ALICE: To*

That is, these words make the source sentence longer or shorter than the TM sentence.

("That" "is" "," "these" "words" "make" "the" "source" "sentence" "longer" "or" "shorter" "than" "the" "TM" "sentence")

;; GC: 349602 words [1398408 bytes] of dynamic storage in use.
;; 109148 words [436592 bytes] of free storage available before a GC.
;; 567690 words [2271892 bytes] of free storage available if GC is disabled.

Parsing time: 46.30783 seconds.
String length: 16
Chart size: 142
spanning edges are: NIL
Chart size: 142

Fragment No. 1
>From 0 To 1

(DET "That")

Fragment No. 2
>From 1 To 2

(UNK-CAT "is")

Fragment No. 3
>From 2 To 3

(UNK-CAT ",")

Fragment No. 4
>From 3 To 10

(SENT
   (VP-ACT (V-TR (MP (DET "these") (NOUN "words")(V-BITR "make")))
       (MP (DET "the") (NOUN (ADJ "source") (NOUN "sentence")(V-BITR "make")))
   (MP "longer")))

Fragment No. 5
>From 10 To 12

((NOUN MOD) (UNK-CAT "or") (NOUN "shorter"))

Fragment No. 6
>From 12 To 16

(MP (MP-MOD "than") (MP (DET "the")
   (NOUN (NOUN MOD) "TM") (NOUN "sentence")))
That is, these words make the source sentence longer or shorter than the TM sentence.

"<That> is" 
"that is" ↔ ADV ADVL @ADV
"<these>" 
"these" DET CENTRAL DEM PL @DM
"<word>" 
"word" N NOM PL @SUBJ
"<make>" 
"make" <SVOC/A> <SVOC/N> <SVOC/A> <SVO> <SV>
 <InfComp> <P/for> <P/for> V PRES -SG -VP -N @FMAINV
"<the>" 
"the" <Def> DET CENTRAL ART SG/PL @DM
"<source>" 
"source" N NOM SG @NN
"<sentence>" 
"sentence" N NOM SG @OBJ
"<longer>" 
"longer" A CMP @PCOMPL -O
"<or>" 
"or" CC @CC
"<shorter>" 
"shorter" A CMP @PCOMPL -S @PCOMPL -O @NOM
"<than>" 
"than" PREP @OBJ
"<the>" 
"the" <Def> DET CENTRAL ART SG/PL @DM
"<TM>" 
"TM" ↔ ABBR NOM SG @NN
"<sentence>" 
"sentence" N NOM SG @P
"<\>"
LPARSER: T6 (Analysis III)

That is, these words make the source sentence longer or shorter than the TM sentence.

Not accepted (no linkage exists)
That is, these words make the source sentence longer or shorter than the TM sentence.

;; time: 0.39 sec.
;; Fragments: 3

(S
  (MP ($bar ($ That)))
  is
  ,
  (CP ($bar (IP
    (MP
      (Det these)
      ($bar ($ words)))
    ($bar (V ($ V_IP
      (V$IP make)
      (IP
        (MP
          (Det the)
          ($bar ($ source sentence)))
        ($bar (AP
          (AP ($bar (A longer)))
        )
        or
        (AP ($bar (A shorter)
          ($ PP ($bar (P
            (P than)
            ($MP
              (Det the)
              ($bar ($ TM sentence)))))))))))))))))))

.)
That is, these words make the source sentence longer or shorter than the TM sentence.

(S (S (NP (PR that)) (VP (BP (BE) (NP (POST_AFP (NP (RELMOD2 (NP (PRO these)))))))) (S (THATLESSREL (S (NP (PR a) (NP (RELMOD1 (NP (PRO these)))))) (VP (BP (BP (MSLASH1b) make) (NP (RELMOD1 (NP (PRO these)))))))) (COORD (A1 longer) (A2 shorter))) (P (a than) (NP (RELMOD1 (NP (COMPOUND1 source sentence))))))
SEXTANT: T6 (Analysis I)*

