Choosing between the Dutch past-tense suffixes -te and -de*

1. Introduction

In Dutch, past-tense forms are created by suffixing -te [tɛ] or -de [dɛ] to the verb stem. The suffix -te is added when the stem ends in an underlyingly voiceless obstruent, while -de is suffixed elsewhere (e.g. Booij 1995: 61). This is illustrated in (1).

(1) Verb stem | Past-tense form
---|---
 kook /kok/ | “cook” | kookte [koktɛ] | “cooked”
 klop /klop/ | “knock” | klopte [kloptɛ] | “knocked”
 zaag /zaɛ/ | “saw” | zaagde [zʌgda] | “sawed”
 sloof /slof/ | “drudge” | sloofde [slofdɛ] | “drudged”

This description is not completely correct, since speakers sometimes suffix -te after underlyingly voiced obstruents, and -de after underlyingly voiceless ones. For instance, 838 out of the 1086 tokens of the past-tense form of glans /glɑns/ “gleam” present on the internet on 8 February 2001 were spelled as glanste, instead of glansde. And 52 out of the 424 tokens of the past-tense form of krab /krɑb/ “scratch” were spelled as krabte, instead of krabde (search engine: AltaVista). Apparently, the choice between -de and -te is not only directed by the underlyingly [voice]-specification of the stem-final obstruent.

In this paper, we investigate violations of the standard description, henceforth referred to as “rule”, that -te follows underlyingly voiceless obstruents and -de all other types of segments. First, in section 2, we describe an experiment that we carried out in order to determine for which verbs speakers tend to create past-tense forms that violate the rule. This experiment shows that the percentage of speakers forming a past-tense form that violates the rule for a certain verb is correlated with the type of the stem-final obstruent, and with the frequency of occurrence of the past-tense form. In section 3, we hypothesize that speakers sometimes choose a suffix because this suffix occurs with phonologically similar words. In section 4, we investigate the interaction of this systematic, lexically-driven, analogical effect with the effects of the type of the stem-final obstruent and the frequency of occurrence of the past-tense form. We show that systematic analogy is a highly relevant factor in the formation of past-tense forms. Finally, in section 5, we summarize and discuss our results.

2. The data
We carried out the following experiment in order to ascertain which past-tense forms speakers use with which verbs. Twenty-eight participants, who were all native speakers of Dutch and studied at Nijmegen University, listened through closed head-phones (Sony MDR-55) to phrases consisting of the pronoun ik [Ik] “I” and an existing verb in the first person singular present-tense form. Examples of these phrases are [Ik tvrf] ik turf “I score”, [Ik dvp] ik dub “I waver”, and [Ik drins] ik deins “I wince”. The final obstruents of the verb forms all sound as voiceless, as a result of Final Devoicing (e.g. Booij 1995: 22). The participants’ task was to write down as accurately as possible the past-tense forms of the verbs. We presented the participant auditorily with the verb forms in order to make sure that they took the whole word into account, and did not base their choice between -te and -de just on the last letter of the verb stem. We asked the participants to write the forms, instead of to pronounce them, because if they had pronounced the forms, we would have been obliged to transcribe the alveolar stop of the past-tense suffixes as voiced or voiceless, which is a time-consuming and error-prone activity (cf. Ernestus 2000: 78). The experiment was self-paced. Participants were presented with a new phrase only after they had indicated that they were ready by pushing a button.

We used all common monomorphemic Dutch verbs that end in an obstruent and that are attested in the Dutch section of the CELEX lexical database (Baayen et al. 1995). These 178 verbs are listed in the Appendix. We did not present verbs ending in /k/, since we do not expect violations for these verbs. The phoneme /k/ has no voiced counterpart in Dutch, and all verbs ending in a velar stop consequently take -te. The phrases were recorded by a female speaker in a soundproof room by means of a portable DAT-recorder Aiwa HD S100 and a Sony microphone ECM MS957. The recordings were stored as .wav files (sample rate: 48 KHz) on a computer by means of the speech analysis package Praat (Boersma 1996). They were presented in one of three random orders to the participants, with two intervening breaks. The actual test phrases were preceded by 9 practice phrases.

