

Grass is coloured ... red? Further sentence completion norms for children during a working memory reading task.

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Towse, John N.¹, Hutton, Una¹, & Hitch, Graham J.²

¹. Department of Psychology, Royal Holloway University of London, Egham, Surrey, TW20 0EX

². Department of Psychology, University of Lancaster, Bailrigg, Lancaster LA1 4YF

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The report is based on research funded by the Economic and Social Research Council, grant number R000236113. The present report provides subsidiary analyses of an experiment on children's working memory (reading) span. Details of the subjects, span scores, and the variation in span performance across experimental manipulations is described elsewhere (Towse, Hitch, & Hutton, in press), and previous sentence norm data are available as an earlier report (Towse, Hutton, & Hitch, 1997). We are grateful to the staff and pupils at St. Nicholas school, Shepperton, for their continued cooperation.

Overview

Eighty children were asked to complete a series of sentences as part of working memory reading span test, 65 of whom also contributed responses from a testing session one year earlier. Data are provided on the words used to complete the 180 stimulus sentences.

Experimental subjects, design and method

In order to provide a measure of children's 'reading span' (a measure of immediate or working memory), we asked children to read to themselves a (varying-length) set of sentences and supply the missing (final) word. Sixty-five children participated at time 1 (see Towse, Hutton, & Hitch, 1997) and 80 children participated at time 2 (twelve months later). For the latter group, the mean age was 10 years 5 months, range 8 years 10 months to 11 years 9 months

Sentences were presented in large type (48 point font) as 'cards' on the screen of a Apple Powerbook 5300c computer (controlling a 10.25" TFT colour screen). Concurrent with this sentence task, children were asked to remember the words which they supplied for a subsequent recall exercise. Initially, two sentences would be presented, after which recall of both sentence-terminal words was requested. If children were able to remember all the words (in their correct serial order) on 2 out of 3 occasions at this or subsequent levels, then span length was increased by 1 and testing was continued. Where children failed to reach this criterion, testing was terminated for that experimental condition. Therefore, the number of sentences presented to children varied as a function of children's proficiency at remembering the set of target words they had produced.

All sentences were sampled without replacement from a total pool of 180 items. Further, where a sentence was selected that was either particularly short or long in length, its counterpart (where the same completion word was expected) was not used elsewhere in the test administration. However, we made no effort to exclude responses from time 1 that re-appeared at time 2 - it was felt that a gap of one year was sufficient to make any repetition essentially a novel sentence (particularly in the context of the number of sentences used on a testing situation, making any one item less distinctive)

The reading task was introduced using three practice sentences written on paper cards and presented prior to computer administration of the task. The three sentences (and the target words in parentheses) were:

"An insect that buzzes is called a..." (bee)
 "The cat sat on the..." (mat)
 "The cow jumped over the..." (moon)

Children invariably understood these practice sentences and produced the expected target word.

Results

As the tabled information illustrates, the sentences as a whole were very successful in generating the predicted target word from subjects. Indeed, it is evident that some sentences produced target words on 100% of occasions. Some sentences were found to generate alternative answers which were quite acceptable (e.g. sentence 164, where "water" was often used instead of "sea"). Occasionally, children failed to produce a word at all, and this is entered as a "---" response. There were only a few examples where subjects produced bizarre words, such as "My teeth are in my case", where it is not obvious that the subject had properly read or comprehended the sentence. Overall, however, target word responses were elicited. Given this high level of target word production, we conclude that subjects were able to read the sentences appropriately, and we take this as evidence that the level of sentence complexity level was acceptable.

In addition to documenting norms for these sentences, the memorability of the sentences is described for the second testing session. That is, the likelihood that a child would correctly

remember the target word (regardless of where the sentence itself appeared within a particular trial) was determined.

References

Leather, C. V., & Henry, L. A. (1994). Working memory span and phonological awareness tasks as predictors of early reading ability. Journal of Experimental Child Psychology, 58, 88-111.

Towse, J. N., Hitch, G. J., & Hutton, U. (in press). A re-evaluation of working memory capacity in children. Journal of Memory and Language.

Towse, J.N., Hutton, U., & Hitch, G.J. (1997). "Humpty Dumpty had a great... banana? Children's sentence completions in a working memory reading task". Technical report CDRG1.

