

It is generally assumed that the time it takes a participant to make a decision reflects the processing time and thereby the degree of complexity of the task (Gass & Mackey 2007: 22ff). Because of the ceiling effect among the adult participants, we neglect accuracy scores in our further analysis and analyze RT as the dependent measure instead, assuming that the time that is needed for a participant to choose the corresponding picture will correlate positively with the degree of difficulty of recognizing the stimulus. The mean RTs are shown in Table 3.

age group	**L1**	$\bar{x}$	*S*	***N***
Children	Danish	2809	592.19	19
	Swedish	2699	637.47	26
	Total	2746	614.30	45
Adult	Danish	1898	370.51	20
	Swedish	2297	469.70	19
	Total	2092	462.60	39
Total	Danish	2342	669.01	39
	Swedish	2529	601.26	45
	Total	2442	636.73	84

Table 3. Mean RTs (ms) for all four groups of participants.

An independent t-test revealed that RT differed significantly between Danish and Swedish participants in the adult group ($t(37) = -2.96$, $p = .005$), which confirms the asymmetry reported in earlier studies (Maurud 1976; Bø, 1978; Delsing & Lundin

Åkesson 2005; Gooskens & Kürschner 2010). The difference in reaction times between Danish and Swedish-speaking children, on the other hand, was not statistically significant ($t(43) = 0.59$, $p = .56$). This result extends the one reported in Schüppert & Gosskens (2010), and is based on an expansion of their data (a superset).

It was pointed out in section 2.1 that the group of adult Danes consisted mainly of females (80%), while the group of adult Swedes mainly consisted of male participants (74%). That means that females tend to dominate in the cells with shorter reaction times and males tend to dominate in the cells with longer reaction times. There has been a substantial amount of research on differences in reaction times between men and women, but, importantly, men have consistently been shown to have shorter reaction times than females (Noble et al. 1964; Welford 1980; Adam et al. 1999; Dane and Erzurumlugoglu 2003; Der and Deary 2006). Bellis (1933) reported that mean time to press a key in response to a light was 220 ms for males and 260 ms for females. The mean RTs to a sound were 190 ms (males) to 200 ms (females). Engel (1972) reported a RT to sound of 227 ms (male) to 242 ms (female). Interestingly, however, Barral and Debu (2004) found that while men were faster than women at aiming at a target, women were more accurate. Jevas and Yan (2001) reported that age-related deterioration in reaction time was the same in men and women. We assume, therefore, that the sex-related bias does not cause the asymmetry in RTs, but, rather, that the differences in RT between Danish and Swedish-speaking participants might be somewhat larger if sex had been controlled for more effectively.

In the same way, it could be argued that measuring reaction times from word offset is an overcorrection since Danish subjects will have a head start in their stimulus processing, as they have been exposed to the first part of the word for a longer time. To test whether the asymmetry remains significant if reaction times are measured from word onset instead of word offset, we conducted an independent *t*-test, which revealed that even RT measured from word onset differed significantly between Danish and Swedish participants in the adult group ($t(37) = -2.88$, $p = .007$), but not in the child group ($t(43) = 0.24$, $p = .82$). This means that the asymmetry in RTs measured from word offset are not due to the fact that Danes had an advantage because they had been exposed longer to the stimuli.

3.2. Attitudes

Figure 7 shows language attitudes held towards the neighbouring language, i.e. attitudes towards Danish held by Swedish participants and vice versa. It can be seen that children generally hold more neutral attitudes, while a rather negative attitude prevails among adults. More specifically, 89.4 percent of the Danish and 57.8 percent of the Swedish children either had no opinion about whether the neighbouring language sounds nicer than their native language, or judged it as equally nice as their meeting language.