That is, these words make the source sentence longer or shorter than the TM sentence.

```
116 -- 0 That that DET 0 0
116 VP 101 is is BE 1 0
116 -- 0 , CM 2 0
116 NP 3 these these DET 3 1 4 (word) DET
116 NP* 3 words word NOUN 4 0
116 VP 102 make make INF 5 1 4 (word) SUBJ
116 NP 4 the the DET 6 1 8 (sentence) DET
116 NP 4 source source NOUN 7 1 8 (sentence) NN
116 NP* 4 sentence sentence NOUN 8 1 5 (make) DOBJ
116 NP 4 longer longer ADJ 9 1 11 (short) ADJ
116 NP 4 or or CC 10 0
116 NP* 4 shorter short ADJ 11 2 8 (sentence) ADJ 5 (make) DOBJ
116 -- 0 than than CS 12 0
116 NP 5 the the DET 13 1 15 (sentence) DET
116 NP 5 TM TM NOUN 14 1 15 (sentence) NN
116 NP* 5 sentence sentence NOUN 15 0
116 -- 0 . . . 16 0
```
DESPAR: T6 (Analysis I)

That is, these words make the source sentence longer or shorter than the TM sentence.

```
WDT  that 1 --> 6 [ SUB
VBZ  is  2 --> 1 ]
,    3 --> 2 -
DT   these  4 --> 5 [
NNS  words  5 --> 6 + SUB
VBP  make  6 --> 17 ]
DT   the  7 --> 9 [
NN  source  8 --> 9 +
NN  sentence  9 --> 6 + OBJ
RBR  longer 10 --> 6 ]
CC   or 11 --> 10 -
JJR  shorter 12 --> 11 -
IN   than 13 --> 12 -
DT   the 14 --> 16 [
JJ   tm 15 --> 16 +
NN  sentence 16 --> 13 +
.   17 --> 0 ]
```
That is, these words make the source sentence longer or shorter than the TM sentence.

2 analyses in 3 seconds with TOSCA-ICE/W0.3.950102
Appendix III

Collated References
AMALGAM. (1996). WWW home page for AMALGAM.
http://agora.lee.dcs.ac.uk/amalgam/
Billot, S., & Lang, B. (1989). The structure of shared forests in ambigu-


EAGLES. (1996). WWW home page for EAGLES. 

http://www. 1lc.pi.cnr.it/EAGLES/home.html


Document EAG-TCWG-SASG/1.5, see EAGLES WWW page). Pisa, Italy: Istituto di Linguistica Computazionale.


