12   Summary of findings and conclusions

This final chapter purposes to give a summary of the most important findings in this book: *T-deletion in Dutch Dialects. Quantitative Analyses of Structural, Spatial and Temporal Variation*. This summary also contains an analysis of the methods employed in the study and enumerates subjects requiring further research.

What is t-deletion? An illustration can be found in (1)-(8), which list words with word-final [t]. In the dialects this [t] is not always pronounced. This so-called word-final t-deletion, its occurence and non-occurence, is the subject of this book.

(1)   verbal forms before silence

pres sg	(jij/hij) loop*t* '(you/he) walk(s)
	bak*t* 'bake(s)', bidt 'pray(s)', blijf*t* 'stay(s), remain(s)', breek*t* 'break(s)', draag*t* 'carry/carries', geef*t* 'give(s), geloof*t* 'believe(s), grijp*t* 'seize(s)', heef*t* 'have/has', jaag*t* 'hunt(s)', kijk*t* 'look(s)', leg*t* 'lay(s)', lieg*t* 'lie(s), tell(s) untruth', lig*t* 'lie(s), are/is recumbent', maak*t* 'make(s)', naak*t* 'near(s)', ruik*t* 'smell(s)', slaap*t* 'sleep(s)' steek*t* 'stick(s), stab(s)', sterf*t* 'die(s),' wach*t* 'wait(s)', weeg*t* 'weigh(s)', werk*t* 'work(s)', zeg*t* 'say(s)'
pres sg	du baks*t* 'thou bakest'
pres sg	(jij/hij) lees*t* '(you/he) read(s)'
	bars*t* 'burst(s), split(s)', blaas*t* 'blow(s)', vries*t* 'freeze(s)', was*t* 'wash(es)'
pres sg	haal*t* 'fetch(es)', kom*t* 'come(s)', neem*t* 'take(s)', woon*t* 'live(s)',
	vaar*t* 'sail(s)', val*t* 'fall(s)', vang*t* 'catch(es)', duw*t* 'push(es)', gaa*t* 'go(es)', slaa*t* 'hit(s)', zie*t* 'see(s)'

(2) pres pl   (wij/jullie/zij) bak*t*, loop*t* '(we/you/they) bake, walk'

(3) pret   brach*t* 'brought', moch*t* 'could', moes*t* 'had to', wis*t* 'knew', zoch*t* 'sought'

(4) nominal forms before silence
     past part (adjectival)   gemaak*t* 'made'
     past part   gehoop*t* 'hoped'
     past part   gewerk*t* 'worked'

(5) noun   knech*t* 'servant'
     noun   nes*t* 'nest', bars*t* 'crack', haas*t* 'hurry'
     noun   hoof*d* 'head'
     noun   herfs*t* 'autumn'
     noun   mark*t* 'market', naak*t* 'naked'

(6) adj/adv   slech*t* 'bad'
     adj/adv   vas*t* 'fast, fixed'
     num   ach*t* 'eight'

(7) superl   groots*t* 'biggest'
                                     bleeks*t* 'palest', braafs*t* 'best-behaved', droefs*t* 'saddest', droogs*t* 'driest', ergs*t* 'worst', slaps*t* 'weakest', slechts*t* 'worst', vaaks*t* 'most often'
     superl   bangs*t* 'most afraid', groens*t* 'greenest', vals*t* 'fals-est, meanest'

(8) forms before vowels and consonants
     clause   hij loop*t* in de val 'he walks into the trap'
     clause   hij krijg*t* last van de hitte 'the heat is troubling him'
     clause   loop*t* veel 'walks a lot
     clause   kom*t* van 'comes from'

So t-deletion is loss of [t] in word-final position. T-deletion occurs principally after non-sonorant consonants:
- in certain types of verbs: *loopt* 'walks' in that case becomes *loop*, *bracht* 'brought' becomes *brach*, see (1)-(3);
- in nominal forms: *gemaakt* 'made' in that case becomes *gemaak* (4) (past part forms apparently behave in a nominal way), *knecht* 'servant' becomes *knech* (5), *slecht* 'bad' becomes *slech* (6) and *grootst* 'biggest' becomes *groots* (7).

Word-final t-deletion does infrequently also occur after sonorants: *vaart* 'sail(s)' in that case becomes *vaar*, *duwt* 'push(es) becomes *duw* and *gaat* 'go(es) becomes *ga*.

A number of internal and external factors play a role in t-deletion. The internal factors are sonority, vowel quantity, 'historical' vowel quantity, vowel quality, underlying voice in the stem-final consonant, perceptual prominence, articulatory complexity, and word frequency. External factors are social, geographical and temporal in character.

Three large dialects groups were studied for t-deletion: the province of Zuid-Holland, the Betuwe or Rivers region, and the dialects of the north-east. The boundaries are given in map 1. These three dialect groups were found to exhibit very significant differences in the conditions for t-deletion. This also holds, for that matter, for the dialects in the provinces of Netherlands and Belgian Limburg and the Belgian provinces of West and OostVlaanderen and the Flemish speaking part of France, which are dealt with in passing in chapters 10 and 11. In all these dialects t-deletion is different again from t-deletion in Middle West Flemish, English and Old French.

Map 1: Area's studied 1-3
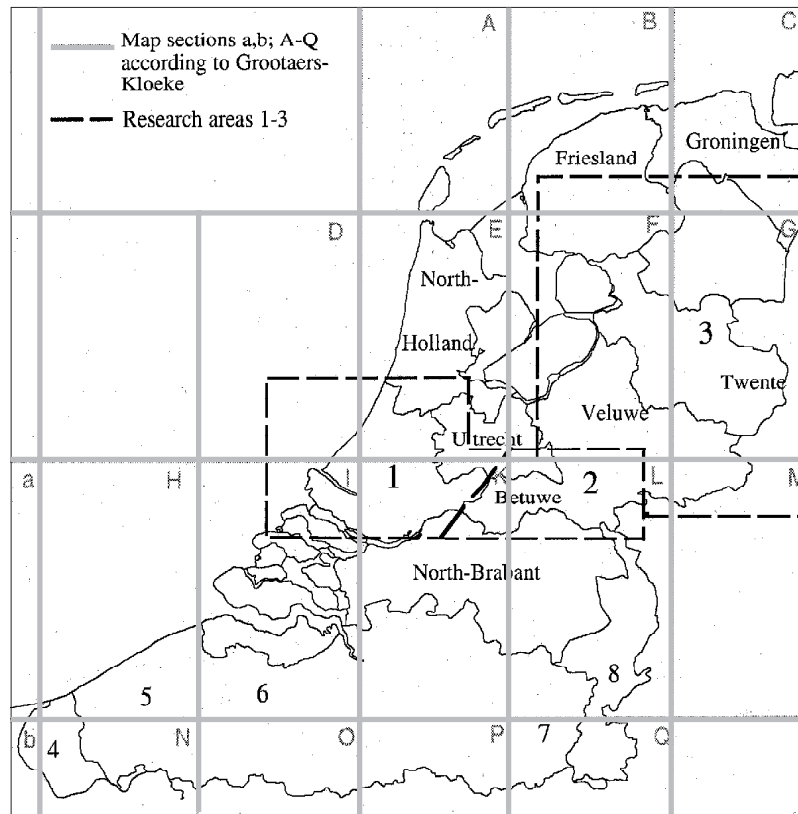
1 = South-Holland; 2 = Betuwe/Rivers region; 3 = North-eastern region; 4 = French Flemisch; 5 = West Flanders; 6 = East Flanders; 7 = Belgian Limburg; 8 = Netherlands Limburg.

One of the findings of this study is that verb forms, as in (1)-(3), show more t-deletion than nominal forms, as in (4)-(7). As indicated, verb participles in -*t* also come under the heading of nominal forms. In the other languages we also invariably come across morphological distributions. Whether the [t] occurs before silence, as in (1)-(7), or before another word in a clause, as in (8), can make a difference.

Below, we will first of all summarise our theoretical expectations (12.1). Then our findings follow in 12.2-12.7. The language internal results, in particular the various conditions for t-deletion in the present-day dialects, are related in 12.2. Then the historical developments which led to the present situation are considered (12.3). In our presentation we also differentiate between words before silence (12.2) and words in sequence (12.4). After the language internal factors the external factors are dealt with (12.5), social factors briefly and language geographical factors more extensively. Differences with other languages are the subject of 12.6, and the theoretical linguistic implications are presented in 12.7. The composition of the corpus, the models and the statistics employed follow in 12.8. In conclusion, a number of possibilities for future research which this study would seem to indicate, are enumerated in 12.9.

12.1. **Theoretical expectations**

On the basis of the literature consulted (Baudouin de Courtenay 1927, Guy 1980, Labov 1982; for more details see chapters 1 and 6), two notions appear to be of importance: perceptual prominence and articulatory complexity.

Articulatory complexity concerns the production of speech utterances. The more complex the cluster is in which [t] occurs, the sooner deletion occurs.