The participants wrote down past-tense forms ending in -te or -de in the great majority of cases. We discarded all forms not ending in -te or -de. In addition, we discarded all past-tense forms the stems of which do not correspond to the stems of the presented stimuli. For instance, we disregarded stapte as the past-tense form for stamp, and loefde as the past-tense form for loof. These particular forms are probably not the past-tense forms of the verbs that were presented, but the past-tense forms of slightly different words which the participants thought they had heard. The remaining numbers of past-tense forms ending in -te and -de for each verb can be found in the Appendix.
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Table 1 lists the counts of responses ending in -te and -de for the verb stems ending in underlyingly voiceless obstruents, and for those ending in underlyingly voiced obstruents. We use the symbols P for voiced and voiceless bilabial stops, T for voiced and voiceless alveolar stops, S for voiced and voiceless alveolar fricatives, F for voiced and voiceless labiodental fricatives, and, finally, X for voiced and voiceless velar fricatives.

Table 1. The absolute and relative (%) numbers of -te and -de suffixed to underlyingly voiceless and voiced obstruents, broken down by the type of these obstruents.

<table>
<thead>
<tr>
<th>Obstruent</th>
<th>Underlyingly voiceless</th>
<th>Underlyingly voiced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-te</td>
<td>-de</td>
</tr>
<tr>
<td>P</td>
<td>838</td>
<td>98%</td>
</tr>
<tr>
<td>T</td>
<td>769</td>
<td>98%</td>
</tr>
<tr>
<td>S</td>
<td>631</td>
<td>84%</td>
</tr>
<tr>
<td>F</td>
<td>128</td>
<td>76%</td>
</tr>
<tr>
<td>X</td>
<td>91</td>
<td>81%</td>
</tr>
<tr>
<td>P,T,S,F,X</td>
<td>2457</td>
<td>92%</td>
</tr>
</tbody>
</table>

The data show that educated speakers of Dutch often violate the rule: they suffix -de to stems underlyingly ending in voiceless obstruents, and -te to stems underlyingly ending in voiced obstruents, even when they do their best to produce the correct past-tense forms.

Interestingly, the participants violated the rule approximately equally often when it prescribes the suffix -te as when it prescribes the suffix -de (two-tailed Fisher’s exact test, p = 0.19). They generated 8% of the past-tense forms with underlyingly voiceless stem-final obstruents by suffixing -de, and 9% of the past-tense forms with underlyingly voiced obstruents by suffixing -te. The participants apparently did not have an overall preference for one suffix (say -te) over the other (-de). This may come as a surprise, since word-internal obstruent clusters tend to be voiceless in Dutch (Zonneveld 1983), and we might therefore expect a preference for the suffix that creates voiceless obstruent clusters, that is for -te.

A generalized linear regression analysis with a logit-link function of the data in the table reveals a main effect for the type of final obstruent (F(4,5) = 2893.8, p < 0.001). First, we see that the verbs ending in alveolar stops present the fewest problems (two-tailed Fisher’s exact test, p < 0.001): These verbs were suffixed with the “wrong” form on average in only 3% of cases. Most mistakes were made with the verb forms laad [lat] and voed [vut]. The reason may be that these words are homophone to the words laat “late” and voet “foot”, which are
highly frequent in Dutch, and end in an alveolar stop with the opposite underlyingly [voice]-specification. The participants may have thought of these words when creating the past-tense forms. Second, with respect to the verbs for which the rule prescribes -te, we find that the participants produced violations of the rule more often if the stem-final obstruent is a fricative than if it is a stop (two-tailed Fisher’s exact test, p < 0.001; there is no difference between the two types of stops: two-tailed Fisher’s exact test, p > 0.2; nor a difference between the three fricatives: two-tailed Fisher’s exact test, p = 0.15). Finally, with respect to the verbs for which the rule prescribes –de, in contradistinction, we find that the participants produced violations in particular if the stem-final obstruent is a bilabial stop or an alveolar fricative (two-tailed Fisher’s exact test, p < 0.001).

In addition to the type of the stem-final obstruent, the frequency of occurrence of the past-tense forms themselves affects the probability of violations. We found a correlation between the logarithms of the numbers of occurrences of the past-tense forms in the Dutch section of the CELEX lexical database (Baayen et al. 1995)\(^1\), which are incorporated in the Appendix, and the percentage of produced past-tense forms that violate the rule (r = -0.34, t(176) = -4.8175, p < 0.001). Participants violated the rule more often for past-tense forms of a low frequency than for past-tense forms of a high-frequency.

In summary, even highly educated speakers of Dutch create past-tense forms which violate the rule. The probability of a violation is affected by the type of the stem-final obstruent and the frequency of occurrence of the past-tense form. In the next section, we offer an interpretation of these effects.