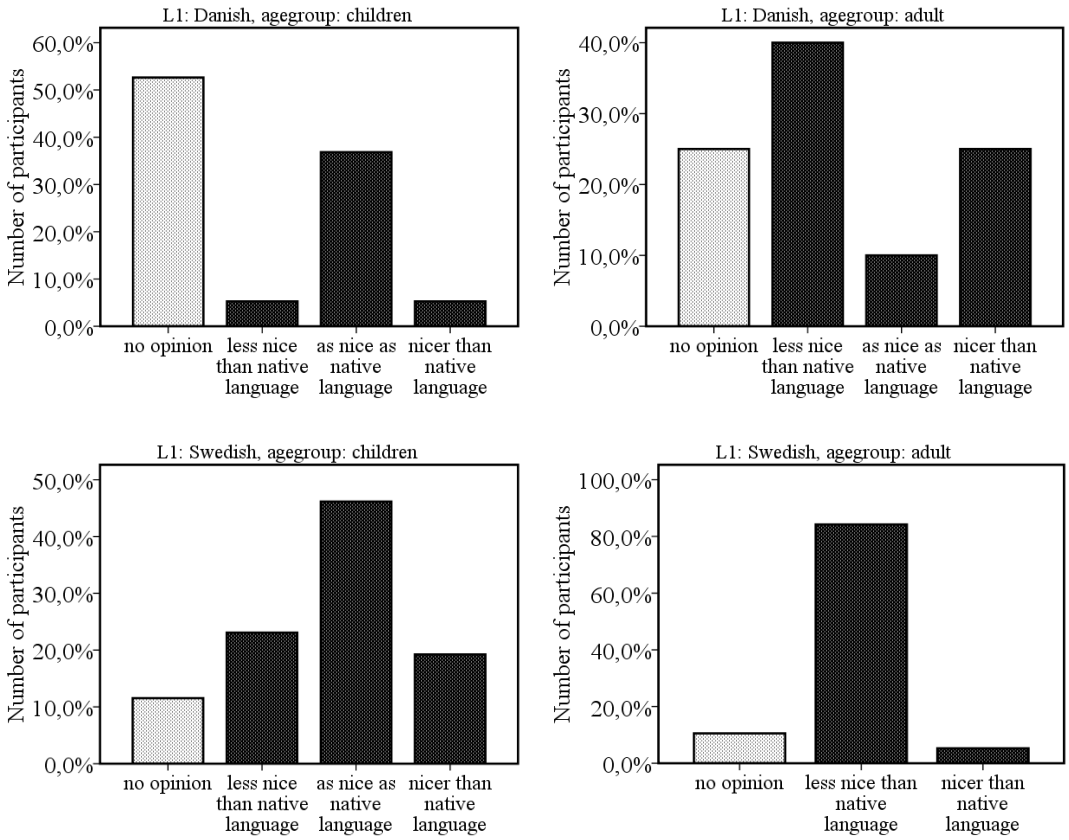

Figure 7. Language attitudes held towards the neighbouring language for all four groups of participants.

In contrast to the children, the adults have clearer attitudes towards the neighbouring language, as the majority (61 percent) chose either ‘less nice than my native language’ (40.0 percent of the Danish adults and 84.2 percent of the Swedish adults) or ‘nicer than my native language’ (25.0 percent of the Danish adults and 5.3 percent of the Swedish adults).

If participants that had no opinion on this question were excluded, a Mann-Whitney-test with attitude as test variable and native language as a grouping variable confirmed that the Swedish participants in the adult group are significantly more negative towards their neighbouring language than the Danish participants (U = 76.5, p = .017). The difference in attitude scores between Danish and Swedish-speaking children, however, was not significant. This finding suggests that the asymmetry in word recognition as indicated by RTs might be associated with an asymmetry in attitude held towards the neighbouring language. Furthermore, as Danish attitudes change from rather neutral to either positive or negative while Swedish attitudes change from rather neutral to negative, our data suggests that a change of attitude towards the neighbouring language takes place mainly in the Swedish-speaking group. This is illustrated in Figure 8, which displays means attitude score per age group and L1.