Prominence is perceptual in the sense that the comprehensibility of speech utterances is at issue; certain aspects are supposed to be more important, more prominent, than others. The more prominent a [t] is, the less t-deletion occurs. We assume four types of perceptual prominence: phonic, morphological, disambiguatory and semantic. The more prominent a [t], the less t-deletion.

Articulatory complexity and the four types of perceptual prominence may concern what precedes [t] (*gaat* 'goes' is less complex than *naakt* 'naked'), or what follows after [t] (*loop.t in* 'walks in' is less complex than *loop.t veel* 'walks a lot').

Consonant (cluster) before word-final [t]

A. Phonic prominence and articulatory complexity

Within the word-final consonant clusters of which [t] forms a part there are phonic prominence effects. Thus [t] in [kt] (*bakt* 'bakes'), [xt] (*wacht* 'waits'), [pt] (*slaapt* 'sleeps') and [ft] (*hoofd* 'head') differs more from [k], [x], [p] and [f] than [t] in the cluster [st] (*gast* 'guest') differs from [s]. According to Guy (1980), this is because [s] is spectrally more like [t] than [k], [x], [p] and [f] are like [t]. Therefore [t] in [st] is less striking, i.e. phonically less prominent, than [t] in the other clusters and as a result [t] in the cluster [st] will delete more easily.

Consonant clusters possess degrees of articulatory complexity. The complexity is determined by a) the number of shifts in place of articulation within in a cluster (Guy 1980); b) the sonority of consonants: a cluster consisting of a [+son] consonant followed by two [-son] consonants, as in *ba+ng+st*, is articulatorily less complex than a cluster of three [-son] consonants, as in *droog+g+st*; and c. the length of the consonant cluster: longer clusters are more difficult to produce and therefore more complex than shorter ones.

Degree of sonority can be expressed on a scale from sonorous to not sonorous. The less sonorous the sound preceding [t] is, the more t-deletion there will be: more deletion in *loop* (loopt 'walks') than in *zoch(t)* 'sought' and in *vaar(t)* 'sails' and *gaat* 'goes', in that order. The total range from less sonorous to more sonorous is: 1) plosives, e.g. [p] in *loopt* 'walks' 2) fricatives, e.g. [x] in *zocht* 'sought', 3) nasals, e.g. [m] in *komt* 'comes' 4) liquids, e.g. [r] in *vaart* 'sails' 5) glides, e.g. [w] in *duwt* 'pushes' 6) vowels, e.g. [a] in *gaat* 'goes' (see chapter 10).

According to this criterion, we expect articulation to be the more difficult, the more articulatorily complex a cluster is. The more difficult the articulation, the more often [t] will be deleted.

From the above it follows that phonic prominence and articulatory complexity are counteractive. The relation between them is expressed in (9).

(9)

	bakt, slaapt, knecht	tendency to t-deletion	*haast, nest*	tendency to t-deletion
phonically prominent articulatorily complex	+	no	–	yes
	+	yes	–	no

From (9) it follows that if [t] is phonically prominent, there is preferably no t-deletion: bak*[t]* 'bakes' does not become *bak*, but *haas[t]* 'hurry; almost' does become *haas*. Conversely, in the case of articulatory complexity, there is a tendency to t-deletion: *bak[t]* becomes *bak*, but *haas[t]* remains *haast*.

The clusters [kt] (*bakt* 'bakes'), [pt] (*slaapt* 'sleeps'), [xt] (*knecht* 'servant'), and [ft] (*hoofd* 'head') are equally articulatorily complex and equally phonically prominent. Between these clusters, therefore, we expect no differences in t-deletion. Where [t] is deleted a great deal, articulatory complexity is evidently predominant, otherwise phonic prominence. (The fact that *-t* in *bakt* is a separate morpheme is left outside of consideration here, see morphological prominence, B1 below).

When [st] is part of a longer consonant cluster, articulatory complexity and phonic prominence are also counteractive. Final [t] in [tst] *grootst* 'biggest' is articulatorily less complex than in [fst, xst, pst, xst] *droefst, droogst, slapst, vaakst* 'saddest, driest, weakest, most often', because there is no shift in place of articulation. But final [t] in the cluster [tst] is phonically less prominent, because [t] and

[s] are spectrally alike. It is impossible to make predictions, therefore, about whether there will be more t-deletion in *grootst* 'biggest' than in the group of *braafst* 'best-behaved'.

B. MORPHOLOGICAL PROMINENCE

In the case of morphological prominence the prediction is that there will be less deletion.

B1. When *-t* is a separate morpheme, it is morphologically more prominent than [t] which is part of a word stem: in *gij naak-t* (verb, 'you are nearing') *-t* is morphologically prominent as compared to [t] in *naakt* (noun, 'naked'), but in *bak-t* 'bake(s)' *-t* is invariably a morpheme. In *ik wacht* 'I wait' [t] is not a morpheme, but in *hij wacht* 'he waits' it is impossible to distinguish between [t] as morpheme and *-t* as part of the verb stem, and in such a case it is not possible to make any a priori statement about morphological prominence.

B2. When [t] is part of a morpheme, it is not a morpheme in its own right, as with [t] in the superl *groenst* 'greenest' and with 2sg *du bak-st* 'thou bakest'. In such a case [t] has no morphological prominence and will delete more easily than where *-t* is a morpheme and morphologically prominent as in *hij bakt* 'he bakes'.

B3. A special case of morphological prominence is suffix alternation: *jij loopt - loop-i* (zero) 'you walk - do you walk' as opposed to *hij loopt - loopt- i* 'he walks - does he walk'. In the one case we find the zero form in the inversion, in the other case the *-t* is retained in this position. A suffix which has a zero alternate in the same category is morphologically less prominent than a suffix without a zero alternate and will therefore sooner show deletion: more *jij loop* 'you walk' than *hij loop(t)* 'he walks'.

C. DISAMBIGUATORY INFORMATION ELSEWHERE WITHIN THE WORD

When there is disambiguatory information elsewhere within the word, [t] may delete more easily (Guy 1980), Du P. Scholtz 1963, Goeman 1983). Before the word ending information about the morphological function of the word has already been provided, so that the morphological information given by [t] is no longer essential to interpret the word correctly. Forms like irregular pret *mocht* 'could', *moest* 'had to' differ already in their stems from the infinitives *mogen* 'can' *moeten* 'have to' in respectively the anomalous stem vowel [ɔ] and the extra stem consonant [s], and the regular part *gewerkt* 'worked' differs from 2,3sg *werkt* 'work(s)' in the prefix *ge-*. We would therefore expect *moch*, *moes* and *gewerk*. I do not go into the question whether [t] in *mocht* and *moest* is synchronically speaking a morpheme; diachronically speaking it is.

D. SEMANTIC PROMINENCE

Semantic prominence refers to expressiveness through contrast: the superlative contrasts with the positive degree: *ergst* 'worst' as opposed to *erg* 'bad' The superlative is semantically prominent. [t] will delete less in *ergst* 'worst' than in *herfst* 'autumn' more in *barst* (noun, 'crack') than in *barst* (superl, 'most severe').

Consonant, vowel or silence after word-final [t]

In a connected sequence new clusters may arise as a result of re-syllabification. [Ct#V] after re-syllabification becomes [C]-[tV] and is consequently articulatorily less complex (syllable ending in single consonant) than [Ct#P] (syllable ending in two consonants before silence or pause (P)). [Ct#P] in its turn is less complex than [Ct#C] with three consonants. *loop.t#in* 'walks in' is therefore less complex than *loopt#* 'walks' which in its turn is less complex than *loopt#van* 'walks from'. Articulatory speaking we expect [t] in this last case to delete the most and in *loop.t#in* the least.

Final [t] is phonically speaking more prominent than non-final [t]. Final [t] will be retained more readily. The maximum perceptual prominence is before following silence or pause and thus there is often a clearly perceptible 'release burst' of the final consonant.

The phonic prominence of the other two sentence contexts has to be lower. The prominence of [t] before consonant, as in *last van* 'trouble from' [Ct#C] is lower than that of [t] before vowel, as in *loopt in* 'walks in' [Ct#V]. The middle consonant in a cluster of three is perceptually less prominent and evidences no 'release burst'. The consonant in the position before vowel is capable of doing so and [t] will therefore be retained to a larger degree, but still less than before silence. In terms of perceptual prominence [Ct#P] is the most prominent and should evidence less deletion, [Ct#C] is the least prominent, and [Ct#V] is situated somewhere in between (compare (10) and see chapter 6).

(10)		Ct#P	Ct#V	Ct#C
	articulatory complexity perceptual prominence	+ ++	− +	++ −
# = word boundary; C = consonant; V = vowel; P = pause or silence. − + ++ degrees of complexity				

In the connected sentence there are thus three possibilities for [t]:
1) the next word begins with a consonant, as in *last van* 'trouble of' [Ct#C]
2) the next word begins with a vowel, as in *loopt in* 'walks in' [Ct#V]
3) no other word follows immediately, there is silence, as in *loopt* 'walks' [Ct#P].