### 3. Interpretation of the results

We have seen that the frequency of occurrence of the past-tense form and the type of the stem-final obstruent affect the percentage of violations. The effect of frequency of occurrence may be interpreted as an effect of computation. The percentage of violations increases when the frequency of the past-tense form decreases. High-frequency complex forms are typically stored in the mental lexicon and can be easily retrieved, whereas low frequency complex forms often have to be computed every time they are needed (Baayen et al. forthcoming). Violations, therefore, appear especially when the speakers have to compute the past-tense forms themselves. Computation appears to favor violations\(^2\).

The effect of the type of obstruent may be due to systematic, similarity-based analogy, which implies that the form of a word is determined on the basis of all phonologically similar words present in the lexicon (Skousen 1989, Daelemans et al. 1994, Eddington 2000, Krott et al. 2001). Speakers may choose a past-tense suffix because this suffix is present in most phonologically similar
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Past-tense forms. For instance, they may add -te to the verb stem dub, although this stem underlyingly ends in a voiced obstruent, because most other verbs ending in a bilabial stop take -te.

Systematic analogy may well play a part in the creation of past-tense forms for existing verbs, since it plays a part as well when speakers have to create past-tense forms for non-existing verbs. This is clear from an earlier experiment (Ernestus & Baayen 2001) in which speakers had to choose between -te and -de for pseudoverbs for which the underlying [voice]-specifications of the stem-final obstruents were unknown. Speakers tend to choose -te for a given verb if most words ending in the same type of final obstruent (P, T, S, F, X) end in an underlyingly voiceless obstruent, while they choose -de if most words ending in the same type of obstruent end in an underlyingly voiced obstruent. Thus, speakers add -te to the nonword [daup], which is in accordance with the fact that most stems ending in a bilabial stop are suffixed with -te, and they add -de to [taux], which corresponds to the fact that most stems ending in alveolar fricatives take -de.

The results from the experiment described in the present paper support the hypothesis that systematic lexically-driven analogy also affects the production of past-tense forms for existing verbs in Dutch. Table 2 lists the numbers and percentages of verbs in the experiment, that is all common Dutch monomorphemic verbs that do not end in a velar stop, for which the rule prescribes -te and for which the rule prescribes -de. It appears that the majority of verb stems ending in a bilabial stop take -te. If systematic, similarity-based, analogy plays a part, we consequently expect that -te is often “erroneously” suffixed to underlyingly voiced bilabial stops (/b/s), whereas -de is seldom “erroneously” suffixed to the underlyingly voiceless counterparts of these obstruents (/p/s). This appears to be the case (see Table 1): Only 2% of the past-tense forms with stem-final /p/ were created with -de, whereas as many as 36% of the forms with stem-final /b/ were created with -te. Table 2 shows, in addition, that the great majority of verbs ending in a labiodental or velar fricative take -de. If analogy plays a part, the participants are consequently predicted to often attach -de “erroneously” to such verbs, and to seldom attach -te “erroneously”. This is also the case: The participants attached the suffix -de “erroneously” to voiceless labiodental and velar fricatives in 24% and 19% of cases, whereas they attached the suffix -te to the voice counterparts of these fricatives only in 9% and 1% of cases. Finally, verbs ending in alveolar stops and alveolar fricatives do not have a clear preference for -te or -de (Table 2), and participants therefore should have no preference for suffixing -te or -de to these verbs, according to the analogy-based account. This is also in accordance with the data, since the participants erroneously add -te to these verbs approximately as often as they erroneously added -de (Table 1). The data apparently support the hypothesis that systematic,
similarity-based analogy plays a role in the formation of past-tense forms in Dutch.

Table 2. The absolute and relative (%) numbers of verbs for which the rule prescribes -te and -de, broken down by the type of the stem-final obstruent.

<table>
<thead>
<tr>
<th>Obstruent type</th>
<th>Verb prescribed to take -te</th>
<th>Verb prescribed to take -de</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>89%</td>
<td>11%</td>
</tr>
<tr>
<td>T</td>
<td>28</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>S</td>
<td>27</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>66%</td>
<td>34%</td>
</tr>
<tr>
<td>F</td>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>22%</td>
<td>78%</td>
</tr>
<tr>
<td>X</td>
<td>4</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>16%</td>
<td>84%</td>
</tr>
</tbody>
</table>

This analogy account, however, cannot explain all effects of the type of the stem-final obstruent on the percentage of past-tense forms violating the rule. It cannot explain why the participants created fewer violations for verbs ending in alveolar stops than for words ending in other types of obstruents. This effect of the type of the stem-final obstruent possibly results from the fact that the infinitive form reappears in the past-tense forms of verbs ending in alveolar stops. For instance, the past-tense form of *laad* is *laadde* [lɑːdə], which is phonetically similar to the infinitive form *laden* [lɑːdə(n)]. The infinitive forms in the past-tense forms of these verbs possibly prevent the creation of “wrong” past-tense forms.

