Language Variation and Change, **8** (1996), 149–175. Printed in the U.S.A.

The devoicing of fricatives in Standard Dutch: A real-time study based on radio recordings

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ABSTRACT

This article gives a detailed analysis of devoicing of the voiced fricatives /v/, /z/, /ɣ/ in two varieties of Standard Dutch: Southern Standard Dutch (as spoken in Belgium) and Northern Standard Dutch (as spoken in The Netherlands). The study is based on archived recordings of radio broadcasts from 1935 to 1993. First, our study shows a divergence between Southern and Northern Standard Dutch in the pronunciation of voiced fricatives in this period. In The Netherlands there is a strong tendency towards devoicing, but in Belgium this tendency is very weak. Second, this study offers insight into the linguistic path of this change: partially voiced compromise variants play an important role, and devoicing is favored in word-initial position. Finally, our study shows the benefits of a retrospective trend study on the basis of radio recordings. In comparison with traditional real-time studies, it offers more insight into the social and linguistic embedding of changes in progress. Its results are also more reliable than those of apparent-time research.

This article has a double aim. We want to show the possibilities of real-time studies on the basis of preserved recordings of speech and the value of this research method in comparison with the current methods for the study of language change in progress. In addition, we want to get more insight into a change in progress in Standard Dutch—the devoicing of the voiced fricatives /v/, /z/, and /ɣ/. First, we situate our study within the context of other studies of language change in progress. We then focus on the Dutch language area, specifically two varieties of Standard Dutch, and the language of radio in The Netherlands and Flanders. Next, we outline the design of our study. We then address the devoicing of the voiced fricatives /v/, /z/, and /ɣ/,

We would like to thank the directors and staff of the Audiovisual Archive of the Film and Science Foundation (Amsterdam, The Netherlands), the Historical Archive of the Dutch Broadcasting Production Company (Hilversum, The Netherlands), and the Spoken Word Archive of the Flemish Broadcasting Corporation (Brussels, Belgium) for their kind cooperation. Thanks are also due to the anonymous reviewers for their comments. Finally we thank Laurie Bauer for his detailed comments on both content and style, which proved to be very helpful in the preparation of the final version of this article.

beginning with a review of the literature; on the basis of this overview, we formulate several hypotheses. The variables (v), (z), and (g) are defined, and the results are discussed.

THE STUDY OF LANGUAGE CHANGE IN PROGRESS

Until quite recently—apart from Hermann's (1929) restudy of Charmey—the study of language change in progress has been limited to apparent-time studies, as introduced by Labov (1966). One of the problems we face in apparent-time research is the fact that age distributions do not necessarily represent language change in real time, but can be the result of, say, age-grading (Hockett 1951). This problem can be solved by making real-time observations. Labov (1994:73) distinguished two basic approaches: researchers can either search the literature and compare earlier findings with current ones, or they can return to the community after a lapse of time and repeat the same study. There are two types of longitudinal studies: (1) trend studies, in which similar populations are selected in the same way (i.e., data collection and analysis are conducted in the same way as was done x numbers of years before) (e.g., Bauer, 1985; Cedergren, 1988; Trudgill, 1988); and (2) panel studies, in which the same individuals are submitted to the same study x number of years later (e.g., Bauer, 1985; Thibault & Vincent, 1990). The study of Paunonen (1994) in Helsinki is basically a panel study complemented with a new group of young speakers.

The repeated cross-sectional studies mentioned here are all prospective ones. The data are collected during several periods. This is a time-consuming method: the data collection takes as long as the period you want to study. By means of recordings from sound archives, it is possible to conduct such a study retrospectively.[1] Data collection occurs only once for all periods, so that it takes less time to collect them. This is the type of study we report on in this article. Our study on the devoicing of voiced fricatives in Standard Dutch is based on preserved recordings of radio broadcasts from The Netherlands and Flanders between 1935 and 1993.

THE LANGUAGE OF RADIO IN THE NETHERLANDS AND FLANDERS

Dutch is a Germanic language spoken in both The Netherlands and Flanders (the northern part of Belgium). Both laymen and linguists agree that two very closely related standard varieties have evolved: Northern Standard Dutch (NSD), which is spoken in The Netherlands (15 million speakers), and Southern Standard Dutch (SSD), which is spoken in Flanders (5.6 million speakers). Before pointing out the main differences between these varieties, we will briefly sketch the historical facts underlying the development of two standard varieties. More details can be found in Donaldson (1983), Geerts (1988), Van

de Craen and Willemyns (1988), Willemyns (1988), and Vandeputte, Vincent, and Hermans (1995).

Two varieties of Standard Dutch

The fall of Antwerp in 1585, when Flanders was conquered by the Roman Catholic Hapsburg monarchy, is the starting point for the permanent split of the Low Countries into north (The Netherlands) and south (Flanders). There was only a short reunion (1814–1830) under the reign of King William I. The Netherlands remained independent, except for a short period under Napoleon, during which time it was known as the Batavian Republic (1795–1813). Such conditions have been favorable for the development of a standard variety of Dutch in The Netherlands—all the more so as all public services have had Dutch as their official language for four centuries. Since the second half of the 19th century, a pronunciation standard has developed in Holland, the central part of The Netherlands (Hellinga, 1938).

The situation in Flanders, however, is quite different (cf., e.g., Van de Craen & Willemyns, 1988). After the fall of Antwerp, the Flemish people lost all contact with the emerging standard variety in the north. Although the majority of Flemings spoke a dialect of Dutch, French became the language of culture. The Flemish nobility and bourgeoisie came under strong French cultural and linguistic influence during the Austrian period (1713–1794). During the French period (1795–1814), the public service system (law, education) became totally francophone. King William I (1814–1830) tried to make Dutch the dominant language in Belgium, but all his efforts failed. By then, French was the only language of culture, but it was spoken solely by the elite. The Flemish common folk spoke one or another Dutch dialect. In 1830, Belgium became independent. Its very liberal constitution prescribed freedom of language, but in practice French became the only official language of Belgium, including Flanders. It was not until the last quarter of the 19th century that the first rights concerning the official usage of Dutch were recognized in Flanders. In 1898, Dutch was recognized as an official language, next to French, and since the early 1930s Dutch has been recognized as the official language in Flanders.[2] Only then could the Dutch-speaking upper class develop and propagate (Standard) Dutch as the new language of culture in Flanders. In the formation and spread of (Southern) Standard Dutch, the Dutch-speaking part of the Belgian broadcasting corporation played a predominant role. In the 1930s the newly emerging standard was clearly based on the spoken and written standard variety of Dutch in The Netherlands. Extreme linguistic nationalism has never gained a firm foothold in Flanders, and the language policy has mainly been one of balanced integration. This unity of language between Flanders and The Netherlands was made official in a treaty of 1980 (*Taalunie*).

Four centuries of separation have led to a large difference in the level of mastery of Standard Dutch in The Netherlands and Flanders. Most speak-

ers in The Netherlands are able to speak Standard Dutch or a variety very close to it, but in Flanders only a minority has an active knowledge of Standard Dutch. The differences between Northern and Southern Standard Dutch are rather small and can be compared with those between British and American English. The two varieties are mutually intelligible, but a speaker of Standard Dutch is immediately recognized as Dutch or Flemish. The most salient differences are found on the level of pronunciation and on the lexical level (cf. Donaldson, 1983).