Sentence sets

1. 'Choo-choo' goes the train

Target answers: 33

Non target answers: 2 (kettle, bird)

2. 'quack quack' said the duck

Target answers: 35

Non target answers: 0

3. A baby dog is called a puppy

Target answers: 31

Non target answers: 0

4. A bicycle has two round wheels

Target answers: 18

Non target answers: 5 (tyres x 5)

5. A clown always has a big smile on his.... face

Target answers: 37

Non target answers: 0

6. A clown has a happy face

Target answers: 20

Non target answers: 8 (clown x 2, person x 2, mouth, joke, day, smile)

7. A cow eats grass

Target answers: 44

Non target answers: 6 (food x 3, hay, meat, straw)

8. A cow lives in a field and eats the long green.... grass

Target answers: 33

Non target answers: 1 (leaves)

9. A dog and a cat and a mouse all walk on four.... legs

Target answers: 39

Non target answers: 9 (feet x 6, miles, paws x 2)

10. A fire feels very... hot

Target answers: 38

Non target answers: 0

11. A giraffe has a long.... neck

Target answers: 37

Non target answers: 1 (tail)

12. A giraffe is a tall animal with a great long.... neck

Target answers: 29
Non target answers: 2 (legs, tail)

13. A joke makes me.... laugh

Target answers: 30
Non target answers: 1 (giggle)

14. A kitten grows up to be a.... cat

Target answers: 32
Non target answers: 1 (adult)

15. A man wearing a crown is called.... king

Target answers: 28
Non target answers: 0

16. A postbox is coloured.... red

Target answers: 35
Non target answers: 0

17. A snail takes a long time to move because it is very.... slow

Target answers: 31
Non target answers: 3 (fat, heavy, slimy)

18. A square has four straight.... sides

Target answers: 15
Non target answers: 15 (lines x 10, edges x 4, corners)

19. A whale swims in the.... sea

Target answers: 18
Non target answers: 5 (ocean, water x 4)

20. A window is made of.... glass

Target answers: 24
Non target answers: 0

21. A woman wearing a crown is called.... queen

Target answers: 21
Non target answers: 0

22. Add some sugar and then stir the tea with a tea.... spoon

Target answers: 21
Non target answers: 9 (bag x 7, cup, pot)

23. After the number one is two and after the number two is.... three

Target answers: 27
Non target answers: 0

24. After winter comes the.... spring

Target answers: 20

Non target answers: 12 (summer x 11, autumn)

25. An elephant is very big and has two great big.... ears

Target answers: 16

Non target answers: 12 (feet x 4, horns x2, legs x 2, trunks, tusks x 3)

26. Ann always likes to eat a big bowl of strawberries and.... cream

Target answers: 28

Non target answers: 7 (berries, ice cream x 2, sugar x 4)

27. Ann likes stawberries and.... cream

Target answers: 19

Non target answers: 4 (apples x 2, bananas, cherries, ice cream x 2, raspberries x 2)

28. At night I go to bed and fall.... asleep

Target answers: 23

Non target answers: 1 (off)

29. At school we were told how to sing a.... song

Target answers: 23

Non target answers: 6 (carol x 2, dance, hymn x 2, rope)

30. At the end of my hand I have four fingers and one.... thumb

Target answers: 29

Non target answers: 2 (finger, five)

31. Ben clapped his.... hands

Target answers: 16

Non target answers: 0

32. Ben ran fast and won the.... race

Target answers: 29

Non target answers: 5 (cup, game, medal x 2, prize)

33. Ben ran faster and faster so he could try and win the.... race

Target answers: 24

Non target answers: 1 (medal)

34. Birds flap and flap their wings and.... fly

Target answers: 25

Non target answers: 3 (cheep, flap, sing)

35. Birds use wings to.... fly

Target answers: 33

Non target answers: 1 (swing)

36. Cars drive on the.... road

Target answers: 33

Non target answers: 3 (left, wheels x 2)

37. Chris drank his orange.... juice

Target answers: 39

Non target answers: 6 (at, carefully, drink, aid, squash, ----)

38. Chris squeezed some oranges and had some orange.... juice

Target answers: 27

Non target answers: 4 (left, orange, peel, too)

39. Do you think Mark likes to drink a glass of coca.... cola

Target answers: 23

Non target answers: 10 (at, chocolate x 3, milk x 2, pops, yes x 3)

40. Eight and one makes.... nine

Target answers: 44

Non target answers: 1 (yes)

41. Every day I comb my.... hair

Target answers: 51

Non target answers: 1 (day)

42. Every day in the morning I comb and brush my.... hair

Target answers: 21

Non target answers: 4 (teeth x 4)

43. Every week we go to the library to read a.... book

Target answers: 33

Non target answers: 0

44. Four and one makes.... five

Target answers: 21

Non target answers: 1 (cakes)

45. Goldilocks and the three.... bears

Target answers: 29

Non target answers: 1 (wolves)

46. Grass is coloured.... green

Target answers: 28

Non target answers: 1 (red)

47. He crossed the river in a rowing.... boat

Target answers: 34

Non target answers: 1 (---)

48. He went to the disco for a.... dance

Target answers: 18

Non target answers: 15 (hour, night x 2, party x 12)