Germany, New York, NY: Mouton de Gruyter.
ALICE, analysis compared to other parsers, 37
AMALGAM, 30
AMALGAM, 32
AMALGAM, 33
AMALGAM, 42
Abney, S., 142
Abney, S., 17
Active Chart Parsing, 52
Affix Grammar over Finite Lattices (AGFL), 186
Algorithm, Viterbi, 167
Algorithm, dynamic context, 163
Alignment, 34
Alshawi, H., 123
Alvey Natural Language Toolkit, 124
Anttila, A., 142
Applications of Parsing, 31
Applications of parsing, 47
Applied Linguistics, 47
Apposition, 68
Approach, hybrid, 162
Argument/Adjunct distinction, 151
Atwell, E. S., 29
Atwell, E. S., 30
Atwell, E. S., 31
Atwell, E. S., 32
Atwell, E. S., 40
Auxiliary verbs, 150
Awk, 144
Axioms, dependency, 163
Barnett, R., 30
Barnett, R., 39
Billot, S., 111
Black, E., 123
Black, E., 161
Black, E., 17
Black, E., 29
Black, E., 17
Boguraev, B., 124
Bouma, G., 130
Bracketing of segments, 40
Brehony, T., 105
Brehony, T., 93
Bridge, D., 129
Brill, E., 145
Brill, E., 96
Briscoe, E. J., 126
Briscoe, E. J., 129
Briscoe, E. J., 132
Briscoe, T., 124
British National Corpus, 34
Brown Corpus, 146
Brown Corpus, 167
Brown Corpus, 34
Burns, A., 123
COMPASS, 142
CRISTAL LRE Project, 51
Capitalisation, problems of, 98
Carbonell, J. G., 130
Carroll, G., 161
Carroll, J., 124
Carroll, J., 125
Carroll, J., 129
Categorial Grammar, 51
Chain, noun, 147
Chain, verb, 147
Chain, verb, 150
Chanod, J. P., 142
Charniak, E., 161
Charniak, E., 163
Charniak, E., 167
Chomsky Normal Form, 53
Chomsky, N., 107
Collins English Dictionary, 113
Conjunctions, problems, 156
Constituency structure, 29
Constituency structure, 45
Constraints, percolation, 113
Cooper, R., 130
Coordination, complex, 68
Coordination, simple, 68
Coordination, strength of Link
Parser in, 104
Corpora, ICAME parsed, 33
Corpus, British National, 34
Corpus, Brown, 167
Corpus, Brown, 34
Corpus, LOB, 126
Corpus, LOB, 32
Corpus, Lancaster Oslo Bergen, 32
Corpus, Lancaster-Oslo-Bergen, 126
Corpus, Polytechnic of Wales, 33
Corpus, SEC, 32
Corpus, SEC, 33
Corpus, SUSANNE, 32
Corpus, Spoken English, 33
Corpus, WSJ, 167
Corpus, WSJ, 171
Corpus, Wall Street Journal, 167
Corpus, Wall Street Journal, 171
Corpus, annotated, 161
Corpus-Based Parsing Approach, 166
Corpus, POW, 33
Corpus, 167
Corpus, 32
Crossing Rate Metric, 131
Cutting, D., 128
Cutting, D., 145
Cutting, D., 153
DESPAR, analysis compared to
other parsers, 39
DESPAR, 162
DESPAR, 162
Debili, F., 142
Default Unification, 129
Definite Clause Grammar, 125
Definition of parsing scheme, 32
Delicacy, 30
Delicacy, 39
Dependency Parsing, 162
Dependency Relations, binary, 142
Dependency Relations, binary, 142
Dependency Relations, binary, 154
Dependency Relations, 157
Dependency axioms, 163
Dependency structure, 40
Dependency structure, 45
Dictionary, Collins Advanced Learner's, 113
Dictionary, Collins, 113
Douglas, S., 130
Duffy, D., 123
Dynamic context algorithm, 163
EAGLES, 30
EAGLES, 34
EAGLES, 39
EAGLES, 40
EAGLES, 43
EAGLES, 44
EAGLES, 45
ENGCG, analysis compared to
other parsers, 37
ENGCG, 62
ENGTWOL lexical analyser, 65
ENTWOL lexicon, 67
English Constraint Grammar, 142
English Constraint Grammar, 62
English language teaching, 47
Enhanced Hidden Markov Model, 162
Error Correction, 129
Error Detection, 31
Expert Advisory Group on Lan-
guage Engineering, 30
| Expert Advisory Group on Language Engineering, 34 |
| Fain, J., 130 |
| Filter, finite-state, 142 |
| Filters, finite-state, 148 |
| Financial Domain, vocabulary of, 53 |