Radio language in the Dutch language area

Recordings of radio programs are an excellent source for the study of changes in standard languages. First of all, radio is a mass medium in which attention is primarily focused on language itself, more so than, say, television where visual stimuli play an important role. A reporter's style of presentation and speech are the sole instruments used to create a connection with an audience: they foster the relationship between communicator and audience (Bell, 1984:192). Second, the preserved recordings of (spontaneous) speech are for the greater part radio transmissions. The first broadcasting corporations were founded in the early 1920s. At that time recording was still a very complicated and expensive technique; as a result, all programs were broadcast directly. But as very often things went wrong in these direct transmissions, technicians worked hard to develop simple recording equipment. In the early 1930s, the first "portable" graphophones were constructed. From 1933 onwards these instruments were used by the broadcasting corporations. In the late 1930s, the Dutch and Belgian broadcasting corporations started to archive these recordings. The oldest preserved recordings of radio transmissions in the Dutch language date back to 1933. Therefore, a time span of 60 years can be studied. Third, the language usage of professional reporters of the national broadcasting corporations can be viewed as representative of the standard variety. Communicators speaking on national broadcasting stations address the language community as a whole; therefore, the standard language is thought to be the most appropriate variety (cf. Bell, 1991; Leitner, 1980; Strassner, 1983; Van Poecke & Van Den Bulck, 1991). In Flanders, the Flemish part of the Belgian broadcasting corporation has played a very important role in the formation and spread of (Southern) Standard Dutch, not only by broadcasting language programs, but also by using everyday Standard Dutch. From the beginning of broadcasting in Dutch, announcers have had to pass very strict language tests, especially for pronunciation. As early as the 1930s Blanquaert's pronunciation guide (Blancquaert, 1934) was the official guideline for correct usage, and professors of Dutch linguistics were contacted as external language advisors. Standard Dutch as it was spoken in The Netherlands was considered to be the ideal model. From the 1960s, a very normative language policy has been conducted internally; in the past few years, though, this has evolved into a more functional and communicative approach.

Thus, a uniform standard variety has developed at the Flemish broadcasting corporation. However, it is a standard that does not follow the recent changes in pronunciation in NSD, but is a Flemish standard variety, SSD. In contrast with the Flemish broadcasting corporation, the Dutch broadcasting corporations have never propagated Standard Dutch explicitly.

DESIGN

Here we discuss the repeated cross-sectional design of our study of the devoicing of fricatives from a corpus of radio broadcasts. The following external factors are introduced: region, period, and type. The compilation of the corpus is then discussed.

Region

In our study, we made a distinction between the two most important varieties of Standard Dutch: the northern variety (NSD), as it is spoken in The Netherlands, and the southern variety (SSD), which is spoken in Flanders. The most important differences between the two varieties are discussed in the literature mentioned earlier. The informants, who were all radio reporters, originated from all over The Netherlands and Flanders.

Period

The time factor in a longitudinal study consists of three subfactors: cohort, age, and period. Because we kept the age factor constant in our study, it was not possible to separate cohort and period effects. In this section we limit our discussion to the period variable. As mentioned earlier, the oldest archived radio broadcasts in Dutch date from the mid-1930s. We started our research with recordings from 1935 and ended with material from 1993. One of the problems we faced in this study was the impossibility of collecting a random population sample. Our sample was severely limited by what was available in the sound archives. For The Netherlands we selected transmissions at an interval of fifteen years. We thus had five measurement years: 1935, 1950, 1965, 1980, and 1993. To avoid the interference of apparent and real time, we selected speakers of approximately the same age. Due to the lack of archived recordings in Flanders, we chose different intervals. On the basis of preliminary research (Cassier & Van de Craen, 1986), less variation and change was expected in SSD than in NSD. For Flanders, then, we selected recordings from 1935, 1965 (halfway between the two outmost measurement points), and 1993.

Type

We focused on two types of broadcasts: royal reports and sports commentaries. Royal reports were considered as samples of a more formal type of broadcasting, and sports commentaries were considered as samples of a less

formal type. The latter are seen as being the least formal in the hierarchy of program types (Lipski,1985). News announcers are generally thought to be outstanding standard language speakers. News announcements, however, seem less suitable for the study of language change in progress, as this speech is comprised of written texts which are read aloud. Moreover, only a small percentage of old news announcements has been preserved. Hence, we chose royal reports for our sample of formal broadcasting. In selecting sports commentaries and royal reports we could then study a larger range of spontaneous speech. In this way we avoided the danger of interpreting changes in one specific reporting style as changes in Standard Dutch. Both types contain almost exclusively spontaneous speech, but spontaneous speech which is still within the realm of formal speech (Labov, 1972:86). A reporter speaking on the radio is always aware of this and realizes that speech is the most important instrument in practicing this profession. However, this does not preclude the reporter from becoming emotional in either type of speech. The difference between the types can be reduced to a difference in topic.

The corpus

Our study was not an extensive repeated cross-sectional design. Because we chose a retrospective design with a heavy accent on the length of the period and because we were limited to the recordings preserved in sound archives, the cross-sectional aspect of our study was limited to the region and style factors. We eliminated three traditional sociolinguistic variables—age, sex, and social class. We selected only male reporters. It seemed impossible to include female informants in our design because, until quite recently, direct reports were almost exclusively the domain of male reporters. Consequently, almost no direct reports of female reporters can be found in the sound archives of the broadcasting corporations.

Social class is complex factor. It is often construed as a combination of education and profession, which is sometimes combined with the same data for the parents. In our study we did not vary this factor. In fact, we came up with a remarkably homogeneous group in terms of social class. All of our informants were professional journalists. A questionnaire given to radio reporters showed that most of them had undertaken some form of higher education after secondary school. The Flemish reporters, almost all of whom held a university degree, seemed to be more highly educated than their Dutch colleagues. The radio reporters we selected could be classified at least as upper middle class.

Table 1 gives an overview of the research design. Table 2 shows for each period the range of the years of birth (i.e., birth cohort) of our informants. We selected reporters who were between the ages of 29 and 36 at the time of the recording and who had some years of experience as radio reporters. On the one hand, this generation could be expected to renew the profession (and the language they use); on the other hand, we expected that they would dis-

TABLE 1. *Design of the study: Number of speakers by region, program type, and period* (N = 68)

		1935	1950	1965	1980	1993
The Netherlands	royal reports	5	5	5	5	5
	sports commentaries	5	5	5	5	5
Flanders	royal reports	3		3		3
	sports commentaries	3		3		3

TABLE 2. *Birth cohorts by period and region*

	1935	1950	1965	1980	1993
The Netherlands	<1906	1914–1921	1929–1936	1944–1951	1956–1963
Flanders	<1907		1924–1939		1950–1963

play a certain amount of stability and spontaneity in their style of presentation. The differences between the cohorts was at least eight years: between the oldest speaker of one period and the youngest of the next period, there was a difference of at least eight years in years of birth. Between the fourth (1980) and fifth (1993) periods, this difference is at least five years. Out of necessity, we took into consideration only the minimum age in the first period. For NSD each cell was filled with five different male speakers who fulfilled the age requirement. In Flanders the age requirement was handled less strictly. As the intervals between the measurement periods were larger than those for The Netherlands, the difference seemed justifiable. Two Flemish reporters did not meet the criteria stated in Table 2, but there was no overlap: the youngest reporter of the 1935 period was born in 1913, and the oldest of the 1965 period was born in 1917. Due to the lack of sports commentaries in the archives of the Flemish broadcasting corporation, we could only select three speakers per cell. This did not cause insurmountable problems, as only little variation and change was expected in SSD (cf. Cassier & Van de Craen, 1986). The complete corpus consisted of 68 speakers: 50 Dutch and 18 Flemish. A total of 10 minutes of spontaneous speech was gathered from every speaker, with a minimum of 1,100 words. The corpus was made up of approximately 108,000 words. Of these fragments a broad transcription was made, following the CHAT conventions with some minor adaptations (MacWhinney, 1991).