Theoretical models

The phonological conditions are interpreted by Kiparsky (1972, 1988) as follows:
a) when it remains possible to distinguish between word forms after deletion, deletion is permitted: *keep* differs in more than one aspect from *kept*, there deletion in *kept* to *kep* is possible;

b) because the conditions for t-deletion relate to word formation or syllable formation, they are universal and not language specific in character. In his vision the influence of the connected sentence for t-deletion also follows from universal principles of sentence phonology. Therefore, according to Kiparsky, there can be no language specific effects for t-deletion. The only language specific effect which does occur concerns the general level of t-deletion for each dialect: one dialect simply t-deletes more than others.

The morphological conditions have been interpreted by Guy (1991a) as following from a lexicon with various levels. Each level has t-deletion, each following level raises the number of cases of t-deletion. The lowest level consists of non-derivations, like nominals, e.g. *apt*, with the least t-deletion, the next level is that of irregular morphology, e.g. *kept*, and then the regular morphology follows, e.g. *heaped.* And finally the sentence phonology is situated at the top.

Deletion of [t] is seen by Labov (1975, 1994), Romaine (1988) and Knott (1986), amongst others, as a stable 'social marker' A stable characteristic shows no evolution in time (any longer). A social marker is a dialect characteristic which is susceptible to styles shifts (more deletion in spontaneous or running speech), for social class (more t-deletion in lower classes); it is a characteristic which people are not very aware of and which provokes little social comment, see (11). A stereotype is a dialect characteristic for which no social stratification or styles shifts can be detected. The indicators are situated at various points in between.

(11)

Types of variables	social stratification	styles shift	consciousness
stereotype	−	−	+
indicator type 1	+	−	−
indicator type 2	−	+	+
social marker	+	+	−

So much for the theoretical expectations.

12.2. Phonological and morphological conditions in present-day dialects in words before silence

As mentioned, t-deletion is not equally frequent everywhere. It is most frequent in verbs, but there are differences between different verb forms. It is less frequent in nominal words and within that category least frequent in superlatives. Participles behave like nominals (see chapters 6 and 11).

12.2.1. *Verb forms and nominal forms*

Three sets of findings are now listed in which verb forms and nominal forms are compared.

A. According to phonic prominence there is less deletion of [t] in [xt], [ft], [kt] and [pt] than in [st]. According to articulatory complexity there is more deletion of [t] in [xt] [ft], [kt] and [pt] than in [st]. In the dialects of the province of Zuid-Holland and the Betuwe region [t] deletes less in *haast* 'hurry, almost' and *nest* 'nest' than in *bakt* 'bakes', *slaapt* 'sleeps', *knecht* 'servant' and *hoofd* 'head', and it follows that articulatory complexity is more important there than phonic prominence (see chapter 6).

B. According to morphological prominence there should be less deletion of *-t* as a separate morpheme than [t] which is not independent. Our findings indicate the opposite. In the dialects of Zuid-Holland and the Rivers region there is more deletion in 2,3sg than in nominal words, where [t] is not a suffix, more t-deletion in 2,3sg *werk* 'work(s)', *leg* 'lay(s)', *geloof* 'believe(s)' than in *ach(t)* 'eight', *knecht* 'servant' and *hoo(d)* 'head' (see chapter 6).

C. According to the principle of disambiguatory information elsewhere within the word, *-t* is supposed to carry less information and therefore delete more easily. We found no differences, however, as a result of disambiguatory information: in preterites like *mocht* 'could' and *moest* 'had to' there is more t-deletion than in 2,3sg pres *werkt* 'work(s)', *zegt* 'say(s)' (or in nominal forms like *markt* 'market', *vast* 'fixed, definite'; this is the result of the high token frequency of the irregular pret verb forms ending in [xt] or [st], see 12.2.2 below and chapter 6.

D. According to morphological prominence *-t* as a separate morpheme in e.g. 2,3sg *vriest* 'freeze(s)' should delete less than [t] as part of a suffix *groens(t)* 'greenest'. We find the opposite, however: [t] deletes more in 2,3sg *vries* 'freeze(s)' than in *groens(t)* 'greenest', see chapter 6.

From A, B, C and D it follows that phonic, morphological and disambiguatory prominence do not play a role in these dialects, at least not in the instances mentioned.

12.2.2. *Verb forms*

Five sets of findings concerning verbs:

A. In the dialects of the north east there are four more aspects which play a role in t-deletion apart from a) sonority of the final stem consonant: to wit b) length of the stem vowel, c) differences in quality of the stem vowel, d) 'historical' length of the stem vowel, and e) underlying voice of the stem consonant. The verb form in question is always 3sg pres. Other verb forms show practically no deletion.
a) Sonority of the final stem consonant. The less sonorous the stem consonant is, the more t-deletion occurs. Thus [kɪk] (3sg 'looks') shows more deletion than [krɪx(t)] (3sg 'gets'), because [k] is less sonorous than [x], and there is even less or no deletion in [voːnt] (3sg 'lives'). As mentioned in 12.1, the total range is:

1) plosives, e.g. [p] in *loopt* 'walks', 2) fricatives, e.g. [x] in *zocht* 'sought', 3) nasals, e.g. [m] in *komt* 'comes', 4) liquids, e.g. [r] in *vaart* 'sails', 5) glides, e.g. [w] in *duwt* 'pushes', 6) vowel, e.g. [a] in *gaat* 'goes' (see chapter 10).

b) length of the stem vowel. Where the stem vowel differs in length from the vowel of the infinitive, there is more deletion than where there is no difference: 3sg [lɛst] of dialect [lɛːzn̩] 'read' is therefore more often found without [t] than if the 3sg vowel had been long or the inf vowel short (see chapter 10).

c) Shortening in 3sg is often accompanied by a quality shift in the vowel sound. This can be seen e.g. in [blɪf] as compared to [bli:vn̩] 'stay, remain'. Two more phenomena may occur when there is shortening: front mutation and back mutation. In some dialects [lo:pt] (3sg 'walks) is only shortened to [lɔp], in other dialects there is additional front mutation to [lœp]. When back mutation occurs the alternates are of the type [ɣeːvm̩ - ɣɪf(t)] inf 'give' - 3sg 'gives'. Sometimes the stem vowel is lengthened, and in that case there may also be quality shifts: [ku:mp] (3sg 'comes') as compared to [kɔmm̩] (inf).

With all types of qualitative differences there is more t-deletion than where there is only a difference in length: -*t* is therefore oftener retained in dialect [lɛst] 3sg of inf [lɛːzn̩] 'read' than in [lœp] 3sg of inf [lo:pm̩] 'walk' and [gɪf] 3sg of inf [ɣeːvm̩] 'give' (see chapter 10).

d) 'Historical length' refers to a vowel which was short in the past and has become long, at least in the standard language. *Komen* 'come' is historically a verb with short stem vowel [ɔ], which was later lengthened in the standard language. Verbs which have always had long stem vowel, like *lopen* 'walk' have less t-deletion than verbs with short stem vowel like *vallen* 'fall', or verbs with lengthened stem vowel like *komen* 'come'. *Hij loop(t)* 'he walks' therefore deletes less easily than *hij val* 'he falls' or *hij kom* 'he comes (see chapter 10).

e) (Underlying) voice plays a role independent of the sonority of the final stem consonant. There is more deletion in [ɣɪf] 3sg of *geven* 'give' and in [vɛlt] 3sg of *vallen* 'fall' than in [brɛkt] 3sg of *breken* 'break' (see chapter 10).

The strong verbs are traditionally categorised into seven classes. In those seven classes t-deletion is affected in different ways by the characteristics (a-e) above. This is the result of the fact that those characteristics have different distributions in the different classes.

When the final stem consonant is voiced, there is less t-deletion in classes 1 and 7 (types *blijven* 'stay, remain' and *blazen* 'blow'), but more in classes 4, 5 and 6 (types *wegen* 'weigh', *lezen* 'read', *dragen* 'carry'). The more sonorous the final stem consonant is, the less t-deletion is found in 3sg in classes 4 (*nemen* 'take' > *wegen* 'weigh' > *breken* 'break'), 5 (*zien* 'see' > *geven* 'give' > *steken* 'stick, stab') 6 (*slaan* 'hit' > *dragen* 'carry' > dialect *wasken* 'wash') and 7 (*vangen* 'catch' > *blazen* 'blow' > *lopen* 'walk'). In classes 1 (*blijven* 'stay, remain' > *grijpen* 'seize') and 2 (*liegen* 'lie' > *ruiken* 'smell') there is more t-deletion when the final stem consonant is sonorous, which is not in accordance with the expectations about sonority (see chapter 10).

B. We expect 2sg to be morphologically less prominent than 3sg in the dialects of the province of Zuid-Holland: *jij loop* 'you walk' occurs more often than *hij loop* 'he walks', because in the inversion there is no inflection for 2sg, whereas there is an inflection for 3sg: *loop jij* 'do you walk' vs. *loopt hij* 'does he walk'. In the Rivers region *hij loop* and *jij loopt* show equal deletion. There 2sg always does have the inflection: *loop-t-e* (see chapters 6 and 9), and as a result there is as much t-deletion as in *hij loopt* and less t-deletion than in Zuid-Holland. It is not possible to make a comparison with the dialects of the north east, because other factors play a role there. A number of the dialects of the north east do not have *loop* in the inversion, see D. below. In the other dialects of the north east, which do have *loop jij* or *lope jij* in the inversion, there are other factors which make a comparison impossible (see chapter 9).