In summary, the effect of frequency of occurrence on the probability of violations of the rule may be interpreted as an effect of computation. The effect of obstruent type may be interpreted partially as an effect of systematic, similarity-based analogy, and partially as the effect of the intrusion of the infinitive in the past-tense forms of verbs ending in alveolar stops. The next section provides details on the relative sizes of the effects of frequency, type of obstruent, and analogy, and their interaction.

4. The interaction of frequency, obstruent type, and analogy

We have seen above that the percentage of violations of the rule is affected by the frequency of the past-tense form, the type of the final obstruent, and by systematic analogy. The question arises whether type of obstruent is a factor separate from analogy, and if so, which of the three factors Frequency, Type of obstruent, and Analogy is most relevant, and how they interact.
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Analogy favors violations, if it prescribes the suffix -de, whereas the rule prescribes -te, or vice versa. It is, therefore, not the suffix prescribed by the analogy-account as such that is expected to affect the percentage of violations, but the difference in prediction between the rule-based account and the analogy-based account. Therefore, we investigated the effect of the absolute difference in probability of -de according to the rule-based account and the analogy-based account. The rule predicts -de with a probability of either 100% or 0%, depending on the underlying [voice]-specification of the final obstruent. We assume that if the suffix is determined by means of analogy, the probability of the suffix -de for a given verb equals the percentage of words that ends in an underlyingly voiced obstruent among the words in the Dutch section of the CELEX lexical database that not only end in the same type of obstruent, but end in the same type of final rhyme. Words end in the same type of rhyme if their final syllables are made up of a vowel of the same quantity (phonologically and phonetically long, phonologically and phonetically short, phonologically long and phonetically short), a consonant preceding the final obstruent, if present, of the same sonority (no consonant, sonorant consonant, obstruent), and the same type of final obstruent (P, T, S, F, X). We therefore distinguish 45 types of rhyme, that is 45 groups of words to which a given verb can belong. Our assumption that the percentages of words ending in underlyingly voiced obstruents in these groups reflect the predictions made by the analogy-account is based on our investigation of the Dutch section of the CELEX lexical database, which revealed a strong correlation between the quantity of the vowel of the last syllable, the presence and sonority of consonants preceding the final obstruent, and the type of final obstruent with the underlying [voice]-specification of this final obstruent. Moreover, it is based on our finding that speakers actually use this correlation when interpreting the underlying [voice]-specifications of words unknown to them (Ernestus & Baayen 2001, section 3). Some of the 45 groups have identical effects on the choice of the past-tense suffix, since they present approximately equal distributions of words ending in underlyingly voiced obstruents. These groups can therefore be merged. We determined the resulting groups by means of the technique of Classification and Regression Trees (Breiman et al. 1984), and were left with eight groups of words. The appendix lists for each verb presented in the experiment the percentage of words underlyingly ending in a voiced obstruent among the words belonging to the same of the eight groups, that is, the probability that participants choose -de if their choice is completely based on analogy. This is our first independent variable.

The other independent variables in the analysis are the logarithm of the numbers of occurrence of the past-tense forms in the Dutch section of the CELEX lexical database, and the type of stem-final obstruent (P, T, S, F, X). The
dependent variable is the percentage of violations created for each verb in our experiment.

We analyzed the effects of the frequency of occurrence of the past-tense forms, the type of final obstruent, and analogy on these percentages by means of a Classification and Regression Tree Analysis (Breiman et al. 1984). Figure 1 shows the resulting cost-complexity pruned classification tree. The vertical length of the branches reflects the relevance of the factors, that is, the explained “variance” (technically the reduction in node heterogeneity).