The older radio recordings were compiled from three sound archives: the Audiovisual Archive of the Film and Science Foundation (Amsterdam, The Netherlands), the Historical Archive of the Dutch Broadcasting Production

Company (Hilversum, The Netherlands), and the Spoken Word Archive of the Flemish Broadcasting Corporation (Brussels, Belgium). The transmissions selected for the fifth period (1993) were recorded directly from the radio.

THE STANDARD DUTCH FRICATIVES

To illustrate our repeated cross-sectional design, we have chosen a hot issue in the linguistic history of Dutch: the devoicing of the voiced fricatives /v/, /z/, and /ɣ/,[3] an ongoing phenomenon that has been signaled for several years by both linguists and laymen. Details on the historical development of Dutch /v/, /z/, and /ɣ/ can be found in Donaldson (1983) and Gussenhoven and Bremmer (1983).

Phonologists traditionally distinguish seven fricative phonemes in Standard Dutch: the glottal fricative /h/, the labio-dentals /f/ and /v/, the alveolars /s/ and /z/, and the velars /x/ and /ɣ/. [ʃ] and [ʒ], which is also often devoiced, only occur in loanwords (e.g., *show, charm, genre, jury*) or as a result of assimilation (e.g., *huisje* 'house + diminutive'), but they are not considered Standard Dutch phonemes (Booij, 1995:7). The glottal fricative /h/ (e.g., *haar* 'hair', *huis* 'house') is actually not specified for place of articulation and assimilates to the place of articulation of the following vowel. The other six fricatives consist of three pairs with a voiced–voiceless distinction. In this article, we focus on the voice character of the voiced fricatives /v/, /z/, and /ɣ/.

In NSD a tendency towards devoicing of the voiced fricatives /v/, /z/, and /ɣ/ has been observed for more than 60 years, but there is a difference in speed and regional spreading of the devoicing. In the late 1920s, Zwaardemaker and Eijkman (1928:195) observed that the opposition /ɣ/–/x/ did not exist for many speakers of Standard Dutch, especially in word-initial position. Similar remarks have been made by several linguists over the years (e.g., Cammenga & Van Reenen, 1980; Cohen et al., 1971; Van Wijk, 1939:44). These findings are confirmed by phonetic experiments (Slis & Van Heugten, 1989; Van den Broecke & Van Heuven, 1979): even in intervocalic position, no voicing activity is measured in the realization of /ɣ/ by speakers coming from the west of The Netherlands. Collins and Mees (1981) and Donaldson (1983) agreed that /ɣ/ is usually devoiced in all positions in NSD, and that most speakers of Northern Standard Dutch do not make a consistent contrast between word initial /v/ and /f/.[4] Intervocalically, however, the contrast between /v/ and /f/ appears to be more stable. Devoicing of /z/ is considered to be socially inferior (cf., e.g., Goossens, 1974:27; Gussenhoven, 1992; Mees & Collins, 1982). Empirical studies of devoicing in NSD all reveal the same hierarchy: /ɣ/ is more devoiced than /v/, and /v/ is more devoiced than /z/ (Gussenhoven, 1981a; Voortman, 1994). Gussenhoven (1981b) showed that the same hierarchy applies in the social evaluation of devoicing. These studies also demonstrated that, in word-internal position, the voice character of the voiced fricatives is preserved more than in word-initial position.

Most descriptions have contended that this tendency to devoice the voiced fricatives does not occur in SSD. Blancquaert (1934) signaled a slight loss of voicing activity in the realization of /v/, /z/, and /ɣ/ in some dialects in Flanders (but not as marked as in The Netherlands). He warned readers to pronounce /v/, /z/, and /ɣ/ as fully voiced fricatives. In a phonetic experiment, Debrock (1977:76) showed that eight out of ten Flemish informants realized /ɣ/ as voiceless [x]. However, /ɣ/, like /v/ and /z/, was commonly described as voiced in SSD.

HYPOTHESES

On the basis of the review of the literature, two hypotheses concerning the difference between Northern and Southern Standard Dutch can be formulated:

1. In NSD (The Netherlands), the devoicing of voiced fricatives would increase in the period from 1935 to 1993.
2. In SSD (Flanders), the voiced fricatives would not devoice in the period from 1935 to 1993.

These hypotheses result from observations in the literature, which are mainly based on intuition and fragmentary data and only exceptionally on systematic synchronic research. Systematic diachronic research has never been done. The power of our study resides in the systematic, quantitative analysis of comparable speech data from different periods. Such a design can offer deeper insight into the process of devoicing: the transitional phases, the in-between variants, the factors determining devoicing, and the differences between the fricatives.

These hypotheses can be supplemented with more specific hypotheses. An important issue is the type factor: although sports commentaries are usually considered a less formal type of broadcasting than royal reports, we have pointed out that this distinction is merely one of difference in topic. Bell (1984) analyzed the speech of the same newscasters speaking about the same topic on different stations and found that these newscasters make considerable style shifts between the stations. Topic and setting are the same at all stations and thus cannot be responsible for the style shift. It is also impossible that this style shift is caused by a difference in monitoring, as it is quite improbable that newscasters would differentiate their attention while reading at different stations in the same setting on the same topic. According to Bell (1984, 1991), social factors are responsible for these differences in style: the choice of style of a speaker is a response to a presumed audience. As the audiences of the different stations differ in their social stratification and consequently in their language usage, the newscasters accommodate to their presumed audience. The communication strategies chosen by commentators on the radio will sometimes be responsive (audience design), sometimes initiative (referee design), or sometimes a combination of both.

The communication strategy chosen by the Flemish reporters in the 1930s ought to be considered as outgroup referee design. The standard language variety of The Netherlands was chosen as the code to address the Flemish audience, although it was outgroup code for both speaker and addressee. Over the years, this communication strategy shifted towards in-group referee design. The commentators spoke in one of their own codes, SSD; however, most of the Flemish audience did not master this code actively. In The Netherlands, the style choice in the royal and sports reports could be characterized as audience design. Bell (1991:91) distinguished four roles in the multilayered audience (addressee, auditors, overhearers, eavesdroppers) and ranked them according to whether they are known, ratified, or addressed by the speaker:

	known	ratified	addressed
addressee	+	+	+
auditors	+	+	−
overhearers	+	−	−
eavesdroppers	−	−	−

In practice, however, it is not possible to make a sharp distinction between the four roles. In our study, only addressees and auditors were considered important, as they would be the ones who would be ratified by the speaker and, as such, would have influence on the speaker's speech behavior. The addressees of royal reports and sport commentaries probably differed in sex and age, but not in their geographical origin; the expectation the speaker would have of the auditors would be the same for both types (i.e., the entire Dutch-speaking population of the relevant country). The difference in addressees, as well as the difference in topic, should cause differences between the two types in register and speech rate. For example, there is more and faster action in sports than in royal events; thus, the speech rate in sports commentaries is faster than that in royal reports. In the intersonorant position we studied, devoicing is not a typical aspect of allegro speech (Dressler, 1975). We would expect that, in our study of the devoicing of fricatives, no differences between the two types of broadcasting would occur. This results in the next hypothesis:

3. There would be no systematic differences in devoicing between sports commentaries and royal reports.

In line with the descriptions mentioned earlier, hypotheses can be formulated about the linguistic embedding of the devoicing of voiced fricatives. We should keep in mind that only realizations in intersonorant position have been analyzed. The internal hypotheses are:

4. The hierarchy of devoicing would be (g) > (v) > (z).
5. Segments in word-initial position would be more prone to devoicing than segments in word-internal position.