C. Many dialects in the north east have a uniform plural in *-t: wij, jullie, zij loop-t* 'we, you, they walk'. These forms have lost the schwa [ə] of *wi/i/se lopet* through syncope. There are also a number of dialects where we still find *wi/i/se lopet*. The uniform plural *-t* in these dialects is much less susceptible to t-deletion, because *-t* is not preceded by a consonant (see chapter 10).

There is a problem, incidentally, relative to the dialects in the eastern part of the Veluwe region. There appears to be more deletion in the present paradigm than in the rest of the dialects of the north east. It is doubtful, however, whether what is in question here is actually t-deletion. The more western dialects of the Veluwe region have a uniform plural in *-en*. The problem is that the eastern Veluwe dialects have both *-t* and *-en* for their uniform plural suffix: *wi/i/se lopen* by the side of *wi/i/se loopt*. The zero forms could therefore also be the result of loss of *-en: lopen > loop*. Another explanation could be that competition between the concurrent *-t* and *-en* suffixes has led to deflection and therefore to the zero forms. These questions are gone into in chapters 7 and 8.

D. In those dialects of the north east which have [st] in 2sg, [t] deletes more in 3sg than in 2sg: [he lœp / lɔp] 'he walks' as opposed to [du lœpst] 'you walk'. The separate morpheme *-t* is more susceptible to deletion, therefore, than the segment [t] which is part of the morpheme *-st*. According to the expectations [t] as separate morpheme should be perceptually more prominent than [t] as part of a morpheme. As a result [t] should resist t-deletion better. Our findings are that this prominence factor, again, does not operate according to expectation (cf. chapters 6 and 7). What predominates is articulatory complexity: [st] is easier to pronounce than other clusters like [pt]: [t] in *-st* is retained.

E. In the province of Zuid-Holland and in the Rivers region a frequency effect may be a factor in pres and irregular pret. We received the impression that above than a certain frequency in use, there is more t-deletion than under it: frequent t-deletion is found e.g. in *mocht* 'could' (token frequency 28), *moest* 'had to' (token freq. 205), *zegt* 'say(s)' (token freq. 249) and *ligt* 'lie(s)' (token freq. 18). Less t-deletion is found for *buigt* 'bend(s)', *vriest* 'freeze(s)', *zwijgt* 'are/is silent' and *barst*

'burst(s), split(s)' (all token frequencies under 2). We are not able to demonstrate this threshold effect positively because of the limitations of the relevant part of the Uit den Boogaart corpus (1975).

It is definitely not a fact that [t] as separate morpheme of 2,3sg pres (*zegt, leest, vriest* 'say(s), read(s), freeze(s)') shows less deletion in these dialect groups than [t] in *moch, moes, wis* 'could, had to, knew'. It is true that [t] in this latter category is deleted very frequently, but this has to be a result of their token frequency: they are very common irregular verb forms.

The dialects of the north east do not display any token frequency effects at all (see chapter 6 and 10).

12.2.3.   *Nominal forms*

A. In the province of Zuid-Holland and the Rivers area [t] is not deleted more easily in past participles like *gemaakt* 'made' than in other nominal forms without disambiguatory information, like *markt* 'market'. This is not in accordance with the expectation that [t] should be less prominent as a result of the existant disambiguatory information. Even more contrary to expectation is the relation between participles like *gemaakt* and the sg pres forms like *werk* 'work(s)', for here results are the opposite: t-deletion is in fact more frequent in sg pres than in past part.

B. In many dialects of the north east the number of words theoretically suscep-tible to t-deletion is small because many nouns and adjectives end in -*e*. In *neste* 'nest' and *slechte* 'bad' [t] is not word-final. In cases where [t] is in fact word-final t-deletion only occurs if the preceding consonant is -[x] or -[s]: *kne[x]* (knecht 'servant'), *ne[s]* (nest 'nest'), *sle[x]* (slecht 'bad') (see chapter 10).

C. Superlatives are characterised by longer consonant clusters than most other forms in [t]: *ergst, slechtst, grootst, droogst* 'worst, worst, biggest, driest': at least three, sometimes four consonants. They are articulatorily rather complex, which could promote t-deletion. But because of their expressive-semantic prominence we expect [t] to be retained. Semantic prominence is in fact predominant, for the regular superlatives show comparatively very little t-deletion. Forms like *groots* for *grootst* 'biggest' are not frequent at all. For more details see chapter 6.

Although t-deletion in superlatives is low in frequency, there are differences depending on the consonant cluster. Like with other nominal forms and with verb forms, it would be conceivable for articulatory complexity and phonic promi-nence to be counteractive and so balance out. In these clusters phonic promi-nence appears to play a role, because [t] in [tst] (*heetst* 'hottest') is deleted more often than in [fst] (*droefst* 'saddest'), [xst] (*droogst* 'driest'), [pst] (*slapst* 'weakest'), [kst] (*vaakst* 'most often'). This is something we had not encountered before. Articulatory complexity turns out to be of no importance here: because in [tst] there is no shift in the place of articulation, as there is in the other clusters [fst] etc. It is conceivable that the dialects differentiate in accordance with the type of

cluster: in that case phonic prominence would predominate in longer clusters, whereas in shorter clusters of two consonants (see 12.2.1 ad A) articulatory complexity would be predominant (cf. chapter 6). Languages can apparently differ in this respect (see also 12.6).

D. In the dialects of the province of Zuid-Holland and the Rivers region sonority plays an additional role in t-deletion. This concerns the opposition sonorous/not sonorous: [+son] + [st] *groenst* 'greenest') as opposed to [-son] + [st] (*bleekst* 'palest'). [st] is articulatorily more complex in the cluster [kst] than in [nst] and as a result we expect more t-deletion in [kst]. In clusters with a larger number of non-sonorant consonants we do in fact find more t-deletion than in clusters with fewer non-sonorant consonants (see chapter 6).

In fact, in the longer clusters with [tst] (*grootst* 'biggest') it is also possible for word-internal [t] to be dropped instead of word-final [t]: *groost*. Apparently clusters of three dental consonants are perceptually too long in the relevant Netherlands dialects, and the solution is dropping either of the two [t]s (see chapter 6).

12.3. **Diachronic aspects. Phonological and morphological conditions in words before silence**

We studied 1) developments in t-deletion in Zuid-Holland and the Rivers region over the period of 1955-1985; 2) the state of affairs in the 20th century and developments in the 14th century for the dialects of the north east. We conclude with a brief discussion of the zero uniform plural in dialects of the Veluwe region.

12.3.1. *The province of Zuid-Holland and the Rivers region*

For the province of Zuid-Holland and the Rivers region we have established two developments for the period of 1950-1985. 1) T-deletion has gained ground in the western Rivers region, lost ground in the eastern Rivers region (see chapter 5). 2) The dialects in the Rivers region evince a separate internal development: the decline in t-deletion can be accounted for by the fact that *-t* had always been retained elsewhere in the paradigm of nouns: *knech* (sg) vs. *knechte* (pl 'servants'), *slech* vs. *slechte* 'bad'. T-deletion has remained a natural phonological process in the region, for the decline in t-deletion results from a dialect-internal generalisation of plurals to singulars. Reintroduction of *-t* under the influence of the standard language is not a plausible explanation, because in the western Rivers region, which is closest to the conurbation of the western Netherlands from which the standard language exerts its influence, there is more t-deletion (chapter 5).

In this connection the question may be raised whether the 17th and 18th-century uniform plural zero forms of Zuid-Holland are actually the result of t-deletion: *wij *loopt > wij loop* 'we walk'. In my opinion the ending was more probably *-en*: *wij lopen > wij loop*. For a comparable problem in the eastern Veluwe region cf. section 12.2.2 ad C and 12.3.2 below, see also chapter 8).

12.3.2. *Dialects of the north east*

3SG PRES

Differences in t-deletion in the dialects of the north east are largely determined by four diachronic developments (chapter 10), which led to a comprehensive morphologisation of t-deletion. As a result t-deletion is now almost completely restricted to 3sg of strong and irregular verbs. The strong verb [loːpm̩] 'walk' and the irregular verb [hɛbm̩] 'have' delete -*t* in 3sg: [lœp], [hɛf], but the regular verb [ʋaːrkŋ] 'work' retains its -*t* in 3sg: [ʋaːrkt].

The four diachronic developments are:

1) Syncope of suffix vowel, as in *givet* (with short i) > *gift* 'gives', leading to a consonant cluster [ft]. In this cluster [t] can delete. Where there is no syncope, these dialects show no t-deletion.
2) Open syllable lengthening (OSL), as in *jaagn* (inf. 'hunt') as opposed to *jag* (3sg 'hunts') and in *leːzn* (vowel [ɛ]) (inf 'read') as opposed to *les* (3sg 'reads') led to qualitative and quantitative differences in the stem vowel which have become factors affecting t-deletion. These differences in stem vowel were dealt with in section 12.2.2.
3) Shortening of vowel before consonant cluster resulting from syncope, as in *kiket* (vowel [iː] > *kikt* (vowel [ɪ]) 'looks' also leads to qualitative and quantitative vowel differences which affect t-deletion (see section 12.2.2.)
4) Moreover, these dialects had very long-standing qualitative vowel contrasts between inf and 3sg which had been caused by front mutation (*varen - veret* 'sail') and back mutation (*breken - brikit* 'break').