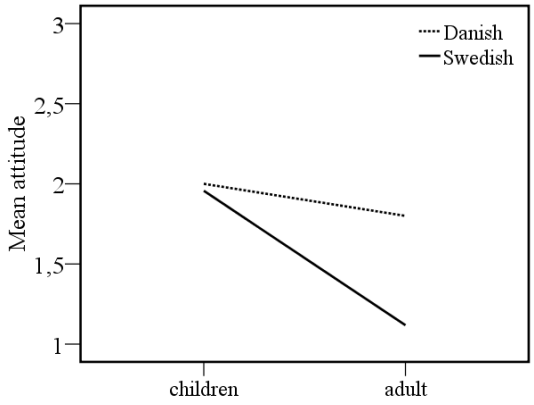

Figure 8. Mean attitude scores per age group for both language groups.

In other words, the difference between adult Danish and adult Swedish attitudes held towards the neighbouring language is not due to the Danish-speaking participants developing a more positive attitude towards Swedish with age, but to Swedish-speaking subjects developing a more negative attitude towards Danish. However, as the oldest pre-schooler in this study was 6.7 years old and the youngest adult participant was 17.0 years old, there is a large gap in our data. Although our data indicates that a significant shift in language attitudes takes place among the Swedish participants between the ages of 7 and 18, we cannot pinpoint the exact age period of this shift.

3.3. Correlation between attitude and word recognition

In section 3.1, it was shown that there was a significant difference in speed of word recognition between Danish and Swedish adult participants, and in section 3.2, we found a significant difference in attitudes held towards the neighbouring language. These results confirm the findings by Wolff (1959), Delsing & Lundin Åkesson (2005) and Gooskens (2006), who reported that that the group of L1 speakers that had a more negative attitude towards the neighbouring language was also the group encountering more difficulties decoding this language. No differences were observed between Danish and Swedish children, neither in attitude towards their neighbouring language nor in speed of word recognition.

We hypothesised that participants with a positive attitude towards the neighbouring language would perform better than participants with a negative attitude. To test this hypothesis, we conducted a Pearson correlation analysis between age-normalised RTs (see section 3.1.) and attitude scores, which resulted in a nonsignificant correlation coefficient of r = -.09 (p = .20, one-tailed). This is illustrated by a scatter plot in Figure 9, which shows the participants' RT *z*-score broken down by their attitudes.

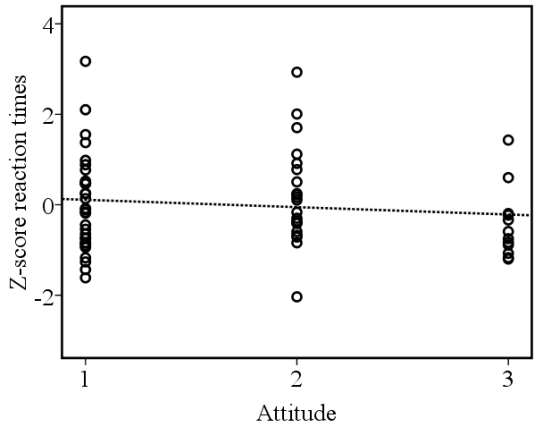

Figure 9. *Z*-normalised RT per attitude score.

Importantly, however, the correlation coefficients are significant neither for the groups as a whole (r = .08, p = .26, one-tailed), nor for any of the two age groups apart (preschoolers: r = −.03, p = .44, one-tailed, adults: r = −.08, p = .15) or for any of the two language groups (Danes: r = .03, p = .44, one-tailed, adults: r = .19, p = .12). This

means that participants with a positive attitude perform equally well as participants with a negative attitude, indicating that, in contrast to our hypothesis, there is no link between a participant's attitude and his or her word recognition abilities. This is in conflict with results reported by Gooskens (2006) and, partly, with those reported by Delsing & Lundin Åkesson (2005). Gooskens (2006), however, correlated attitudes and comprehension scores aggregated per test site rather than individually. This suppresses variance and increases correlation coefficients compared to calculations based on individual attitude and comprehension scores (as in the present study). Delsing & Lundin Åkesson (2005) correlated individual attitude (willingness to move to the neighbouring country and perceived beauty of the neighbouring language) with individual scores in the comprehension test for the 288 Danish-speaking participants listening to Swedish and for the 222 Swedish-speaking participants listening to Danish. They employed two different test series, and every participant completed one of them. They thus report significance values for eight different correlation analyses (2 language groups x 2 test series x attitude questions), each of which was based on approximately 100-150 participants. Five out of these eight correlation analyses yielded significant results. However, their sample sizes are approximately twice as big as ours, which inevitably yields larger significance values, but does not distort correlation coefficients. It might be the case that the difference in significance values between our and their study is linked to the difference in sample sizes, and thereby due to the lack of statistical power in our study. This supposition, however, cannot be evaluated as Delsing & Lundin Åkesson (2005) did not report their correlation coefficients, but solely the significance values. Therefore, a comparison of correlation coefficients across the studies is not possible.