DEFINITION OF VARIABLES

All syllable-initial, intersonorant realizations of the voiced fricatives /v/, /z/, and /ɣ/ were located in the broad transcription. In this way complex assimilation rules, whose relationship with devoicing processes is not always clear, were excluded from the analysis. In every transcript the first twenty word initial and the first twenty word-internal realizations were transcribed.[5]

vuur	[vyːr]	'fire'	lever	[le.vər]	'liver'
zuur	[zyːr]	'sour'	lezer	[le.zər]	'reader'
guur	[ɣyːr]	'bleak'	leger	[le.ɣər]	'army'
vlas	[vlas]	'flax'	aanval	['a.nval]	'attack'
glas	[ɣlas]	'glass'	verzet	[vərzɛt]	'resistance'

Words and syllables that are often reduced in connected speech, as well as unclear realizations, were excluded (e.g., *van* 'of', *ver-* [prefix], pronouns). Proper names and foreignisms were also excluded from the analysis. To avoid the effect of repetition, the second realization of a word following the first realization within 7 seconds was not transcribed unless the realizations clearly differed. If the same word recurred three times close to one another, no further transcriptions of that word were made for 1 minute of speech.

The speech signal on our recordings was disturbed by background noise and the primitive recording techniques. In addition, age and bad conservation circumstances affected the sound quality. Hence, an instrumental analysis of the speech signal was almost impossible. Consequently, all realizations were transcribed by the lead author. In case of doubt, a consensus transcription was made by the three authors. The devoicing of the voiced fricatives was scored on a 3-point scale. Voiceless realizations ([f], [s], and [x]) received a value of 1; completely voiced realizations ([v], [z], and [ɣ]) received a value of 3; and in-between variants, the so-called partially devoiced variants (Laver, 1994:340), received a value of 2. In Dutch, these in-between variants are commonly initially devoiced and have a late voice onset (cf. Slis, 1985; Van den Berg, 1969:56), but finally devoiced realizations (with an early voice drop) also occur. For the statistical analyses, SPSS (version 4.0 for Macintosh) was used.

RESULTS

The results for the devoicing of (v), (z), and (g) are presented in Tables 3, 5, and 7. The mean values, presented by means of an index ranging from 0 (completely voiceless) to 100 (completely voiced),[6] are split up by period, region, and type. The effects of the region factor were tested by means of an analysis of variance (ANOVA) for each variable. Only the three periods we studied for both varieties—1935, 1965, and 1993—are included in the comparison. The effects of period and type were also tested by an ANOVA. Because we found quite drastic changes in NSD, we include additional tables

TABLE 3. (v) *Statistics by region and period*

		1935	1950	1965	1980	1993
NSD	*M* (*SD*)[a]	87.3 (7.9)	77.7 (12.6)	84.1 (10.6)	68.4 (23.2)	37.2 (21.7)
	royal/sports[b]	89.5/85.1	85.5/70.0	83.0/85.0	56.0/81.0	32.5/42.0
	range	76.5–100.0	64.0–98.5	66.5–97.5	30.0–97.5	4.0–81.0
SSD	*M* (*SD*)	99.1 (1.0)		99.0 (2.0)		86.4 (14.6)
	royal/sports[b]	99.5/98.5		100.0/98.0		73.0/99.5
	range	97.5–100.0		95.0–100.0		70.0–100.0

[a]*M* = overall mean score; *SD* = standard deviation.
[b]Mean score for royal programs/mean score for sports programs.

showing the distribution over the three variants (Tables 4 (v), 6 (z), 8 (g)); for SSD, there is an additional table for (g) (Table 9). These tables, which were not analyzed statistically, are presented to gain better insight into the process of devoicing. We compare the results for (v), (z), and (g) not only to achieve a global overview of the process of devoicing, but also to test Hypothesis 4 (hierarchy of devoicing). Later, we address the linguistic factors conditioning the process of devoicing (Hypothesis 5).

(v)

Table 3 shows the results for (v) split up by region and by period. The overall mean score, the standard deviation, and the range are given. In addition, the mean scores for the royal reports and the sports commentaries are given separately. The higher the value, the more often the segment was pronounced voiced.

An ANOVA shows a two-way Region × Period interaction, $F = 9.850$, $df = 2,42$, $p = .000$. There are main effects of region, $F = 43.684$, $df = 1,42$, $p = .000$, and period, $F = 40.051$, $df = 2,42$, $p = .000$. There is a significant difference between The Netherlands and Flanders, but the differences are not the same for all periods. In 1935 and 1965 the differences are fairly small, but in 1993 the difference between NSD and SSD becomes much larger.

The Netherlands. The ANOVA only shows a main effect of period, $F = 16.874$, $df = 4,40$, $p = .000$. There is no type effect, which is in line with Hypothesis 3. A look at Table 3 reveals that the devoicing of (v) already occurs in 1935 ($M = 87.3$), but the standard deviation remains small ($SD = 7.9$). Table 4, which presents the distribution of the three variants by period, shows that completely voiceless realizations [f] are still very uncommon in 1935 (1.8%), but the in-between variants [v̥] already appear quite frequently (22.2%). Devoicing goes up in 1950 ($M = 77.7$). The in-between variants increase (36.9%); voiceless realizations increase only slightly (4.1%). In 1965 the change does not continue ($M = 84.1$). The language policy of the Dutch

TABLE 4. *Distribution variants of* (v) *in NSD by period*

	1935		1950		1965		1980		1993	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
[v]	298	76.0	232	59.0	277	71.6	201	50.2	95	23.9
[v̥]	87	22.2	145	36.9	100	25.8	145	36.3	105	26.4
[f]	7	1.8	16	4.1	10	2.6	54	13.5	197	49.7
Total	392		393		387		400		397	

broadcasting corporations is probably responsible (i.e., in the 1950s some Dutch reporters were selected on the basis of their pronunciation of Dutch).

From 1980 on, the process of devoicing seems to accelerate. In 1980 the mean score decreases to 68.4, and the variation becomes large ($SD = 23.2$). The voiced variant [v] remains the most frequent (50.2%), and the portion of the in-between variants remains more or less constant (36.3%), but there is a sharp increase of voiceless variants [f] (13.5%). However, a Tukey HSD test does not show a significant difference between 1980 and the three preceding periods. This post-hoc comparison distinguishes two homogeneous subsets: the 1993 period and the four preceding periods. In 1993 the devoiced variants dominate for the first time (49.7% [f], 26.4% [v̥]). Fully voiced [v] appears only in one case out of four. This is also visible in the mean score ($M = 37.2$); the variation remains large ($SD = 21.7$). Voiceless [f] is the most common variant for seven out of ten 1993 commentators. "Voiced speakers," however, have not yet disappeared completely from the national broadcasting corporation: two commentators of the last period use the voiced variants in most cases. But they also devoice: the highest score for 1993 is 81.0.

These results clearly confirm Hypothesis 1. Between 1935 and 1993 there is an increase in the devoicing of /v/. In the early stage of the change (between 1935 and 1980) we see an increase of the in-between variants; by 1980 [f] realizations increase. In the second part of the change (after 1980) fully devoiced variants increase sharply. The higher variation in the last two periods reflects the change: standard deviation and range become larger.