Syncope takes place over a long period in the Middle Dutch and Middle Low German dialects and progresses roughly from south west to the north east, earlier in the Belgian province of West Vlaanderen and later in the dialects of the north east.

OSL takes place over an even longer period and is not completed by the end of the Middle Dutch writings. The progress is from west to east, in the east lengthening in open syllables takes place last. Thus the two changes cross each other. In the medieval dialects we sometimes find OSL first, followed by syncope, and sometimes only syncope, as a result of which OSL is no longer possible. This phenomenon also occurs n the eastern dialects, although later than elsewhere. In some dialects the two changes may have been at work simultaneously, in different sections of the lexicon.

Syncope makes it impossible for OSL to have any effect, because open syllables do not arise before consonant clusters. In the north east the interference of syncope with OSL is strongest.

In fact, conditions for syncope change as times passes. At first syncope occurs more often after short stem syllable than after long stem syllable, more in VC *hevet* 'takes' than in VVC *vriezet* 'freezes' and VCC *stervet* 'dies'. Later we see a change in conditions: more syncope after short vowel than after long vowel, more in VC *hevet* 'has' and VCC *stervet* 'dies' than in VVC *vriezet* 'freezes', cp. (12).

(12) Development of syncope in relation to verb stem

syncopated form		non-syncopated form		
VC VC	VCC	VCC	VVC VVC	initially later
V=short vowel; VV=long vowel; C=consonant; CC=consonant cluster or geminate				

The newly created consonant clusters with [t] from now on occur mainly after verbs with short stem vowel. As a result these verbs have the first and the most t-deletion. This situation explains the fact that *leghet* 'lays' and *hevet* 'takes, has' are at the forefront in both syncope and t-deletion. In these forms syncope is so early (resulting in *legt* and *heft*) that both retained their short vowels. T-deletion then leads, also relatively early, to: *legh* en *hef*. At present [lɛɣ(t)] and [hɛf(t)] are still forms with a high frequency of t-deletion. For the record we would like to point out that syncope takes place independent of the sonority of the final stem consonant.

Uɴɪғᴏʀᴍ ᴘʟᴜʀᴀʟ
In the dialects of the north east the competition between uniform plural in -*t* and in -*en* is very old. The form in -*en* is therefore probable just as indigenous as the form in -*t* and the stability of the ratio between them renders both Heeroma's Westphalian expansion of uniform -*t* plural and expansion in the sense of Kloeke of Hollands -*t* plural not very plausible. It is not true that in the regions where -*t* and -*en* occur side by side all the plural forms necessarily have either -*t* or -*en*, in some regions both are possible. Developments may differ for each finite form (1, 2 or 3pl). See chapters 7 and 8.

12.4. **Phonological and morphological conditions in the connected sentence in present-day dialects**

Just like in words in isolation, t-deletion in words in the connected sentence shows a lot of variation. The initial sound of the following word makes a difference for t-deletion. Thus [t] is more often retained before vowel than before consonant or silence.

I will discuss, successively, the province of Zuid-Holland and the Rivers region, the Netherlands as a whole, and Flanders. For the sake of convenience the sentence factors are listed once more:
1) the next word begins with a consonant, as in *last van* 'trouble of' [Ct#C]
2) the next word begins with a vowel, as in *loopt in* 'walks in' [Ct#V]
3) no other word follows immediately, there is silence, as in ... *loopt* 'walks' [Ct#P].

[Ct#V] after re-syllabification becomes [C]-[tV] and as a result is less articulatorily complex (syllable ending in single consonant) than [Ct#P] (syllable ending in two consonants), which in its turn is less complex than [Ct#C] where there is a succession of three consonants.

In terms of phonic prominence [Ct#P] is the most prominent and should therefore show the least deletion, [Ct#P] is the least prominent and [Ct#V] occupies a position somewhere in between (see chapter 6).

12.4.1. *The province of Zuid-Holland and the Rivers region*

PHONIC PROMINENCE AND ARTICULATORY COMPLEXITY

When, in addition to (a) word-internal context [p; k; f; x; s] and (b) relevant morphological categories of the word (monomorphemes: noun, adj and num; part; irreg pret; 2,3sg pres), discussed extensively above, we now also consider (c) the positions of the word in the connected sentence (silence, vowel, consonant) collectively as relevant groups of factors respecting t-deletion, then the province of Zuid-Holland and the Rivers region behave in dissimilar ways (see chapter 11)

For Zuid-Holland we are now able to be more precise about the effect of articulatory complexity at the word ending because the effect of sentence context is now taken into account. In the cluster [pt], as in *hij slaapt* 'he sleeps', [t] is deleted more often than in clusters in [kt] (*bakt* ' bakes'), [xt] (*knecht*, 'servant'), [ft] (*hoofd* 'head'). The cluster [st] (*haast* 'hurry') has low phonic prominence and [t] could possibly be dropped sooner, but this proves not to be the case. which means that articulatory complexity predominates. This leads to a dichotomy between labial and lingual sounds. It appears that the cluster [pt], which is articulated with the lips as well as with the tongue, is more difficult to pronounce than the clusters [st, kt, xt], which have only lingual articulation (see chapter 6). The cluster [ft] falls outside this dichotomy, because [f] is labio-dental.

In the Rivers region the situation is different. Contrary to expectations, phonic prominence at the word ending plays no role, and neither does articulatory complexity at the word ending before silence: [pt, ft, xt] are neutral, but both [s] in [st] and [k] in [kt] show a tendency to resist t-deletion when they occur before another sound: *bakt* 'bakes' and *wast* 'washes' in these circumstances do not drop [t] whereas in *hoopt* 'hopes' and *blijft* 'stays, remains' the possibility is maintained.

MORPHOLOGICAL FACTORS

Given the position, in the connected sentence or not, of word-final *-t*, we are now also better able to delimit the role of the morphological factors. The results confirm our findings so far. Apart from their superlative forms the regular participles like *gemaakt* 'made' behave like normal forms like *hoofd* 'head' and *acht* 'eight'. They have less deletion than the verb forms 2,3sg like *loopt* 'walks' and irregular pret forms like *mocht* 'could'. The irregular pret forms show the most deletion.

Moreover, the province of Zuid-Holland shows *less* t-deletion than the Rivers region in nominal forms and in regular participles. In irregular pret and in 2,3sg, on the other hand, Zuid-Holland has *more* t-deletion than the Rivers region. In the Rivers region 2,3sg is neutral with respect to t-deletion.

As regards the sentence context itself, now that all the relevant word-internal factors have at the same time been taken into account, it is possible to classify the contexts [#C], [#V] and [#P]. We repeat diagram (10) as (13)

(13)

	Ct#P	Ct#V	Ct#C
articulatory complexity	+	−	++
perceptual prominence	++	+	−
# = word boundary; C = consonant; V = vowel; P = pause or silence. − + ++ degrees of complexity			

The context [#V], in both dialects, proves not be measurably influenced by phonic perceptual prominence and articulatory complexity. See diagram (13). In the context [#P] there is the least t-deletion, which is in accordance with the expectations. It is true that the cluster is articulatorily complex, but phonic prominence predominates. In the position before [#C] the most t-deletion is found. Articulatory complexity is the decisive factor here. These effects primarily play a role in the province of Zuid-Holland, for in the Rivers region the sentence context does not affect t-deletion. There we only find the effects of contexts preceding [t] (see chapter 11).

Speakers from the Rivers area thus have as their rule of behaviour: be sure to delete a great deal, especially in irregular verbs, a little less in nominal forms (including regular part) and delete yet a little less after [k] and [s].

Speakers from the province of Zuid-Holland follow the rule: do not delete too much, but if you do, delete especially much in irregular pret, a great deal in 2,3sg en not too much in nominal words. Also delete after bilabial consonant and delete especially much before consonant and less before silence.

12.4.2. *The Netherlands*

When we consider the Netherlands as a whole, the emphasis is a little different than for the province of Zuid-Holland and the Rivers region only. The findings are based on an interpretation of the total picture produced by the dialect maps for t-deletion in the connected sentence in the Netherlands. The picture emerging from the maps concerning the whole country, in chapter 11, can be condensed into diagram (14), in which I also incorporate the findings of Ottow-Kolman (1989).

(14)

	-t#P	-t#V	-t#C	examples		
- =C=consonant - =C=sonorant art - =V=vowel fon	x (–) (– –)	+ (+) x	+++ ++ ++	x (*vaart*) (*doet*)	*loopt in* *komt als* x	*krijgt last* *hoort mij* *gaat goed*
+ here means more t-deletion; – means less t-deletion; x means: not studied; between ( ) the findings of Ottow-Kolman (1989) for Zuid-Holland and the Rivers region.						