49. Humpty Dumpty had a great.... fall

Target answers: 31

Non target answers: 1 (banana)

50. I am going to drive a.... car

Target answers: 31

Non target answers: 3 (lesson, mile, motorbike)

51. I am thirsty and I want a.... drink

Target answers: 20

Non target answers: 0

52. I am tired at the end of the.... day

Target answers: 31

Non target answers: 7 (game, lesson, play, race x 2, walk, week)

53. I can find a post box - a post box is coloured.... red

Target answers: 23

Non target answers: 0

54. I can fly in a.... plane

Target answers: 26

Non target answers: 4 (aero, sky x 3)

55. I can look around and see things with my.... eyes

Target answers: 27

Non target answers: 0

56. I can tell what time it is when I look at my wrist.... watch

Target answers: 28

Non target answers: 0

57. I cut my food with a.... knife

Target answers: 24

Non target answers: 2 (fork x 2)

58. I don't have a coat so when it rains I will get.... wet

Target answers: 22

Non target answers: 0

59. I drink tea from a tea.... cup

Target answers: 26

Non target answers: 9 (bag x 2, mug, pot x 6)

60. I eat with a knife and.... fork

Target answers: 39

Non target answers: 0

61. I go to sleep in my.... bed

Target answers: 19

Non target answers: 1 (pyjamas)

62. I go to the cinema and watch a funny.... film

Target answers: 24

Non target answers: 6 (movie x 5, show)

63. I have a tooth brush and some tooth paste to clean my.... teeth

Target answers: 35

Non target answers: 0

64. I have a tooth brush to clean my.... teeth

Target answers: 29

Non target answers: 0

65. I have four fingers and one.... thumb

Target answers: 19

Non target answers: 2 (hand x 2)

66. I hear with my.... ears

Target answers: 31

Non target answers: 2 (friend, mum)

67. I like to paint on paper with a paint.... brush

Target answers: 33

Non target answers: 0

68. I like to play hide and.... seek

Target answers: 28

Non target answers: 2 (run, seat)

69. I like to read a.... book

Target answers: 21

Non target answers: 3 (bike x 2, comic)

70. I put a hat on my.... head

Target answers: 25

Non target answers: 1 (coat)

71. I see with my.... eyes

Target answers: 23

Non target answers: 0

72. I sit down and eat my dinner with a knife and.... fork

Target answers: 29

Non target answers: 0

73. I smell with my.... nose

Target answers: 29

Non target answers: 1 (feet)

74. I tell the time with a wrist.... watch

Target answers: 36

Non target answers: 0

75. I wave goodbye with my.... hand

Target answers: 36

Non target answers: 2 (mum x 2)

76. I wear socks on my.... feet

Target answers: 28

Non target answers: 0

77. If I hear a funny joke it makes me smile and.... laugh

Target answers: 36

Non target answers: 1 (fire)

78. If it rains I will get.... wet

Target answers: 25

Non target answers: 0

79. If my hands are cold I wear my.... gloves

Target answers: 36

Non target answers: 1 (mittens)

80. If the sun is hot and bright I put a hat on my.... head

Target answers: 22

Non target answers: 4 (forehead, hat x 2, glasses)

81. If you eat too much you will get.... fat

Target answers: 12

Non target answers: 14 (ache, full, ill, indigestion, sick x 10)

82. In the middle of the fire it feels very.... hot

Target answers: 25

Non target answers: 4 (scared, warm x 3)

83. In the sky I can see the moon come out at.... night

Target answers: 34

Non target answers: 1 (dark)

84. In the spring leaves start growing on the big high.... trees

Target answers: 25

Non target answers: 2 (branches, hill)

85. In winter we wear a coat because it is so.... cold

Target answers: 23

Non target answers: 2 (hot, ---)

86. Jack and Jill went up the.... hill

Target answers: 31

Non target answers: 0

87. Jane skips with a skipping.... rope

Target answers: 33

Non target answers: 0

88. Jane went to the baker and he then made a loaf of.... bread

Target answers: 36

Non target answers: 1 (mess)

89. Jim likes to eat fish and.... chips

Target answers: 39

Non target answers: 1 (trout)

90. Just in time the football team scored the winning.... goal

Target answers: 19

Non target answers: 2 (game, team)

91. Leaves blow in the.... wind

Target answers: 22

Non target answers: 3 (air, autumn, tree)

92. Leaves grow on the big.... trees

Target answers: 27

Non target answers: 0

93. Mark drinks coca.... cola

Target answers: 33

Non target answers: 1 (---)

94. Mark heard the story of Goldilocks and the three.... bears

Target answers: 42

Non target answers: 1 (geese)

95. Mark put the lights on the Christmas.... tree

Target answers: 33

Non target answers: 4 (cake x 2, day, time)