Flanders. There is a two-way Type × Period interaction, $F = 105.950$, $df = 2,12$, $p = .000$, with main effects of period, $F = 87.108$, $df = 2,12$, $p = .000$, and type, $F = 74.394$, $df = 2,12$, $p = .000$. Due to the period effect, we have to refute Hypothesis 2, and the results are not in line with Hypothesis 3. In 1935 and 1965, the mean score for (v) remains constant (see Table 3). The standard deviation is very small. In the last period, however, the three royal reporters slightly devoice (v), which causes the interaction. These reporters often use the in-between variant [v̥] (37%), while the voiceless variant [f] remains quite rare (8.5%).

TABLE 5. (z) *Statistics by region and period*

		1935	1950	1965	1980	1993
NSD	*M* (*SD*)[a]	90.9 (7.3)	94.2 (7.7)	94.7 (9.2)	83.9 (15.7)	62.4 (23.7)
	royal/sports[b]	90.0/91.5	95.0/93.5	91.5/98.0	84.5/83.0	54.0/71.0
	range	76.5–99.0	75.0–100.0	70.0–100.0	46.5–98.5	15.0–90.5
SSD	*M* (*SD*)	98.1 (4.0)		98.0 (3.8)		84.8 (14.9)
	royal/sports[b]	99.5/96.5		99.5/96.5		73.5/96.0
	range	90.0–100.0		90.5–100.0		61.0–99.0

[a]*M* = overall mean score; *SD* = standard deviation.
[b]Mean score for royal programs/mean score for sports programs.

Should we consider this Flemish devoicing as an accommodation to the northern standard, possibly caused by increasing contact with The Netherlands? Or should we see it as the acceptation of the new northern standard, or as a repressed change that perseveres at this moment? The latter seems the more acceptable explanation. Blanquaert (1934) observed that in Flemish dialects vocal cord vibration was disappearing in the first part of the voiced fricatives. It is possible that the shift in language policy of the Belgian broadcasting corporation from normative to functional created the opportunity for the breakthrough of devoicing in Flanders. Of course the process in SSD may have been accelerated under the influence of NSD.

(z)

Table 5 shows the results for (z) split up by region and by period. The overall mean score, the standard deviation, and the range are given. In addition, the mean scores for the royal reports and the sports commentaries are given separately. The higher the value, the more often the segment has been pronounced voiced.

The analysis of variance shows main effects of region, $F = 7.511$, $df = 1,42$, $p = .007$, and period, $F = 17.155$, $df = 2,42$, $p = .000$. There is a significant difference between SSD and NSD.

The Netherlands. There is a main effect of period, $F = 8.857$, $df = 4,40$, $p = .000$. The Tukey HSD test only shows a significant difference ($p < .05$) between 1993 and the four preceding periods. Between 1935 and 1965 there is no change. The mean scores remain constant around 92, but variation shows up: the standard deviations fluctuate slightly between 7.3 and 9.2. The devoicing of (z) only seems to start around 1980 ($M = 83.9$). At that moment variation also becomes larger ($SD = 15.7$). The change breaks through rather spectacularly in the 1990s. To gain more insight into the process of devoicing, the distribution of the three variants by period is presented in Table 6.

In the first three periods the mean scores of all speakers fluctuate between 70 and 100. All of them have the voiced [z] as the most common variant.

TABLE 6. *Distribution variants of* (z) *in NSD by period*

	1935		1950		1965		1980		1993	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
[z]	298	84.0	334	89.8	330	91.7	275	74.5	175	48.6
[ẓ]	48	13.5	31	8.3	21	5.8	75	20.3	98	27.2
[s]	9	2.5	7	1.9	9	2.5	19	5.2	87	24.2
Total	355		372		360		369		360	

Consequently, [z] occurs most frequently from 1935 until 1965 (88.5%). Completely voiceless realizations [s] are rare (2.3%); the number of in-between variants also remains rather low (9.2%). The frequency of [ẓ] rises from 1980 onwards; voiceless realizations increase only in the last period.

The devoicing of (z) breaks through between 1965 and 1980 in NSD and is displayed in the more frequent usage of the in-between variant. Between 1980 and 1993 devoicing grows stronger, but now by an increase of the voiceless variant [s]. These results confirm Hypothesis 1.

Flanders. The mean score for (z) is equal in 1935 and 1965 (see Table 5). The standard deviations are small. We almost exclusively find fully voiced realizations of (z). Analogous to (v), devoicing of (z) shows up in the royal reports of the last period: Type × Period interaction, $F = 8.206$, $df = 2,12$, $p = .006$; main effect of period, $F = 8.812$, $df = 2,12$, $p = .004$. Hypotheses 2 and 3 are not confirmed.

From an observation of the raw data it appears that in SSD (z) is slightly more susceptible to devoicing than (v). Devoicing of (z) is not exclusively limited to the three reporters of the last period who devoice (z). In each of the other two periods we find one speaker with some realizations deviating from the voiced standard (compare the lowest scores of (z) in Table 5 with those of (v) in Table 3).

(g)

Table 7 shows the mean score, the mean score split up by type, and the range of (g) by period and by region. An analysis of variance shows a two-way Region × Period interaction, $F = 9.160$, $df = 2,42$, $p = .000$. There are main effects of region, $F = 107.400$, $df = 1,42$, $p = .000$, and period, $F = 6.176$, $df = 2,42$, $p = .004$. These effects indicate that the differences between NSD and SSD have become larger. In SSD there is even a minor tendency towards voicing between 1935 and 1993.

The Netherlands. There is only a significant main effect of period, $F = 8.632$, $df = 4,40$, $p = .000$. This effect is caused by the increase of devoicing

TABLE 7. (g) *Statistics by region and period*

		1935	1950	1965	1980	1993
NSD	*M* (*SD*)[a]	20.8 (12.3)	4.6 (6.0)	1.9 (2.9)	7.7 (8.7)	4.8 (9.8)
	royal/sports[b]	18.0/24.0	9.0/0.0	3.0/1.0	14.0/1.5	6.5/3.0
	range	9.0–51.5	0.0–19.0	0.0–8.5	0.0–22.5	0.0–30.0
SSD	*M* (*SD*)	32.6 (8.6)		34.6 (9.8)		43.2 (6.3)
	royal/sports[b]	25.5/40.0		29.5/39.5		42.5/44.0
	range	21.5–42.0		24.5–51.5		34.5–50.0

[a]*M* = overall mean score; *SD* = standard deviation.
[b]Mean score for royal programs/mean score for sports programs.

TABLE 8. *Distribution variants of* (g) *in NSD by period*

	1935		1950		1965		1980		1993	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
[ɣ]	20	5.6	1	0.3	0	0	7	1.8	5	1.3
[ɣ̈]	106	29.8	25	7.2	14	3.8	39	10.5	28	7.4
[x]	230	64.6	321	92.5	358	96.2	327	87.7	345	91.3
Total	356		347		372		373		378	

between 1935 and 1950. The Tukey HSD test shows a significant difference ($p < .05$) between 1935 and the four following periods. In 1935 (g) is already highly devoiced ($M = 20.8$). This is in line with observations of several linguists of the period. The distribution of the variants is presented in Table 8. Before World War II, fully voiced realizations of (g) are already very uncommon (5.6%), and slightly voiced realizations occur quite frequently (29.8%). The majority of realizations, however, are voiceless (64.6%). From 1950, most of the speakers use voiceless realizations almost exclusively; slightly voiced ones have disappeared to a large extent, and fully voiced realizations are rarities. Out of fifty Dutch informants, forty never use a voiced variant; they do not make a voice distinction between /ɣ/ and /x/. Hypothesis 1 of this study is confirmed.