The two dialect groups discussed above, the province of Zuid-Holland and the Rivers region, are included in the analysis. Here [t] is phonically less prominent but articulatorily more complex after sonorant and before silence than after vowel and as a result will delete more often. After sonorant consonant or vowel [t] deletes from less to more often in the order [#P] -(-) / [#V] + / [#C] ++.
We included the findings of Ottow-Kolman (1989) in this. There is no similar pattern to this to be found in (13), as the pattern for either phonic prominence or articulatory complexity. For [#C] articulatory complexity is predominant, for [#V] phonic prominence possibly predominates. In the rest of the Netherlands t-deletion after vowel is restricted to the provinces of Zeeland, Noord-Brabant and Zuid-Holland, and the Rivers region, after sonorant (including vowel) to the province of Zeeland and the Rivers region. In the rest of the Netherlands articulatory complexity is therefore predominant in the sentence context.

12.4.3. *The Flemish-speaking part of Belgium and France*
In the Flemish-speaking parts of Belgium and France the constellation is different. There, the picture emerging from the maps on t-deletion in chapter 11 agrees best with the complexity diagram in (13) which concerns *articulatory* complexity, see diagram (15).

(15)

	Ct#P	Ct#V	Ct#C	examples		
verbs: after consonant after vowel or sonorant nouns:	 + + x	 – – x	 ++ ++ +	*geeft* *brengt*	*loopt in* *komt als*	*krijgt last* *gaat goed/* *komt van* *last van*
+ here means more t-deletion; – means less t-deletion; x means: not studied						

In the Belgian province of Limburg there is, independent of morphological class, especially a great deal of t-deletion after non-sonorant consonant. Outside that province, as it appears from the literature (see chapter 1), t-deletion in the Flemish-speaking parts of Belgium and France occurs almost exclusively in verbs and not in nouns. After vowel or sonorant t-deletion occurs in the whole area (with the exception of Belgian Limburg) before consonant. Before vowel t-deletion occurs the least often, particularly in the Flemish-speaking part of France. Before silence there is t-deletion in France and in the province of West-Vlaanderen, and less in the southern part of Oost-Vlaanderen.

12.5. **External influences**

12.5.1. *Social factors*

The data for the investigations in this study originate mainly from the project on phonology and morphology of the Netherlands dialects on the basis of fieldwork (Goeman en Taeldeman 1996). They were collected in the Netherlands by a large number of fieldworkers. We investigated whether this fact affected the data.

We took into consideration the fieldworker's sex and the informant's sex, age and social class. It turned out that they play only a very minor role (chapters 2 and 4). We assume that the marginal role of social factors in t-deletion is not due to the manner in which our corpus was built up. This impression is confirmed by the stereotypical 'soft g' in our material (chapter 2), which behaves in accordance with theoretical expectations about stereotypes. A stereotype is a characteristic for which no social stratification or styles shifts can be detected (and which moreover provokes comment and of which speakers may be aware). According to these two criteria of stratification and styles shifts 'soft g' and t-deletion are both stereotypes. This does not imply, however, that social factors could not play a role in other phenomena.

12.5.2. *Dialect geographical factors*

The most important language-external factor is geography, see diagram (16) for a survey of the aspects discussed, arranged by province for dialect (group) or language.

(16)

	subject	dialects
Chapter 4	t-deletion, general	Zuid-Holland, Rivers region
Chapter 5	t-deletion, general	Zuid-Holland, Rivers region
Chapter 6	t-deletion and factors	Zuid-Holland, Rivers region
Chapter 7	present paradigm	the Netherlands
Chapter 8	development plur pres	the Netherlands, the north east of the Netherlands, Middle English
Chapter 9	2sg inversion	the Netherlands
Chapter 10	t-deletion 3sg pres verbs (+ nouns) and factors	the Netherlands, Flemish-speaking Belgium, Middle Dutch, Middle Low German, Old English
Chapter 11	t-deletion and factors	Zuid-Holland, Rivers region, the Netherlands, Flemish-speaking Belgium, Middle West Flemish, Old French

The most important findings are:

A. Increase or decrease in t-deletion occurs largely independent of the standard language. Geographically speaking I regard the standard language as a western, Zuid-Hollands dialect (chapters 4 and 5). The autonomy of the phenomenon is apparent both from the analysis of dialect data (as mentioned in 12.3.1) and from the analysis of speakers judgements about proximity and relationships between languages, see chapters 3-5. They demonstrate that short distance contacts are more important than longer distance contacts. Overall influence of the standard language should be visible in a uniform decrease in t-deletion in the whole area, or in an increase in t-deletion moving slowly from west to east. There are no signs of such an influence.

B. More local contact processes can be detected. Local contact processes fit in well with dialect-internal processes as established in 12.3.1.

Contact zones prove to have high frequencies of t-deletion. The Rivers region is such a zone, at the intersection of the dialects of the southern province of Brabant, the western province of Zuid-Holland and the Veluwe, a northern dialect region. This dialect contact was also apparent from an analysis of migrations between and across these areas. In the towns of Zuid-Holland t-deletion is the most frequent, in the countryside of Zuid-Holland it is much less common.From

the beginning of the Eighty Years' War of Independence in the 16th century right into the Industrial Age for the western Netherlands the towns had been (and in fact still are, because of the influx of immigrants) real 'melting-pots', which has caused long-standing language contact situations (chapter 6). The Eighty Years' War caused an influx of many immigrants from (French) Flanders and Brabant, with their own forms of t-deletions, which reinforced existing local tendencies. The east of the Zealand Flanders region of the province of Zeeland is also a t-deletion area. In the 17th century it was repopulated with people from elsewhere: the west of the region (particularly the Land van Axel), was colonised by Zealanders from the island of Walcheren and by Flemish and French-speaking Belgians (Taeldeman 1979); the Zealanders and Flemish-speaking Belgians probably had different t-deletions (considering the present data on t-deletion in the connected sentence). The eastern area was repopulated exclusively by Waaslanders, who brought with them a form of t-deletion similar to that in Flemish.

For the contact situation in the east of the Veluwe region and its zero forms for the uniform plural I refer to section 12.2.2, ad C. In my opinion this situation of contact between speakers of Hollands and Utrecht dialects and speakers of north eastern dialects is of very long standing.

C. Dialect contact of a very particular character is established by the expansion of a given phenomenon to peripheral regions from a central region: the Rhineland (Ponelis 1993). Contact between the t-deletion regions in the Netherlands province of Limburg and the neighbouring t-deletion regions in the Rhineland on the one hand and the rest of the t-deletion regions in the Netherlands on the other hand, leading to an expansion of t-deletion from the former regions, is not plausible for two reasons: a) the conditions for t-deletion in the Limburg-Rhineland group differ from those in the rest of the Netherlands dialect groups, and b) there is no geographical continuity between the former and the latter dialect groups (chapter 10).

D. In the province of Zuid-Holland, the Rivers region and the dialects of the north east there are no contexts for t-deletion which are valid for all three dialects. Zuid-Holland and the Rivers region agree in the fact that articulatory complexity (including sonority, namely the number of non-sonorant consonants in a cluster) and phonic prominence (only in the case of superlatives) play a role, besides morphological class: there is more t-deletion in verbs than in nouns, adjectives, participles and superlatives. In chapter 6 we restricted our study principally to t-deletion after non-sonorants. For t-deletion after nasals, liquids and vowels our findings for Zuid-Holland and the Rivers area were replicated by Ottow-Kolman (1989): although there is less t-deletion when these conditions are present, the trends established by us in chapter 6 are identical.

The province of Zuid-Holland and the Rivers region show nothing like the specific form of t-deletion in 3sg in strong and irregular forms which is so characteristic of the dialects of the north east (chapter 10). As established in

chapter 10, sonority plays a different role in the dialects of the north east than in Zuid-Holland and the Rivers region.

E. We have also established differences between Zuid-Holland and the Rivers region with respect to the word-internal contexts and sentence context affecting t-deletion. They concerned the facts a) that sentence context is relevant in Zuid-Holland (in which cases articulatory complexity is predominant), but is irrelevant in the Rivers region; b) that word-internal articulatory complexity causes t-deletion in Zuid-Holland but does not do so in the Rivers region, and c) that word-internal phonic prominence counteracts t-deletion in the Rivers region but not in Zuid-Holland (see section 12.2.1)

F. Morphologically speaking and as to sentence context Flemish t-deletion operates different from t-deletion in the dialects of the Netherlands. It is restricted mainly to 3sg, but there, unlike the dialects of the Netherlands, it encompasses all verbs. Articulatory prominence in the sentence context is predominant (see section 12.4, diagrams 13 and 15).

12.6. **American English, Middle West Flemish, Middle English and Old French**

We compared our findings to other languages.

A. The fact established in this study, that [t] in [st] clusters, as in *haas[t]* 'hurry' is deleted less often than in clusters with other non-sonorant consonants, as in *knech[t]* 'servant', does not occur in American English (AE). The opposite is in fact the case in AE: [t] is deleted the most frequently in the cluster [st] and in that position behaves according to expectations on phonic prominence. With longer consonant clusters Netherlands dialects possibly display more perceptual tolerance than American English dialects, where lower phonic prominence affects clusters as relatively short as [st]: in Netherlands dialects lower phonic prominence may affect clusters of three dentals, as in *grootst* 'largest', but it does not affect shorter clusters of two, in which cases articulatory complexity predominates.

