

University of Groningen

Measuring Dialect Pronunciation Differences using Levenshtein Distance

Heeringa, Wilbert Jan

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:

2004

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Heeringa, W. J. (2004). *Measuring Dialect Pronunciation Differences using Levenshtein Distance*. [Thesis fully internal (DIV), University of Groningen]. s.n.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Appendix A

Figures

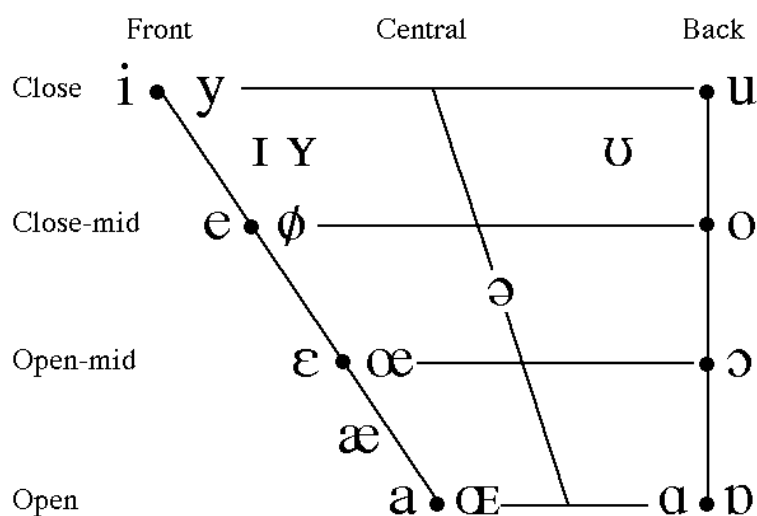


Figure A.1: The RND vowels located in the IPA vowel quadrilateral. Where symbols appear in pairs, the one to the right represents a rounded vowel.

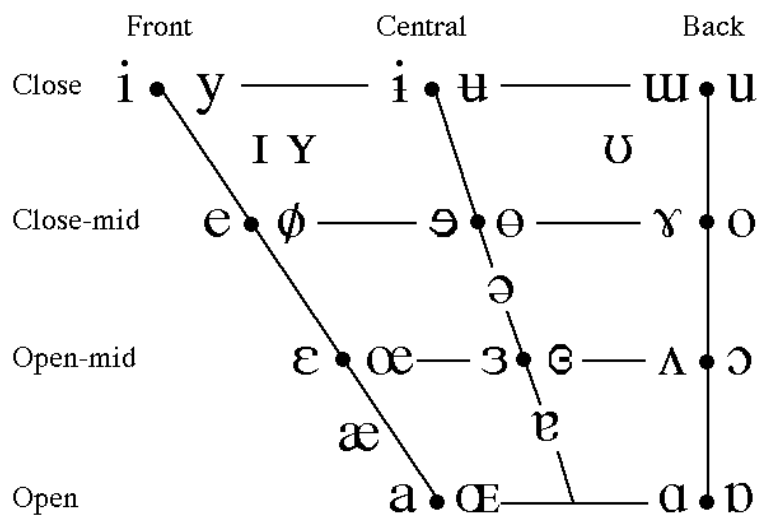


Figure A.2: The IPA vowel quadrilateral. Where symbols appear in pairs, the one to the right represents a rounded vowel. We interpret the [æ] and [ɐ] as not rounded, the [ə] as half rounded and the [ɔ̠] as rounded.

| | Bilabial | Labiodental | Dental | Alveolar | Postalveolar | Retroflex | Palatal | Velar | Uvular | Pharyngeal | Glottal |
|---------------------|------------|-------------|------------|------------|--------------|-----------|----------|------------|----------|------------|----------|
| Plosive | p b | | t d | | | | c | k g | | | ʔ |
| Nasal | m | | n | | | | ɲ | ŋ | | | |
| Trill | | | r | | | | | | ʀ | | |
| Tap or Flap | | | | | | | | | | | |
| Fricative | | f v | | s z | ʃ ʒ | | | x ɣ | | | h |
| Lateral fricative | | | | | | | | | | | |
| Approximant | w | ʋ | | | | | j | | | | |
| Lateral approximant | | | l | | | | | | | | |