We see that the difference between the predictions of the rule-based account and the analogy-based account, $|R-A|$, is highly relevant. Participants created fewer violations in case the difference between the two predictions is smaller than 23%, than if the difference is larger. Among the verbs for which the rule and analogy accounts make approximately the same prediction, the words ending in alveolar fricatives appear to be the most problematic (13% of violations against 2.1% of violations for verbs ending in other types of obstruent). A possible explanation is that, apart from the alveolar stops which appear to be unproblematic possibly because of the intrusion of the infinitive, the alveolar fricative is the only obstruent which is approximately equally often underlyingly voiced as voiceless (see Table 2), and is consequently approximately equally often followed by -te and -de. The choice between -te and -de is wide open for verbs ending in this type of final obstruent.

Among the verbs for which the two accounts make very different predictions ($|R–A| > 23%$), the verbs ending in alveolar stops are the least problematic (only 5.6% of violations). We have made this same observation in section 3, where we related it to the intrusion of the infinitive. The verbs ending in other types of obstruent are problematic especially if the frequency of their past-tense forms is low (33.9% of violations). The numbers of violations for the verbs with high-frequency past-tense forms is affected by whether the difference in predictions made by the rule-based and analogy-based accounts is larger than 63%.

In conclusion, the difference in prediction between the rule-based account and the analogy-based account, the type of the stem-final obstruent, and the frequency of occurrence of the past-tense form all affect the percentage of violations. The difference in prediction between the rule-based account and the analogy-based account is a very important factor: Violations appear to occur especially if the rule and analogy make very different predictions. That is, large percentages of violations mainly appear if the resulting violating forms are those forms that are expected under the analogy-based account. If the difference in prediction between the rule-based and the analogy-based account favors violations, the type of the obstruent and the frequency of the past-tense form emerge as co-determining the percentages of violations.
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Figure 1. CART analysis of the percentage of violations. The term |A-R| indicates the absolute difference in probability of -de according to the analogy-based account and the rule-based account, while Freq stands for the frequency of the past-tense form. The numbers in parentheses indicate the numbers of verbs falling in each class as identified by the CART tree.

5. Conclusion and discussion

Our data show that speakers do not always suffix -te to verb stems ending in underlyingly voiceless obstruents and -de to verb stems ending in underlyingly voiced ones. Speakers sometimes produce forms violating the rule, induced by systematic, similarity-based analogy. That is, they sometimes “erroneously” choose a certain affix because the words that are phonologically similar to the given verb take this affix as well.

Speakers tend to create past-tense forms by analogy especially if the frequency of occurrence of the past-tense form is low. Low frequency past-tense forms are computed more often than low frequency forms. If a past-tense form is computed, speakers can base their computation on the rule but also on analogy, giving analogy a chance to co-determine the past-tense form.
The finding that the choice between –de and –te is affected by analogy may come as no surprise. It has been noted before that completely regular past-tense forms may become irregular as a result of analogy (van Haeringen 1940). For instance, the past-tense form of brei [brei] “knit” is sometimes realized as bree [bre], instead of the regular breide [breids], in analogy to the past-tense forms [re] and [yle] of the stems rijd [rei] en glijd [ylei], which are phonologically similar to [brEi]. Note that in the case of [bre], irregular verbs affect a regular verb. Speakers sometimes seem to be uncertain whether brei is regular or irregular, they may opt for irregular, and, since there is no rule for the formation of the past-tense forms of irregular verbs, they form an irregular past-tense form in (idiosyncratic) analogy to phonologically similar, irregular verbs. The kind of systematic analogy discussed in this paper is of a different type. The participants knew that the verb is regular, since otherwise they would not have chosen to create the past-tense form with –te or –de. Although they knew that the verb is regular, they did not form the past-tense form by applying the rule, but by means of analogy. This shows that even if a simple rule is available and applicable, speakers nevertheless form morphologically complex forms by systematic analogy.

Systematic, similarity-based analogy is clearly a more important process in language production than has been assumed so far, and we have to take it seriously as part of the grammar.

Notes

* We thank Pim Mak and the anonymous reviewer for their valuable comments on an earlier version of this paper.

1 We added 1 to all frequency counts to avoid taking the logarithm of zero.

2 The correlation cannot be explained by the hypothesis that low-frequency verbs have instable representations in the lexicon, and that, for instance, participants “erroneously” added –te to the verb stem dub, because they did not know that the final obstruent of this stem is underlyingly voiced. This hypothesis does not find support in the data since, the participants nearly always wrote down the correct final obstruent, which indicates that they knew the underlying [voice]-specification of the stem-final obstruents, at least of the final stops and velar fricatives. For instance, most participants who “erroneously” added the suffix –te to dub wrote down dubte, whereas we would expect dupte, if they created a violation because they did not know that the final obstruent of dub is underlyingly voiced.