B. In the Netherlands dialects [t] deletes more often in finite verbs than in nominal forms like nouns and adjectives (and past participles). American English behaves remarkably different: t-deletion takes place in the order noun - irregular pret verb - regular pret verb. More in *pact* than in *kept*, and more in *kept* than in *heaped*. Therefore t-deletion in the Netherlands dialects, unlike in the AE dialects, does not behave according to the principle of morphological prominence. In the Netherlands dialects there is no differentiation for prominence between morphemic *-t* (in verbs) and either final [t] als part of the stem (in nouns, numerals, adjectives and adverbs) or [t] as part of an affix (2sg *-st* or superlative *-st*). The Ripuarian dialects in the province of Limburg must be excluded in this respect. In this area morphological prominence does appear to play a role (Hinskens

1992). In fact, this reinforces our argument that t-deletion cannot be explained as an expansion from the Rhineland.

C. In early Middle West Flemish there is t-deletion in 3sg, but only in enclitics: *maketse > makese* '(he) makes them'. By the side of that we find *maaktse*, in which [t] tends to be retained even though it is positioned between two consonants. When word-final [t] precedes -*men* 'people, one' it is more easily deleted than before -*se 'them*. This is a result of the syllabification: -.*tme* is more difficult than -.*tse*. Independent of this, there is more t-deletion in non-syncopated forms than in syncopated ones: [t] in *maaktse* is retained more often, whereas *maketse* drops its [t]. Moreover, it appears that independent of the two factors just outlined, the sonority of the stem consonant has a remote effect on t-deletion: the less sonorous the stem consonant is, the more t-deletion occurs (see scale section 12.2.2 ad A-a). So there is more deletion in *makese* than in *gevetse* '(he) gives them'.

D. In Old French we also find t-deletion: it occurs the most often in the passé simple of verbs, like *achata < achatat* 'he bought', a little less often in nouns like *foi < foit* 'faith' and much less in participles like *vendu < vendut* 'sold' (chapter 11). The Middle West Flemish t-deletion was not influenced by t-deletion in Old French: the conditions for t-deletion are different and moreover, there is no geographical adjacency.

E. Syncope of suffix vowel is a precondition for t-deletion in other dialects than Old French and West Flemish. More in general, there is scarcely any similarity to be found between the different languages and dialects in which syncope occurred. In the Old English dialects, the dialect of the Cleves region in Germany and the Middle Low German dialects (in this case Goor in the Twente region) also, syncope of the suffix vowel operates in a different manner in each case. The sonority of the stem consonant, incidentally, plays no role in these languages and dialects. The only similarity I have been able to find is between the Kentish dialect in Old English and the Middle Low German dialect of Goor in the type of stem consonant: there is more syncope after *d*: *bidt* 'prays' than after *liquids* and *nasals*: *vallet* 'falls'. I have not been able to study all non-sonorant consonants. A study needs be made of the role *g* and *v* play, as in *dreget/dreegt* 'carries', *givet/gift* 'gives'. As fricatives they occupy a middle position on the sonority scale, between *d* and the *liquids/nasals* (chapter 10).

12.7. **Language theoretical implications**

The most important pattern all the Netherlands dialects under discussion share, in spite of all their differences, is that t-deletion is morphologically determined. This is in fact something which proved to be the case in all other languages studied so far. The morphological context in which t-deletion occurs is, however, in each case profoundly different. The differences are:

A. For the Netherlands language we have established a dichotomy of verbal as opposed to nominal (including participle), in which the verb forms exhibit more t-deletion.

In American English the division is into three: nouns > irregular verbs > regular verbs, in which t-deletion increases in that order.

B. Although the dialects of the north east demonstrate the same dichotomy verbal-nominal as the other Netherlands dialects, they differ in their marked restriction of t-deletion to 3sg of strong and irregular verbs.

C. Middle Flemish has t-deletion in 3sg pres, but in combination with an enclitic with which the 3sg forms one word.

D. In Old French the division is into three: most deletion in 3sg pres, a little less in nouns, and much less in participles.

E. The phonological contexts for t-deletion in the three Netherlands dialect groups differ a great deal (see 12.2.2. and 12.2.3). In the north east word-internal factors concerning the stem structure of the verb are predominant, in the Rivers region a number of word-internal factors predominate which, in a limited fashion, concern phonic prominence and sonority. Finally, the dialects of Holland display articulatory complexity effects of the connected sentence, apart from chiefly word-internal factors of articulatory complexity.

F. Considered diachronically, there are differences between the dialects of the north east (see chapter 10) in the issue of contexts for t-deletion: a) the context of morphemic structure length evolves into stem vowel length, for this latter context turns out to explain t-deletion in the Middle Low German period better; b) subsequently, in the dialects which are the successors of the Middle Low German ones, the importance of the context stem vowel length for t-deletion is diminished by the fact that qualitative differences in the stem vowel become more important.

G. Token frequency plays a role in the dialects of the province of Zuid-Holland and the Rivers region and this is something which has not so far been found in any other of the languages studied. We found this effect only for verbs. The irregular pret forms like *moest, mocht* 'had to, could' and some (2),3sg pres forms like *(jij) hij buigt* '(you) he bend(s), bow(s)' lose their [t]'s very frequently; for the irregular pret forms in [st] and [xt] like *moest, mocht* 'had to, could' it was established that the high frequency in t-deletion is partly caused by their token frequency.

These findings show that we have established a great number of different t-deletion patterns, so numerous and varied that all theories proposed so far break down.

1. The theoretical model that was formulated for the American English data does not work for the present-day Netherlands dialects (with the exception of the Ripuarian dialects of Limburg), the Middle West Flemish dialects and Old French. In the model, morphological forms can pass through three cycles of t-deletion (Guy 1991a): firstly monomorphemic words like nouns, secondly these plus the irregular verbs, and finally these two plus the regular verbs. This cyclic model of the lexicon was proposed to account for the morphological differences in t-deletion in American English dialects and proves to fit those but not the Netherlands dialects. In the Netherlands dialects there is rather a dichotomy nominal vs. verbal to be found (chapter 11).

2. Nor does the rephrasing in terms of Optimal Theory (OT) by Kiparsky (1994) of the effects of the cyclic model just referred to fit the Netherlands and other findings (chapter 11).

3. T-deletion is not a stable social marker in the sense of Labov. This is counter to the assumptions of Romaine (1986) and Knott (1986) about t-deletion including Netherlands t-deletion, for in one region t-deletion is gaining ground while in the other region it is losing ground. The styles shifts that accompany social markers do in fact occur (chapter 5), but there is little or no social stratification (chapter 4).

4. From 3 it follows that as to typology of variables (see diagram (11)) the styles shifts and social stratification of t-deletion in the Netherlands dialects rather fit the indicators (indicator type 2). It is not clear whether t-deletion is in fact always unconscious and invites no social comment, as is required for an indicator phenomenon. Social comment is restricted to stereotypes, but t-deletion is in fact the object of social comment, as is evident from the fact that speakers with t-deletion from the Rivers region are called 't-thieves'. The patterns of t-deletion established by us do not fit well into the typology of variables (chapter 2).

5. The reduction as proposed by Kiparsky of the phonological conditions into universal conditions, in which the only difference between dialects is the general level of t-deletion and not the conditions affecting it, does not fit the differences we have established. Dialects do not only differ in their general levels of t-deletion, but also in the number of conditions affecting deletion and the degree to which they affect it.
   The morphological phenomena are reduced by Kiparsky to functional differences like preservation of information (*keep - kep*, dropping of [t] is permitted) and avoidance of ambiguity. For avoidance of ambiguity we have demonstrated that it does not play any role in the Netherlands dialects. What could possibly be seen as preservation of information is the role qualitative and quantitative vowel differences play for t-deletion in the dialects of the north east. But in those dialects the process of t-deletion is highly morphologised and factors of stem structure appear to play a larger role than a functional need to distinguish between word forms.

6. From 1-5 it follows that no universal patterns and factors for t-deletion, pertaining to all languages, can be established.

12.8. **Methods employed**

This study is based on very large numbers of dialect data. The bulk of them were collected from the beginning of the 1980s in the project on phonology and morphology of the Netherlands dialects on the basis of fieldwork (Goeman and Taeldeman 1996).

The corpus was built up by selecting as informants individuals who regularly use dialect in their daily environment. In selecting these individuals for the Netherlands we have not tried to restrict ourselves to Non Mobile Older Rural Males. Such restrictions lead to a decrease in variability and to distortions which affect the validity and reliability of the material.

The dialect data were tested for reliability and validity by comparing our sample with what is encountered in the Netherlands population. Here we concentrated on a) the social background variables of the informant and b) the distribution of the localities over the Netherlands.