| Flickenger, D., 17 |
| Flickenger, D., 17 |
| Forney, D., 167 |
| Francis, W. N., 146 |
| Functional labels, 41 |
| Gapping, 68 |
| Garside, R. G., 29 |
| Garside, R. G., 32 |
| Garside, R., 123 |
| Gazdar, G., 125 |
| Gdaniec, C., 17 |
| Gdaniec, C., 17 |
| Generalised Phrase Structure Grammar, 125 |
| Gibson, E., 150 |
| Goebel, R., 108 |
| Goebel, R., 113 |
| Government-Binding Theory, 107 |
| Grammar Workbench (GWB), 186 |
| Grammar formalism, necessary for parsing or not?, 162 |
| Grammar, Definite Clause, 125 |
| Grammar, English Constraint, 62 |
| Grammar, Generalised Phrase Structure, 125 |
| Grammar, Link, 93 |
| Grammar, categorial, 51 |
| Grammar, constraint, 142 |
| Grammar, machine learning of, 131 |
| Grammar, object, 125 |
| Grammar, wide-coverage, 125 |
| Grammars, principle-based vs. rule-based, 107 |
| Grefenstette, G., 141 |
| Grefenstette, G., 142 |
| Grefenstette, G., 142 |
| Grefenstette, G., 143 |
| Grefenstette, G., 144 |
| Grishman, R., 17 |
| Grishman, R., 17 |
| Grover, C., 124 |
| HMM, enhanced, 162 |
| HMM, enhanced, 171 |
| HMM, 162 |
| Harrison, P., 17 |
| Harrison, P., 17 |
| Hayes, P. J., 130 |
| Hayes, P. J., 130 |
| Head, verbal, 150 |
| Heikkila, J., 142 |
| Hendrickson C., 163 |
| Hendrickson C., 167 |
| Hidden Markov Model, enhanced, 162 |
| Hidden Markov Model, enhanced, 171 |
| Hidden Markov Model, 162 |
| Hierarchy of Syntactic Annotation Layers, 43 |
| Hindle, D., 154 |
| Hindle, D., 17 |
| Hindle, D., 17 |
| Horizontal format, 40 |
| Hughes, J. S., 30 |
| Human Language Technology Survey, 31 |
| Hybrid approach to parsing, 162 |
| Hypertag, 34 |
| ICAME, 30 |
| IPSM Utterance Corpus, breakdown by utterance type, 9 |
| IPSM Utterance Corpus, selection of 60 utterance subset, 9 |
| IPSM Utterance Corpus, selection of 600 utterances, 9 |
| Idiomatic Phrases, 34 |
| Ill-formed Input, 129 |
Ingria, R., 17
Ingria, R., 17
Järvinen, T., 52
Jacobson, N., 163
Jacobson, N., 167
Jelinek, F., 17
Jelinek, F., 17
Johansson, S., 32
Jones, B. E. M., 132
Kahrel, P., 30
Kahrel, P., 39
Kaplan, R. M., 144
Karlsson, F., 61
Karttunen, L., 144
Karttunen, L., 144
Klavans, J., 17
Klavans, J., 17
Klein, E., 125
Knowledge Extraction, 31
Koskenniemi, K., 63
Kučera, H., 146
Kupiec, J., 128
Kupiec, J., 145
Kupiec, J., 153
LOB Corpus, 126
LOB Corpus, 32
LPARSER, analysis compared to other parsers, 38
Labelling of segments, 40
Lafferty, J., 17
Lancaster-Oslo-Bergen Corpus, 126
Lancaster Oslo Bergen Corpus, 32
Lang, B., 111
Leech, G. N., 29
Leech, G. N., 30
Leech, G. N., 32
Leech, G. N., 39
Leech, G., 123
Lemmatization, 145
Lexicography, 31
Lexicon, finite-state, 144
Lex, 143
Liberman, M., 161
Liberman, M., 162
Liberman, M., 163
Liberman, M., 17
Liberman, M., 17
Lin, D., 107
Lin, D., 108
Lin, D., 113
Lin, D., 114
Lin, D., 18
Lin, D., 19
Lin, D., 23
Lin, D., 23
Linguistic Database, 184
Link Parser, 93
Link, syntagmatic, 94
Lists, 148
Lists, 155
Lotus Development Ireland, 93
MacNish, C., 123
Machine Learning of Grammar, 131
Machine Learning of Language Models, 31
Magerman, D. M., 123
Magerman, D. M., 129
Magerman, D. M., 17
Magerman, D. M., 23
Magerman, D., 161
Marcinkiewicz, M. A., 167
Marcus, M. P., 167
Marcus, M., 17
Marcus, M., 17
McDermid, J., 123
McEligott, A., 105
Melčuk, I., 163
Melčuk I. A., 19
Merialdo, B., 163
Metric, crossing rate, 131
Minton, S. N., 130
Module, unknown word, 169
Morphological Analysis, 144
Morphology, finite-state, 144
Index