Figure A.3: The RND consonants in the IPA consonant table. Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

| | Bilabial | Labiodental | Dental | Alveolar | Postalveolar | Retroflex | Palatal | Velar | Uvular | Pharyngeal | Glottal |
|---------------------|------------|-------------|------------|------------|--------------|------------|------------|------------|------------|------------|------------|
| Plosive | p b | | t d | | | ʈ ɖ | c ɟ | k g | q ɢ | | ʔ |
| Nasal | m | ɱ | n | | | | ɲ | ŋ | ɴ | | |
| Trill | ʙ | | r | | | | | | ʀ | | |
| Tap or Flap | | | ɾ | | | ɽ | | | | | |
| Fricative | ɸ β | f v | θ ð | s z | ʃ ʒ | ʂ ʐ | ç ʝ | x ɣ | χ ʁ | ħ ʕ | h ɦ |
| Lateral fricative | | | ɬ ɮ | | | | | | | | |
| Approximant | w | ʋ | ɹ | | | ɻ | j | ɰ | | | |
| Lateral approximant | | | l | | | ɭ | ʎ | ʟ | | | |

Figure A.4: The IPA consonant table. Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

Appendix B

Tables

| | Norwegian | English | NOS |
|----|-----------------------|---------------------|---------------|
| 1 | nordavinden | the northwind | 1, 4, 4, 6 |
| 2 | og | and | 1, 4, 5, 5, 6 |
| 3 | sola | the sun | 1, 5, 6 |
| 4 | kjekla / kjeklet | quarrel | 1 |
| 5 | om | about | 1, 3 |
| 6 | kven / hvem | who | 1 |
| 7 | av | of | 1, 3, 6 |
| 8 | dei / dem | them | 1, 3, 6 |
| 9 | som | who | 1, 3 |
| 10 | var | was | 1, 6 |
| 11 | den | the | 1, 3, 6 |
| 12 | sterkaste / sterkeste | strongest | 1, 3, 6 |
| 13 | da | then | 2, 5 |
| 14 | kom | came | 2 |
| 15 | det | there | 2 |
| 16 | en | a | 2, 2 |
| 17 | mann | man | 2 |
| 18 | gaaande / gaaende | going | 2 |
| 19 | med | with | 2 |
| 20 | varm | warm | 2 |
| 21 | frakk | coat | 2 |
| 22 | pa | around | 2 |
| 23 | seg | himself | 2, 3, 4, 5 |
| 24 | dei / de | they | 3 |
| 25 | vart / blei | were | 3 |
| 26 | samde / enige | agreed | 3 |
| 27 | at | that | 3, 6 |
| 28 | han / den | he | 3 |
| 29 | foerst | first | 3 |
| 30 | kunne | could | 3 |
| 31 | faa | get | 3 |
| 32 | mannen | the man | 3, 4, 5 |
| 33 | til aa | till | 3 |
| 34 | ta | take | 3 |
| 35 | av | off | 3, 5 |
| 36 | frakken | the coat | 3, 4, 5 |
| 37 | skulle gjelde for | would apply for | 3 |
| 38 | saa | so | 4, 5, 6 |
| 39 | blaaste | blew | 4, 4 |
| 40 | av all si makt | with might and main | 4 |

Table B.1: List of 58 words which appeared in the text ‘Nordavinden og sola’. The third column gives the sentence number(s) in which the word can be found. All instances of one word are used.

| | Norwegian | English | NOS |
|----|-------------------|----------------|------------|
| 41 | men | but | 4 |
| 42 | dess | the | 4, 4 |
| 43 | meir / mer | more | 4 |
| 44 | han | he | 4 |
| 45 | tettare / tettere | tighter | 4 |
| 46 | trakk | draw | 4 |
| 47 | rundt | around | 4 |
| 48 | til sist | finally | 4 |
| 49 | gav | gave | 4 |
| 50 | opp | up | 4 |
| 51 | skein / skinte | shone | 5 |
| 52 | fram | to the front | 5 |
| 53 | godt | good | 5 |
| 54 | varmt | warm | 5 |
| 55 | straks | at once | 5 |
| 56 | tok | took | 5 |
| 57 | maatte | must | 6 |
| 58 | innroemme | admit | 6 |

Table B.2: Table B.1 continued.