Another possible explanation for the deviation between Delsing & Lundin Åkesson's (2005) and our findings might be found in the participants, as the preschoolers in our study held more neutral attitudes, which results in much less variance than in the adult group. Correlation coefficients in our adult group are higher and closer to significance than for the group as a whole, despite the fact that this correlation analysis is based on half as many participants, namely 32.

In fact, analysing preschoolers and adults separately might do data such as ours more justice than analysing them together as it is likely that adults and children base their judgments of the neighbouring language on different factors. It can be assumed

that adults' attitude is more likely to be contaminated by stereotypical ideas about the neighbouring country and its inhabitants than children's attitudes are. Our data, however, does not provide evidence for this conclusion to be drawn, and further research needs to be conducted to test this hypothesis.

Another difference between our study and the study by Delsing & Lundin Åkesson (2005) is the fact that attitude ratings in our study were explicitly based on the speech sample employed, as participants were asked how they liked the language they had heard during the word recognition experiment. In contrast, Delsing & Lundin Åkesson (2005) overtly asked they participants how they liked the neighbouring language. It is likely that participants in their study referred to more than just the speech sample that was used in the comprehension tests, but also evaluated speakers of the neighbouring language that they had heard in completely different circumstances. By restricting our attitude elicitation to one speech sample per language, differences in voice quality between our two native speakers such as lively or monotonous intonation, the absence or presence of creaky voice, or differences in speech rate are more likely to bias attitude data.

Future research should therefore focus more in-depth on the development of language attitudes, i.e. how language attitudes might be influenced by stereotypes about a language variety and speakers, as well as the age-factor in the development of this influence. Also, the role of speaker or language-specific traits that influence language attitudes, such as differences in intonation or speech rate, should be investigated more thoroughly.

4. Conclusion

In this paper, we tested the hypothesis that attitude and word recognition of a closely related language are linked. We found that our two adult L1 groups (Danish and Swedish-speaking, respectively) differed significantly in their RTs when they were presented with stimuli from the neighbouring language. They also had significantly different attitudes, suggesting that there might be a link between these two variables.

In section 1, it was pointed out that, even if a negative correlation between attitude and speed of word recognition is found in our data, it will not be possible to answer the

question of the causal relationship between these variables, asking whether a positive attitude causes high recognition scores, or whether high recognition scores cause a positive attitude towards the language. As the variables attitude and speed of word recognition do not correlate in our data, however, this suggests that (a) a participant's attitude does not have an influence on his or her word recognition performance, and (b) the difficulties that a participant encounters when confronted with a closely related language do not have an influence on his or her attitude towards that language.

However, a restriction in our study was the overt elicitation of consciously held attitudes towards a language by asking the participants directly if they think that the neighbouring language sounded less nice than, as nice as, or nicer than their native language. As it has been shown that that a person's way of talking can elicit stereotypical ideas of the speaker (Giles & Coupland 1991), it is possible that participants who recognised the neighbouring language did not solely judge the sound of the language, but unconsciously incorporate their stereotypical ideas about speakers from the neighbouring country into their judgment. Future research should therefore focus more in-depth on the relationship of attitudes and word recognition by eliciting consciously and subconsciously held attitudes. This could be done by using the well-established affective priming task (Fazio et al. 1996) which has been employed successfully with auditory stimuli by Impe (2010) in an investigation of language attitudes towards Dutch varieties in Belgium and in the Netherlands.

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