MultiTreebank, 33
MultiTreebank, 47
N-gram Model, 31
N-gram Model, 31
N-gram model, 34
Name Recognition, 144
Normal Form, Chomsky, 53
Notational differences, 30
Noun Phrase, heads, 148
Noun Phrase, longest match, 147
Nunberg, G., 132
O’Donoghue, T. F., 35
Osborne, M., 129
Osborne, M., 129
Osborne, M., 132
Oxford Advanced Learner’s Dictionary, 113
PLAIN, analysis compared to other parsers, 39
POW Corpus, 33
PRINCIPAR, analysis compared to other parsers, 38
Parse Forest, 154
Parse Forest, 157
Parse Forest, 162
Parse Tree, conversion to dependency notation, 157
Parser, Link, 93
Parser, evaluation, 157
Parser, noun-phrase, 171
Parsers, FIDDITCH, 154
Parsers, Helsinki, 142
Parsers, SEXTANT, 141
Parsers, SEXTANT, 142
Parsers, SEXTANT, 146
Parsers, chunking, 142
Parsers, constraint grammar, 142
Parsers, evaluation criteria, 153
Parsers, evaluation, 151
Parsers, evaluation, 153
Parsers, finite-state, 142
Parsers, finite-state, 142
Parsers, low-level, 141
Parsers, pre-processing, 143
Parsers, purpose, 141
Parsers, robustness, 141
Parsing Approach, corpus-based, 166
Parsing Approach, statistical, 166
Parsing as tagging, 163
Parsing schemes, 29
Parsing with Unknown Words, 124
Parsing, active chart, 52
Parsing, applications of, 31
Parsing, definition of, 161
Parsing, dependency, 162
Parsing, error correction in, 129
Parsing, island, 151
Parsing, message passing in, 113
Parsing, problems of punctuation, 132
Parsing, robustness in, 128
Parsing, sentence segmentation prior to, 132
Parsing, skeletal, 31
Parsing, unrestricted language, 123
Pearlmutter, N., 150
Pedersen, J., 145
Pedersen, J., 153
Pederson, J., 128
Peh, I. S., 162
Peh, I. S., 171
Penn Treebank, 167
Percolation Constraints, 113
Perkowitz M., 163
Perkowitz M., 167
Phrase Boundaries, 154
Plan Recognition, 113
Polytechnic of Wales Corpus, 33
Predicate Arguments, 151
Prepositional Phrase, attachment, 150
Prepositional Phrase, attachment, 154
Prepositional Phrase, heads, 148
Probability, 31
Problem of Creating a Lexicon, 138
Proteus Project, 123
Pullum, G. K., 125
Punctuation, relationship to parsing, 132
Punctuation, treatment of commas, 156
Punctuation, used for sentence segmentation, 132
Punctuation, 137
RANLT, analysis compared to other parsers, 39
Raising, 39
Raising, 42
Raising, 44
Rank, 42
Resource Bounds, 124
Robustness in parsing, 128
Robustness, 141
Roukos, S., 17
Skeletial Parsing, 31
Santarini, B., 167
Santarini, B., 17
Santarini, B., 17
Schulze, B. M., 142
Segmentation, 34
Semantic Component, 31
Sentence Boundaries, 143
Sentence level, 172
Sentence, distinguished from utterance, 9
Sieber, S. M., 130
Sibun, P., 145
Sibun, P., 153
Sibun, P., 128
Skeletal Parsing, 31
Sleator, D. D. K., 93
Souter, D. C., 30
Souter, D. C., 31
Speech Recognition Systems, surveys of, 31
Speech Recognition, 31
Speech Recognition, 31
Spoken English Corpus, 33
Spoken language, 42
Statistical Parsing Approach, 166
Strzalkowski, T., 17
Strzalkowski, T., 17
Subcategorisation, 37
Subcategorisation, 41
Subclassification, 41
Sundheim, B. M., 131
Sutcliffe, R. F. E., 105
Syntactic Annotation, EAGLES vs. IPSM, 43
Syntagmatic relation, 94
TOSCA Research Group, 181
TOSCA analysis system, 181
TOSCA parser, 188
TOSCA, analysis compared to other parsers, 39
Tagger, Brill, 145
Tagger, building from Brown and Wall Street Journal Corpora, 167
Tagger, part-of-speech, 162
Tagger, stochastic, 128
Taggers, Hidden Markov Model, 145