Flanders. There are significant main effects of period, $F = 4.009$, $df = 2,12$, $p = .046$, and type, $F = 7.435$, $df = 1,12$, $p = .018$. But, in contrast with (v) and (z), the voiced character does not decrease but increases slightly between 1935 and 1993 in SSD. There is also a small type effect: in royal reports (g) is more devoiced than in sports commentaries. We do not have an explanation for these effects. The most striking characteristic of Flemish (g) is its relatively voiceless character. The majority of realizations are in-between variants (58.4%), but voiceless realizations also occur frequently (34.0%).

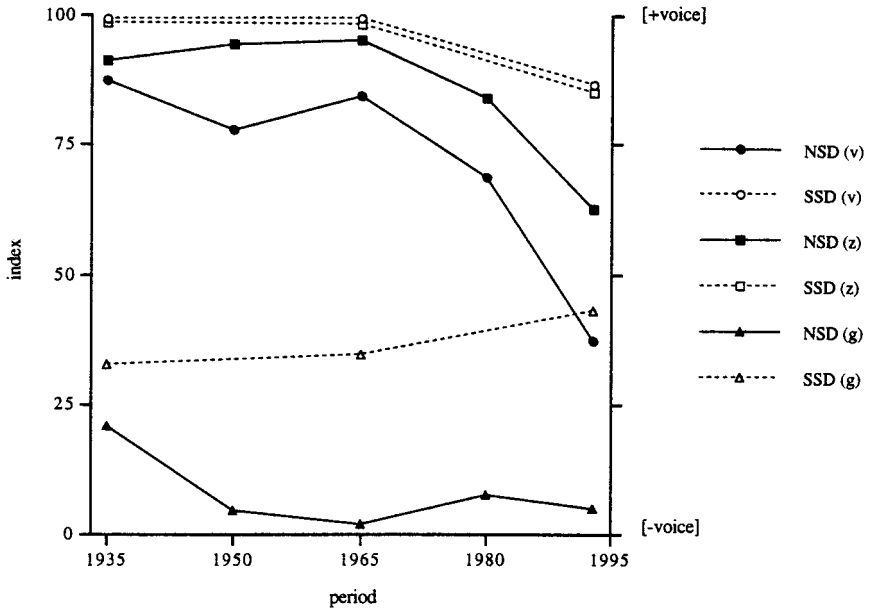

FIGURE 1. Devoicing of the fricatives (v), (z), and (g) in Standard Dutch, split up by period and region.

Fully voiced realizations of (g) are rather uncommon (7.6%). These observations are strengthened by experimental phonetic research. Debrock (1977:70) observed that eight out of ten Flemish informants invariably realize initial /ɣ/ as a voiceless fricative. Another remarkable fact is the high intra-speaker variation: eight out of eighteen Flemish commentators realize at least three of each of the three variants. Just as for (v) and (z), Hypotheses 2 and 3 are not confirmed.

Comparison

The results of our study of the devoicing of (v), (z), and (g) are given in Figure 1. The mean scores of each variable are split up by period and region. What is especially striking are the ever growing differences between The Netherlands and Flanders in the pronunciation of (v), (z), and (g). Over time a definite local pronunciation standard has developed in Flanders. In the 1930s SSD was modeled upon the northern standard, but, in contrast with the latter, the southern standard has hardly changed. In NSD there is a clear shift towards a voiceless pronunciation of the voiced fricatives. On the one hand, this shift can be considered illustrative of the growing dominance of the Randstad[7] on NSD. On the other hand, it can also be seen as the loss of a real pronunciation standard. Flanders falls outside the economic and cultural

TABLE 9. *Pearson correlations between (v), (z), and (g) within SSD*

	(z)	(g)
(v)	.9105**	−.2161
(z)		−.1687

**$p \leq .01$.

TABLE 10. *Pearson correlations between (v), (z), and (g) within NSD*

	(z)	(g)
(v)	.7981**	.3170*
(z)		.1045

*$p \leq .05$; **$p \leq .01$.

dominance of the Randstad. Furthermore, the standard is still cherished in Flanders as a consequence of the struggle for the recognition of Dutch as an official language. Finally, there is the unwillingness to speak like the Dutch. These factors avoid a breakthrough of the devoicing of the voiced fricatives in Flanders.

Figure 1 also clearly shows that (g) is devoiced more than (v), and (v) more than (z). This confirms Hypothesis 4. This hierarchy is similar to those found in synchronic data and diachronic observations. This is an indication that our data are valid. This hierarchy may be explained by a fear of homophonic clashes. The less possible the homophones, the sooner the voice distinction would disappear. For (g) we only know of two such pairs. From this perspective, it is not surprising that the devoicing of (g) has progressed the furthest. We suppose that there are more /s/–/z/ pairs than /f/–/v/ pairs, but this must be studied in greater detail before we can stipulate that homophony accounts for the hierarchy.

To check whether there is a connection between the devoicing of (v), (z), and (g), we calculated correlations between (v), (z), and (g) for Flanders (Table 9) and The Netherlands (Table 10). In both varieties of Standard Dutch there is a strong correlation between devoicing of (v) and devoicing of (z). Reporters who devoice (z) generally devoice (v) as well. In most cases (v) is more devoiced than (z).

In Flanders there are no significant correlations between (g) and the other fricatives, as the voice character of (g) has hardly changed for 60 years. In The Netherlands there is only a weak correlation between (g) and (v). There

is no significant correlation with (z), because at the moment that (z) starts devoicing (g) is almost completely devoiced.

An interesting factor that demands further research is the role of perception in this process of devoicing. In some theories on sound change (e.g., Ohala, 1981) an important role is attributed to the listener. Sound change might originate in an incorrect interpretation of a segment by the listener. Afterwards, the listener will produce the segment in the way he or she has parsed it, and this can give the initial impetus to sound change. Subsequently, this sound change may or may not spread through the community. Research has shown that [v] is perceived more as [f] than vice versa and also more than [z] is perceived as [s] (Balise & Diehl, 1994). This may explain why /v/ has been devoiced before /z/. Similar research on the perception of /ɣ/ and /x/ has not yet been conducted as far as we know, but we intuit that the interpretation of [ɣ] as [x] happens even more easily than the interpretation of [v] as [f]. If this statement could be justified, then the hierarchy could be partly explained by perceptual factors.

Finally, the observed hierarchy may be explained by phonological factors. In Germanic languages dentals are considered phonologically stronger than labials, and labials are stronger than velars (Escure, 1975:37; Foley, 1977:50). Usually, devoicing is a strengthening process (Foley, 1977:49), as voiceless segments are considered stronger than their voiced counterparts. But in this case devoicing seems to be a lenition process. Two arguments may be given. First, in syllable-final position voiced fricatives are devoiced in Standard Dutch (Booij, 1995:55). In weakening processes this is the first context to be reduced (Escure, 1975:33). Second, the devoicing of the voiced fricatives /v/, /z/, and /ɣ/ results in a merger with the voiceless counterparts /f/, /s/, and /x/. Strong segments are more resistant to weakening processes than are weak elements. This implies that /z/ is more resistant to devoicing than /v/, and /v/ is more resistant than /ɣ/. Hence, the observed hierarchy /ɣ/–/v/–/z/ reflects the phonological strength of these segments.