| | Dutch | English | RND |
|----|--------------|----------------|------------|
| 1 | mijn | my | 2 |
| 2 | vriend | friend | 2 |
| 3 | werk | work | 4 |
| 4 | op | on | 5 |
| 5 | schip | ship | 5 |
| 6 | kregen | got | 5 |
| 7 | brood | bread | 5 |
| 8 | vinger | finger | 6 |
| 9 | vier | four | 10 |
| 10 | bier | beer | 10 |
| 11 | twee | two | 11 |
| 12 | drie | three | 12 |
| 13 | hij | he | 13 |
| 14 | knuppel | cudgel | 13 |
| 15 | ik | I | 14 |
| 16 | knie | knee | 14 |
| 17 | gezien | seen | 14 |
| 18 | kerel | fellow | 21 |
| 19 | stenen | stones | 25 |
| 20 | breder | broader | 25 |
| 21 | duivel | devil | 28 |
| 22 | gebleven | stayed | 28 |
| 23 | meester | master | 29 |
| 24 | zee | sea | 29 |
| 25 | graag | gladly | 31 |
| 26 | steel | handle | 33 |
| 27 | bezem | broom | 33 |
| 28 | geroepen | called | 35 |
| 29 | peer | pear | 36 |
| 30 | rijp | ripe | 36 |
| 31 | geld | money | 38 |
| 32 | ver | far | 39 |
| 33 | brenge | bring | 39 |
| 34 | zwemmen | swim | 42 |
| 35 | bed | bed | 45 |
| 36 | springen | spring | 47 |
| 37 | vader | father | 53 |
| 38 | zes | six | 53 |
| 39 | jaar | year | 53 |
| 40 | school | school | 53 |
| 41 | laten | let | 53 |

Table B.3: List of 125 words selected from the 141 RND sentences. The third column gives the sentence number from which the word usually was taken.

| | Dutch | English | RND |
|----|--------------|-----------------|------------|
| 42 | gaan | go | 53 |
| 43 | potten | jars | 56 |
| 44 | zijn | are | 56 |
| 45 | veel | much | 56 |
| 46 | maart | March | 58 |
| 47 | nog | yet | 58 |
| 48 | koud | cold | 58 |
| 49 | kaars | candle | 59 |
| 50 | geeft | gives | 59 |
| 51 | licht | light | 59 |
| 52 | paard | horse | 60 |
| 53 | tegen | against | 63 |
| 54 | kaas | cheese | 66 |
| 55 | dag | day | 68 |
| 56 | avond | evening | 68 |
| 57 | barst | crack | 70 |
| 58 | brief | letter | 71 |
| 59 | hart | hart | 72 |
| 60 | spannen | put | 74 |
| 61 | nieuwe | new | 74 |
| 62 | kar | cart | 74 |
| 63 | zoon | son | 76 |
| 64 | koning | king | 76 |
| 65 | ook | also | 76 |
| 66 | geweest | been | 76 |
| 67 | lange | long | 78 |
| 68 | woord | word | 79 |
| 69 | kindje | baby | 80 |
| 70 | was | was | 80 |
| 71 | dochtertje | little daughter | 82 |
| 72 | bos | wood | 82 |
| 73 | ladder | ladder | 83 |
| 74 | mond | mouth | 86 |
| 75 | droog | dry | 86 |
| 76 | dorst | thirst | 86 |
| 77 | weg | way | 87 |
| 78 | krom | curved | 87 |
| 79 | liedje | ditty | 90 |
| 80 | goed | good | 92 |
| 81 | kelder | cellar | 95 |
| 82 | voor | for | 95 |
| 83 | moest | must | 96 |

Table B.4: Table B.3 continued.

| | Dutch | English | RND |
|-----|--------------|----------------|------------|
| 84 | drinken | drink | 96 |
| 85 | broer | brother | 98 |
| 86 | moe | tired | 98 |
| 87 | dun | thin | 100 |
| 88 | zuur | sour | 100 |
| 89 | put | well | 101 |
| 90 | uur | houre | 101 |
| 91 | vuur | fire | 104 |
| 92 | duwen | push | 105 |
| 93 | hebben | have | 106 |
| 94 | stuk | piece | 106 |
| 95 | brug | bridge | 106 |
| 96 | veulen | foal | 107 |
| 97 | komen | come | 107 |
| 98 | deur | door | 109 |
| 99 | gras | grass | 111 |
| 100 | bakken | bake | 113 |
| 101 | je | you | 116 |
| 102 | eieren | eggs | 116 |
| 103 | krijgen | get | 116 |
| 104 | waren | were | 119 |
| 105 | vijf | five | 119 |
| 106 | hooi | hay | 122 |
| 107 | is | is | 122 |
| 108 | groen | green | 122 |
| 109 | boompje | little tree | 124 |
| 110 | wijn | wine | 125 |
| 111 | huis | house | 126 |
| 112 | melk | milk | 127 |
| 113 | sput | spouts | 127 |
| 114 | koe | cow | 127 |
| 115 | koster | sexton | 128 |
| 116 | buigen | bend | 129 |
| 117 | blauw | blue | 131 |
| 118 | geslagen | struck | 131 |
| 119 | saus | sauce | 132 |
| 120 | flauw | flat | 132 |
| 121 | sneeuw | snow | 133 |
| 122 | doen | do | 136 |
| 123 | dopen | baptize | 137 |
| 124 | dorsen | thresh | 138 |
| 125 | binden | bind | 139 |

Table B.5: Table B.3 continued.