Taggers, Xerox, 145
Taggers, accuracy, 153
Taggers, accuracy, 157
Taggers, ftp sites, 145
<table>
<thead>
<tr>
<th>Taggers, ftp sites, 145</th>
<th>Wall Street Journal Corpus, 171</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taggers, lexical probabilities, 157</td>
<td>Weighted scores, 46</td>
</tr>
<tr>
<td>Tagset, Brown Corpus, 146</td>
<td>Weischedel, R. M., 130</td>
</tr>
<tr>
<td>Tagset, layered, 145</td>
<td>Wier, C., 129</td>
</tr>
<tr>
<td>Tagset, layered, 146</td>
<td>Wood, M. M., 51</td>
</tr>
<tr>
<td>Tagset, simplification, 146</td>
<td>Word level, 172</td>
</tr>
<tr>
<td>Tagset, simplification, 146</td>
<td>Word-tag, 34</td>
</tr>
<tr>
<td>Tapanainen, P., 143</td>
<td>Words, unknown, 144</td>
</tr>
<tr>
<td>Tapanainen, P., 65</td>
<td>XSoft, 145</td>
</tr>
<tr>
<td>Taylor, L. C., 126</td>
<td>Xerox, PARC, 142</td>
</tr>
<tr>
<td>Temperley, D., 93</td>
<td>Xerox, Rank Xerox Research Centre, 142</td>
</tr>
<tr>
<td>Text, technical vs. informal, 154</td>
<td>Zaenen, A., 144</td>
</tr>
<tr>
<td>Thesaurus construction, 142</td>
<td>analysis trees, 184</td>
</tr>
<tr>
<td>Ting, C., 162</td>
<td>automatic parsing, 183</td>
</tr>
<tr>
<td>Ting, C., 171</td>
<td>automatic tagging, 183</td>
</tr>
<tr>
<td>Ting, C., 171</td>
<td>cleft sentence, 188</td>
</tr>
<tr>
<td>Tokenisation with Unix lex, 143</td>
<td>conjoin marker, 192</td>
</tr>
<tr>
<td>Tokenisation, 34</td>
<td>connective, 188</td>
</tr>
<tr>
<td>Tokenization, 143</td>
<td>contextually appropriate analysis, 189</td>
</tr>
<tr>
<td>Tomita, M., 111</td>
<td>coordination, 192</td>
</tr>
<tr>
<td>Trace, 42</td>
<td>direct speech, 188</td>
</tr>
<tr>
<td>Transducers, finite-state, 144</td>
<td>discourse element, 188</td>
</tr>
<tr>
<td>Treebank, 33</td>
<td>elliptical clause, 188</td>
</tr>
<tr>
<td>Two-level rules, 144</td>
<td>enclitic forms, 188</td>
</tr>
<tr>
<td>Unknown Words, parsing sentences with, 124</td>
<td>end-of-noun-phrase-postmodifier marker, 192</td>
</tr>
<tr>
<td>Unknown Word, 169</td>
<td>existential sentence, 188</td>
</tr>
<tr>
<td>Utterance, distinguished from sentence, 9</td>
<td>extraposed sentence, 188</td>
</tr>
<tr>
<td>Verbs, auxiliary, 150</td>
<td>formal grammar, 182</td>
</tr>
<tr>
<td>Vertical Strip Grammar, 35</td>
<td>formulaic expression, 188</td>
</tr>
<tr>
<td>Vertical Strip Grammar, 45</td>
<td>grammar-based parser, 181</td>
</tr>
<tr>
<td>Vertical format, 40</td>
<td>immediate constituent structure, 188</td>
</tr>
<tr>
<td>Viterbi algorithm, 167</td>
<td>imperative sentence, 188</td>
</tr>
<tr>
<td>Vocabulary, financial domain, 53</td>
<td>interrogative sentence, 188</td>
</tr>
<tr>
<td>Vogel, C., 130</td>
<td>labelled tree, 188</td>
</tr>
<tr>
<td>Voutilainen, A., 142</td>
<td>lexicon, 185</td>
</tr>
<tr>
<td>Voutilainen, A., 52</td>
<td>lookahead, 189</td>
</tr>
<tr>
<td>Voutilainen, A., 61</td>
<td>overspecification, 194</td>
</tr>
<tr>
<td>WSJ Corpus, 167</td>
<td>parse selection, 182</td>
</tr>
<tr>
<td>WSJ Corpus, 171</td>
<td>parse selection, 190</td>
</tr>
<tr>
<td>Wall Street Journal Corpus, 167</td>
<td>parse trees, 184</td>
</tr>
</tbody>
</table>
preposed complement, 188
preposed object, 188
raising, 188
reaction signal, 188
rule-based component, 186
shared forest, 184
subject-verb inversion, 188
tag correction, 191
tag selection, 182
tokenization, 183
tokenizer, 185
two-level grammar, 186
verbless clause, 188