Linguistic conditioning

Here we discuss Hypothesis 5—segments in word-initial position are more prone to devoicing than segments in word-internal position. We try to refine the insights in the linguistic factors affecting syllable-initial fricative devoicing by taking into account the role of word stress. For the study of the linguistic factors ruling the devoicing of the voiced fricatives in intersonorant onset position, only Dutch speakers with at least three realizations deviating from the speaker's mode were selected. Consequently the study of the linguistic conditioning was not biased by data from speakers who always devoice, who do not devoice, or who devoice sporadically, possibly as a result of a slip of the tongue. Flemish reporters who devoice were also excluded, as it was not quite evident that devoicing in SSD follows a pattern similar to that in NSD. The analyses presented are averaged over variants, not over speakers.

The analyses of (v) are based on 1,820 realizations (46 speakers), (z) on 1,230 realizations (34 speakers), and (g) on 805 realizations (23 speakers). For this study of the linguistic factors determining devoicing, data from all five periods were collapsed, as there were no indications that the linguistic factors favoring devoicing did not remain stable throughout the whole process of devoicing.

Quantitative studies have already shown that voiced fricatives in word-initial position are more often devoiced than are those in word-internal position (Gussenhoven & Bremmer, 1983; Van Hout, 1989; Voortman, 1994). Consequently, position within the word is one of the factors we dealt with in this study. It should be kept in mind that this study is limited to (v), (z), and (g) in syllable-initial, intersonorant position. In word-initial position a distinction is made between occurrences of (v), (z), and (g) in connected speech and those after a (long) pause. In the latter case, voice assimilation of (v), (z), or (g) towards a sonorant preceding the pause is blocked. In word-initial position occurrences of (v), (z), and (g) in stressed syllables were transcribed. In word-internal position, however, we made a distinction between syllables that have main word stress (e.g., *geval* 'case'), syllables carrying secondary word stress (e.g., *aanval* 'attack'), and unstressed syllables (e.g., *lever* 'liver').

Thus, five different contexts were distinguished. The variable (v), (z), or (g), which is always in syllable-initial position, is in

1. word-initial position + after a pause + stressed syllable (in most cases primary word stress): e.g., *Voorzet naar de midvoor* 'pass to the centre forward';
2. word-initial position + stressed syllable: e.g., *Hij geeft een voorzet* 'He gives a pass'; *jouw vader* 'your father';
3. word-internal position + primary word stress: e.g., *geval* 'case';
4. word-internal position + secondary word stress: e.g., *aanval* 'attack';
5. word-internal position + unstressed syllable: e.g., *lever* 'liver'.

According to Hypothesis 5 there would be more devoicing in contexts 1 and 2 (word-initial), than in contexts 3, 4, and 5 (word-internal). We also expected more devoicing in context 1 (after a long pause) than in context 2. On the basis of the findings in the literature it is not possible to formulate clear expectations concerning the role of word stress.

For each variable mean index scores have been calculated for the five contexts, ranging from 0 (completely voiceless) to 100 (completely voiced). The results are presented in Figure 2, and the exact figures can be found in Tables 11 (g), 12 (v), and 13 (z). In these tables the variants of (g), (v), and (z) are also split up by the five contexts. The chi-square tests in these tables appear to be significant for (g), $\chi^2 = 142.746$, $df = 8$, $p = .000$; (v), $\chi^2 = 89.025$, $df = 8$, $p = .000$; and (z), $\chi^2 = 33.107$, $df = 8$, $p = .000$. We suggest that the results regarding contexts 1 and 4 should be carefully interpreted, as the number of observations in these contexts is rather low.

TABLE 11. *Variants and index score of* (g) *divided by context* (n = 805)

	1		2		3		4		5	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
[ɣ]	0	0.0	4	1.1	5	5.2	0	0.0	24	8.4
[ɣ̈]	2	8.7	41	11.2	16	16.5	11	32.4	128	44.8
[x]	21	91.3	320	87.7	76	78.4	23	67.6	134	46.9
Total	23		365		97		34		286	
Index	4.3		6.7		13.4		16.2		30.8	

TABLE 12. *Variants and index score of* (v) *divided by context* (n = 1,820)

	1		2		3		4		5	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
[v]	10	25.0	380	43.5	197	64.0	53	67.9	319	61.2
[ɣ]	17	42.5	324	37.1	69	22.4	15	19.2	152	29.2
[f]	13	32.5	169	19.4	42	13.6	10	12.8	50	9.6
Total	40		873		308		78		521	
Index	46.2		62.1		75.2		77.6		75.8	

TABLE 13. *Variants and index score of* (z) *divided by context* (n = 1,230)

	1		2		3		4		5	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
[z]	15	44.1	430	67.9	181	78.4	31	58.5	183	65.6
[z̥]	8	23.5	137	21.6	35	15.2	16	30.2	64	22.9
[s]	11	32.4	66	10.4	15	6.5	6	11.3	32	11.5
Total	34		633		231		53		279	
Index	55.9		78.7		85.9		73.6		77.1	

In Figure 2 we see that for the contexts 1, 2, and 3 (i.e., syllables carrying main word stress) the results perfectly fit our expectation. There is more devoicing in word-initial than in word-internal position, and a preceding long pause favors devoicing. Note that the devoicing hierarchy is also reflected in these results. In contexts 4 and 5, however, the results seem to be more diffuse. In word-internal position there does not seem to be a clear-cut role of word stress. The differences between the five contexts are tested by means of

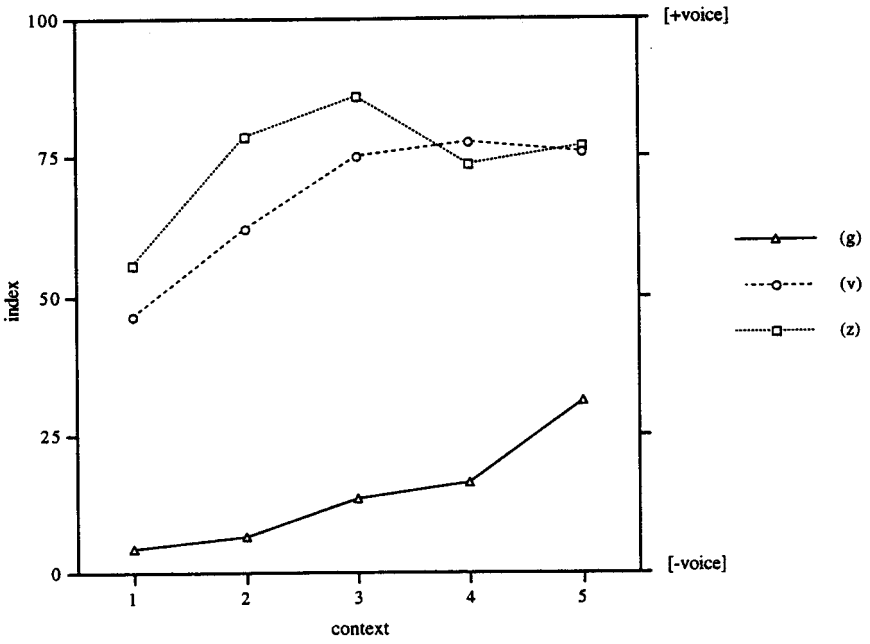

FIGURE 2. (g), (v), and (z) in NSD, split up by context.

chi-square tests. The results of these tests are summarized in Tables 14 (g), 15 (v), and 16 (z).

Voicing of (g), mainly the partially voiced [ɣ̬], is most preserved in context 5—unstressed syllables in which (g) is followed by a schwa (Table 11). The realization of (g) in context 5 differs significantly from the other four contexts (Table 14). In word-initial position (contexts 1, 2) (g) is more devoiced than in word-internal position (levels 3, 4, 5),[8] which confirms Hypothesis 5.