In addition we verified, for the two transcribers who made the largest number of recordings and transcriptions, whether their narrow phonetic transcriptions in IPA were sufficiently precise.

In nearly all these cases it proved that the selection of informants had minimal adverse effects on reliability and validity, compared to other dialectological studies of this type, for example. the RND (Series of Regional Dialectatlasses of the Netherlands, see chapter 2, map 1), and especially the Survey of English Dialects.

All the tape recordings were transcribed in narrow IPA. This requires considerable skill in the transcribers. The two transcribers who did the bulk of the transcriptions were tested for the reliability and validity of their transcriptions. This was done by asking them to do a transcription of the same recording and then comparing their transcriptions, not only mutually, but also to a master transcription of the same recording which could be considered as a standard. The transcriptions were assessed on vowels, diphthongs and consonants. In addition the use of diacritics was compared. The quality of the elicited material was good, measured by the standard of an independently drawn up phonological vowel chart for the informant's dialect. Most of the phonetic transcriptions can be considered to be valid (even better than the master transcription taken as standard) and to be reliable (mutually consistent).

The numbers of forms (tokens) studied are to be found in (17).

(17a)	Zuid-Holland and the Rivers region	
	forms in which t may be deleted	
	past part	1016
	3sg	2482
	2,3sg paradigm	399
	irreg pret	369
	noun	2187
	superl	2058
	sentence	148
(17b)	Dialects of the north east	
	forms in which t may be deleted	
	3sg	12208
	irreg pret	128
	noun	1120
	sentence	869
	other forms studied:	
	inf	12208

(17c)		The Netherlands	Belgium
	forms in which t may be deleted		
	present paradigm	8800	
	(including 2sg inversion)		
	connected sentence	2128	1504

The maps in chapters 10 and 11 are based on data for 353 locations in the Netherlands. The maps for Belgium in chapter 11 are based on 188 locations.

For the processing of the many thousands of forms I developed models and employed statistical techniques. They served to establish under which conditions the results are significant.

    Two techniques in particular were employed in the developing of models: multiple linear regression (Mosteller and Tukey 1977) and logistic regression (McCullagh and Nelder 1983, employed in chapters 7, 8, 10 and 11), and in addition to these tests like chi squared, Spearman's rho and Kendalls W (Siegel 1956) in chapter 6. The developing of models through regression and loglinear analysis implies that I investigated in each case which of the possible factors play a significant role. The developing of models was at all times theoretically controlled and aimed at finding the optimal set of factors. An optimal estimation of effect is achieved when all the relevant factors, and no irrelevant factors, have been incorporated in the model.

I selected this procedure because it is formulated in terms of *dependent* and *determining* factors and because it allows an *interpretation* which goes beyond the establishing of correlations. Interpretation makes a causal connection between the dependent process (t-deletion) and the determining factors (the language internal and external contexts, chapter 1). Important factors prove to be constituted e.g. by the geographical dimensions, expressed in co-ordinates: west-east and south-north. Another important factor is time (chapters 5, 8, 10 and 11). As a matter of fact, the rule is that the larger number of factors are involved, the more precarious it becomes to disentangle them, unless enough data are available. The most complicated models are in chapters 4 and 5 and in chapter 10. Two illustrations are given below and carried on to the maps in this study.

A. In chapter 4, 11 factors were tested for significance. Of those 11 factors, six were geographic in character, five were social in character. At our first try only five factors were apparently significant, all five of them geographic. After this first try another model was therefore estimated, in which only those variables were incorporated that had been found to be significant in the first instance. The significant factors were: the east-west (1) and south-north (2) dimensions, and both these dimensions to the power three ((3) and (4)). The power three at this stage was the best way to account for two additional general trends in the geographical pattern of t-deletion, in which there is comparably more t-deletion in the east and the south west than in the central regions and the north west. The square factor turn out not to be needed in this round (chapter 4).

One of the significant factors from the first model, distance from the standard language (5), of which I established a strong interdependence with the west-east dimension, on further consideration proved to have no relevance (chapters 3 and 4). On the other hand, the local mutual proximity of the dialects did appear to be relevant. Such, at any rate, is my interpretation of the remaining, unexplained portion of the variation, in which additional association between dialects appeared to exist (technical term: auto-correlation as a measure of extra association between dialects, see chapter 3 for extra association along the west-east dimension and chapter 5 for a general approach accounting for all dimensions). This additional association can be seen as an expression of local language/dialect contact.

Eventually it proved in chapter 5 that the additional association was expressed adequately in the new model by the square factor. We were able to establish this because we used more precise co-ordinates in chapter 5. They result in a lower measuring error rate, which in its turn leads to better estimates in the whole model. In point of fact, it is then established even more clearly that the distance from the standard language was incorporated in the model in an incorrect manner. Because of the use of more precise co-ordinates, the square of the two geographical dimensions now proved sufficient. The fact that this model is more economical than the third power model, is a happy side-effect. This third try produces a sharper image than the first and second tries. A fourth round was not necessary. The variation in the data that could not be explained by our final

model, the residue, in the end thus turns out not be auto-correlated and so not to contain additional association.

B. In chapter 10 we examined the effect of the geographical distribution (two factors: the west-east distribution and the north-south distribution) and of five language internal factors: the historically determined length of the stem vowel, the voice or voicelessness of the stem consonant, the sonority of the stem consonant, the quantity of the stem vowel (long or short) as compared to that of the infinitive, and the different quality of the stem vowel as compared to the infinitive. In this way is was possible to establish that all these factors were significant, and that they have differing effects in the seven classes of strong verbs (the irregular verbs and weak verbs were in fact included in the analysis), different in the extent of the effect and different in whether the effect is positive or negative. From a factor analysis it emerges that the five language internal factors, which function as independent variables in the regression model, cluster in ways which are specific for each class. On the basis of the estimated values for these factors in the regression model, the classes of strong verbs can be divided into three groups: a) strong verbs of classes 1-2, b) strong verbs of classes 4-6, and c) strong verbs of class 7 plus irregular verbs and weak verbs.

   In this way the systematic factors are isolated and it is established what the effect is that each of them has on t-deletion, independent of the other factors. Additionally, there is always a residue. In general this 'noise' does not allow of any further interpretation. It embodies errors in the material and perhaps other explanatory factors that have not been identified so far.

C. There are different types of dialect maps (chapter 1). The quantitative maps in chapters 4-6 represent a geographical application of the multiple regression model. The model is called regional trend analysis and it is capable of distilling general geographical tendencies, the system, from the totality of variation. The remaining variation was analysed more closely for possible further patterns (as measured by auto-correlation) and could be mapped if so required. The maps in chapters 7-11 are also model based: the effects of the local mutual association were incorporated in the model which is the basis of these maps. As a result, the geographical pattern was adjusted for this local mutual influence, and the final maps present a realistic picture of that portion of the variation which is systematic and is *really* significant. Apart from general tendencies this sort of map also gives a direct representation of the more local effects, undisturbed by unsystematic noise. Were the noise to be mapped, the result should rightly be a patchy picture without any system.

12.9. **Future research**

1. In this study we have been able to demonstrate the emergence of t-deletion in the dialects of the north east in the 14th century. It is urgently expedient that a historical, diachronic investigation be made into the emergence of t-deletion

in the other dialects and into the evolution of t-deletion in the intervening periods. We have developed the methods in our study.

2. Little is known about the evolution through time of t-deletion in the Flemish dialects. It should be sufficient to select a restricted number of geographically scattered locations or towns with sufficient data in time slices.

3. Our study demonstrates that geographical variation is very important. Nevertheless, complementary to our investigation, a sociolinguistic study of one or two dialects of the north east would be a welcome addition to existing studies on the towns of Leiden (De Vries et al. 1974), Utrecht (Schouten 1982, 1984) and Nijmegen (Van Houten 1989) and the east of the province of Limburg (Hinskens 1992).

4. As to theory, I am in favour of further development of quantitative probabilistic models. From the point of departure I selected, no relevant information in the data is lost. The usefulness of variational data is becoming more prominent in the light of further development of theory on syllable structure and the evolving of theories accounting for language internal, intra- language and dialect variation better than so far. Optimality theory is a step in the right direction, since it allows the violating of conditions, thus acknowledging a certain degree of variability. But OT reduces quantitative variability to a list of rankings and therefore gives information on less or more. In such a reduction to rankings, information about "the degree of" less of more is lost. Categorising is a further step on the road to loss of information: a phenomenon is assigned to a certain group or fits in a certain category. After that no more information is available about rankings, about less or more. What remains is only information of the type 'belongs to/does not belong to'. It is of course possible that certain information can be put in categorial terms only, but in those cases where reduction of quantitative information to ranking or categorial information takes place, the information is really thrown away. In those cases it is not clear a priori whether any systematic aspects have been lost or whether that type of information is part of the 'noise' aspects. I therefore advocate a quantitative version of OT. Meanwhile from the OT front different proposals for t-deletion have appeared (Reynolds, Nagy and Reynolds). It is not yet clear what the relevance for the Netherlands facts is.

Finally, in diachronic and synchronic studies of t-deletion in the Netherlands dialects special attention should be paid to the distinction verbal - nominal.