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Appendix

The experimental items. Each item is followed by the percentage of phonologically similar words that end in an underlyingly voiced obstruent, the logarithm of the number of occurrence of its past-tense form in the Dutch section of the CELEX lexical database plus 1, the number of past-tense forms in the experiment created with -te, and the number of forms created with -de.

Verbs prescribed to be suffixed with -te: blaat 20% 2.303 27 1; blaf 51% 5.568 25 3; blus 20% 2.639 26 2; boet 20% 2.079 27 0; dans 20% 6.772 24 4; dop 0% 4.718 27 1; dop 20% 2.197 22 1; dory 20% 0.693 25 3; eis 75% 6.586 23 5; froms 20% 5.956 21 7; gaap 0% 5.100 28 0; gis 20% 2.485 23 5; glip 20% 5.333 27 1; gris 20% 4.990 24 3; groot 20% 6.153 28 0; haat 20% 6.351 28 0; hap 20% 4.970 28 0; heers 75% 0.000 22 6; heet 20% 7.767 27 0; hoop 0% 7.367 28 0; juich 99% 5.308 15 13; kaap 0% 2.398 28 0; klamp 20% 5.257 24 3; klap 20% 6.223 28 0; klit 20% 2.485 28 0; klop 20% 7.305 27 1;
Verbs prescribed to be suffixed with –de beef
99% 6.078 0 28; bleef 51% 2.197 16 12; bloos 75% 5.670 2 26; bons 20% 5.451 11 17; braad 20% 2.833 0 28; brand 20% 6.844 0 28; deins 75% 5.308 8 20; deug 95% 4.836 0 28; dood 20% 5.380 0 28; doof 99% 5.371 1 27; draaf 99% 5.100 0 28; dreig 95% 6.942 0 28; droog 95% 5.328 0 28; dub 20% 1.386 12 16; duid 20% 4.927 3 25; duid 20% 4.934 0 28; duf 51% 7.748 3 25; glans 20% 5.905 7 21; grijns 20% 4.828 3 25; grijs 75% 6.727 4 24; hijg 95% 6.087 1 27; hoef 51% 7.884 5 23; klaag 95% 6.033 0 28; kleed 20% 6.306 0 28; kleef 99% 5.371 2 26; kneed 20% 4.304 0 28; krab 20% 5.687 13 15; laad 20% 4.836 10 17; land 20% 5.389 0 28; leef 99% 7.902 2 26; leg 99% 8.826 0 28; leid 20% 7.888 0 28; loof 99% 3.555 0 28; loos 75% 3.091 3 25; luid 20% 6.574 0 28; meld 20% 6.397 0 28; peins 75% 4.868 2 26; plaag 99% 5.371 0 28; plen 99% 5.220 0 28; plons 20% 3.714 15 13; pluis 75% 1.386 7 21; poog 99% 5.352 2 26; proef 51% 5.673 2 26; raas 75% 5.366 4 24; red 20% 6.597 0 28; reis 75% 6.023 1 27; roof 99% 3.714 1 27; schoa 20% 2.773 0 27; scheid 20% 5.659 1 21; scheck 20% 3.178 9 18; schreef 51% 4.710 2 26; schud 20% 8.258 2 26; slaan 99% 7.113 0 28; smeed 20% 3.638 7 20; smoer 75% 2.565 13 15; snoef 51% 2.565 1 27; spred 20% 6.192 0 28; spuang 95% 5.425 0 25; stoof 99% 1.609 3 25; streef 99% 5.389 0 28; terg 95% 2.565 1 24; tob 20% 3.526 6 22; treef 51% 1.609 2 26; turf 51% 1.386 5 23; veeg 99% 6.969 0 26; veg 95% 5.081 1 27; vlug 95% 0.000 0 28; voed 20% 4.779 8 19; voeg 95% 7.521 0 24; volg 95% 3.801 1 27; vrees 75% 6.648 0 28; waant 20% 4.431 0 28; waag 99% 6.075 0 28; wend 20% 7.312 1 25; wied 20% 2.079 1 27; wieg 95% 5.323 1 27; wijd 99% 6.366 2 26; zalf 51% 2.398 3 25; zeeft 99% 1.386 3 25; zoog 99% 2.398 0 26; zorg 95% 7.124 0 28; zweef 99% 6.246 1 27.