In word-internal position stress does not seem to have any influence on the devoicing of (v) (see Figure 2). The chi-square tests, however (Table 15), show that there is a significant difference between context 3 (main word stress) and context 5 (unstressed). For both categories the mean score for (v) is equal, but the partially voiced variant [v̬] is used more often if word-internal (v) is followed by a schwa instead of a stressed full vowel (see Table 12). There are no significant differences between contexts 3 and 4 or between contexts 4 and 5. Hypothesis 5 is confirmed: there are significant differences between word-initial (contexts 1, 2) and word-internal (v) (contexts 3, 4, 5). In addition, a preceding pause clearly favors devoicing.

In contexts 1, 2, and 3 the results for (z) are similar to those for (v). After a pause (context 1) there is much more devoicing than in all other positions.

TABLE 14. *Chi-square tests for* (g) *between the five contexts*

	context 2	context 3	context 4	context 5
context 1	n.s.	n.s.	*	**
context 2		*	*	**
context 3			n.s.	**
context 4				*

*$p < .05$; **$p < .001$.

TABLE 15. *Chi-square tests for* (v) *between the five contexts*

	context 2	context 3	context 4	context 5
context 1	*	**	**	**
context 2		**	**	**
context 3			n.s.	*
context 4				n.s.

*$p < .05$; **$p < .001$.

TABLE 16. *Chi-square tests for* (z) *between the five contexts*

	context 2	context 3	context 4	context 5
context 1	**	**	n.s.	*
context 2		*	n.s.	n.s.
context 3			*	*
context 4				n.s.

*$p < .05$; **$p < .001$.

Stress seems to play an important role in word-internal position (see Table 16 for the results of the chi-square tests). In unstressed syllables (contexts 4, 5) (z) is more prone to devoicing than in stressed syllables (context 3). In unstressed word-internal position there is a high number of partially voiced variants (Table 13). In Van Hout's study of Nijmegen vernacular (Van Hout 1989:124 ff.) a similar diverging pattern is found for (z). Hypothesis 5 is neither confirmed nor rejected for (z): there are no clear differences between word-initial and word-internal (z). If we exclude context 1, for which we only have a small number of observations, there is only a significant difference between contexts 2 and 3. At the moment it is not possible to give a solid explanation for the differences in linguistic behavior between (z) and the other variables. Van Hout (1989) tentatively suggested a kind of neutralization strat-

egy in unstressed position for (z) and linked this with the stigmatization of the devoicing of (z) in Nijmegen vernacular. Further research is necessary to develop this idea and to test whether this explanation is also applicable to Standard Dutch and to the other fricatives. For (v), and possibly also for (g)[9] in word-internal position before schwa (context 5), a similar strategy seems to be at work in Standard Dutch.

This analysis has shown that context 1 (after a pause) is the most favorable context for devoicing for all variables. There is also more devoicing in word-initial than in word-internal position.[10] This is very obvious for (g) and (v), but less clear for (z), which apparently follows a different linguistic pattern in the process of devoicing. There is not a clear-cut role of word stress in the process of devoicing,[11] but for all variables partially voiced variants are clearly favored before schwa.

CONCLUSIONS

We have formulated five hypotheses concerning the devoicing of the voiced fricatives in Standard Dutch. Three of them are confirmed by our study: (1) between 1935 and 1993 the devoicing of voiced fricatives increases in NSD (Hypothesis 1); (2) the hierarchy of devoicing is (g) > (v) > (z) (Hypothesis 4); and (3) segments in word-initial position are more prone to devoicing than segments in word-internal position (Hypothesis 5).

Hypothesis 2—the process of devoicing fails to occur in SSD between 1935 and 1993—is contradicted by our data. The tendency towards devoicing is much less strong in Flanders than in The Netherlands, but devoicing of (v) and (z) is found in Flanders as well. For (g) there is an opposite effect: (g), which quite frequently has a devoiced pronunciation in SSD, has become slightly more voiced between 1935 and 1993. The phenomenon of devoicing in Flanders needs further study.

Hypothesis 3—there is no systematic differences in devoicing between sports commentaries and royal reports—is partly confirmed. There are no differences for NSD. In SSD, there are small differences, but they are mainly the result of three reporters in the last period who devoice in recordings concerning royal events.

This study shows that devoicing of the voiced fricatives is a very gradual process in Standard Dutch, and that the partially voiced in-between variants play a substantial role. This study also shows that, even in a standard variety, language change can spread quite rapidly. It is difficult to evaluate the exact value of this study compared with other methods of measuring language change in progress, as there are no comparable apparent-time studies of spoken Standard Dutch, and detailed descriptions of Standard Dutch in the periods we have studied are lacking. Nevertheless we have shown that retrospective longitudinal studies on the basis of old recordings can contribute to the study of language change in progress; our results are in line with the

results drawn from similar synchronic research and add to our knowledge of this change in progress (cf. Bauer, 1985). Data collection, however, is not easy, but this is also the case for prospective studies. The advantages of retrospective studies are the consistency of the study (the whole survey can be conducted by the same researcher) and the large time period that can be covered in a fairly short amount of time.

NOTES

1. Others have occasionally explored this new possibility to study language change. Brink and Lund (1975) used old phonographic records to deepen the time dimension in their study of Copenhagen vernacular. Prince (1987) used recordings from the period 1940 to 1979 of Sarah Gorby, a Jewish popular singer, to study sound change in Yiddish.
2. In 1930 the University of Ghent was completely Dutchified. Formerly it was impossible for Flemish students to get a university degree by taking courses and exams in their native language in Flanders.
3. In this article we do not specify the place of articulation of /ɣ/, and we will use the phonetic symbols [ɣ] for voiced and [x] for voiceless realizations. In SSD /ɣ/ and /x/ are velar fricatives. In modern NSD /ɣ/ and /x/ are mainly uvular. In regional accents, however, velar and palatal realizations occur. In this article we concentrate exclusively on voicing. Information about place of articulation and "rasp" (uvular vibration) and their relation to voicing can be found in Van de Velde (1994, 1996).
4. Collins and Mees (1981:159) described the labio-dental pair as /f/ and /f̬/.
5. The examples are transcribed phonemically.
6. The original scores were made on a 1–2–3-scale, of which an index (x) was calculated (sum scores / n). To convert to the scale 0–100 (y) the following formula was used: $y = (100x - 100) / 2$.
7. The Randstad is the urban agglomeration in the west of The Netherlands. The main cities are Amsterdam, The Hague, Rotterdam, and Utrecht.
8. Although the difference between contexts 1 and 3 is larger than that between contexts 2 and 3 (see Figure 2), the former is not statistically significant. This is due to the small number of observations in contexts 1 and 3.
9. As fully voiced realizations of (g) are very rare in our corpus we should be very careful in interpreting the partially voiced realizations of (g) as compromise variants.
10. This seems to be an argument against our vision of devoicing as a weakening process. In weakening processes initial segments are more resistant to weakening than segments in intervocalic position (Escure, 1975). It should be remarked, however, that the intervocalic position in Escure's historical linguistic study is not the same as the word-internal context in our study. In her study the domain of the rules is the phonological phrase; consequently intervocalic segments can also occur word-initially.
11. In the realization of English intervocalic voiced fricatives there is no systematic effect of the stress characteristics of the surrounding vowels (Docherty, 1992:39; Haggard, 1978). For Dutch further research is necessary to reveal the linguistic factors ruling the devoicing of the voiced fricatives. In this research the difference between tense and lax segments should play an important role (Debrock, 1977; Slis, 1985; Slis & Van Heugten, 1989).

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