96. Mary unlocks the door with her.... key

Target answers: 37

Non target answers: 1 (hand)

97. Mum sat down in an arm.... chair

Target answers: 34

Non target answers: 0

98. My dog wags his.... tail

Target answers: 25

Non target answers: 0

99. My feet are at the end of my.... legs

Target answers: 14

Non target answers: 6 (ankles, bed, body, toes x 2, walk)

100. My hand is at the end of my.... arm

Target answers: 21

Non target answers: 0

101. My pet barks - it is a.... dog

Target answers: 32

Non target answers: 0

102. My teeth are in my.... mouth

Target answers: 31

Non target answers: 4 (case, clean x 2, jaw)

103. On a bright sunny day the sky is coloured.... blue

Target answers: 32

Non target answers: 1 (white)

104. One game for friends to play is hide and.... seek

Target answers: 32

Non target answers: 1 (play)

105. Pam put on her socks and.... shoes

Target answers: 35

Non target answers: 8 (coat x 2, dress, morning, scarf, trainers, ---- x 2)

106. Pam was happy and put on her bright new socks and.... shoes

Target answers: 32

Non target answers: 4 (dress, pants x 2, trousers)

107. Paul's dog can run very.... fast

Target answers: 31

Non target answers: 0

108. Paul's dog plays in the park and it can run very.... fast

Target answers: 37

Non target answers: 2 (exhausting, muddy)

109. People with lots of money are called.... rich

Target answers: 28

Non target answers: 8 (king, millionaires x 6, ---)

110. Robert spent his money at the sweet.... shop

Target answers: 23

Non target answers: 0

111. Seven days make a.... week

Target answers: 38

Non target answers: 1 (cake)

112. Sometimes I go to a swimming.... pool

Target answers: 27

Non target answers: 7 (class, club, gala, lesson x 3, session)

113. Sometimes we go out and eat some fish and.... chips

Target answers: 33

Non target answers: 1 (tea)

114. Stir the tea with a tea.... spoon

Target answers: 37

Non target answers: 5 (bag x 5)

115. Sue has her own little room in a great big.... house

Target answers: 29

Non target answers: 5 (bed, bedroom x 2, mess, nan, room)

116. Sue lives in a.... house

Target answers: 20

Non target answers: 1 (flat)

117. Teacher told the class a.... story

Target answers: 24

Non target answers: 4 (lesson, poem, sentence, sum)

118. That shiny new bike in the bike shop has two round.... wheels

Target answers: 18

Non target answers: 6 (tyres)

119. The baker made a loaf of.... bread

Target answers: 31

Non target answers: 0

120. The cinema shows a.... film

Target answers: 21

Non target answers: 4 (movie x 3, picture x 6, play)

121. The colour of a banana is.... yellow

Target answers: 23

Non target answers: 0

122. The dog wagged his.... tail

Target answers: 36

Non target answers: 0

123. The dog was very happy and so he wagged his.... tail

Target answers: 37

Non target answers: 0

124. The farmer lives on a.... farm

Target answers: 45

Non target answers: 2 (field, hill)

125. The farmer look after his animals down on his.... farm

Target answers: 27

Non target answers: 0

126. The fire engine came and the fire man put out the.... fire

Target answers: 30

Non target answers: 1 (smoke)

127. The fire man put out the.... fire

Target answers: 23

Non target answers: 1 (helmet)

128. The football team scored a.... goal

Target answers: 29

Non target answers: 0

129. The hammer hit the.... nail

Target answers: 27

Non target answers: 9 (bat, door x 2, wall x 5, wood x 2)

130. The leaves on the trees are coloured.... green

Target answers: 27

Non target answers: 5 (brown)

131. The magician waves his magic.... wand

Target answers: 25

Non target answers: 1 (flag)

132. The moon comes out at.... night

Target answers: 31

Non target answers: 2 (dark)

133. The next number after one and two and three is.... four

Target answers: 34

Non target answers: 0

134. The number which always comes after seven and eight is.... nine

Target answers: 32

Non target answers: 3 (head, seven, two)

135. The number which always comes after three and four is.... five

Target answers: 33

Non target answers: 2 (four, two)

136. The opposite of bad is.... good

Target answers: 35

Non target answers: 0

137. The opposite of black is.... white

Target answers: 35

Non target answers: 0

138. The opposite of dark is.... light

Target answers: 29

Non target answers: 1 (on)

139. The opposite of fat is.... thin

Target answers: 23

Non target answers: 5 (skinny x 2, slim x 3)

140. The opposite of hot is.... cold

Target answers: 30

Non target answers: 0

141. The opposite of long is.... short

Target answers: 35

Non target answers: 4 (small)

142. The pirate found silver and.... gold

Target answers: 30

Non target answers: 0

143. The rabbit ran down his rabbit.... hole

Target answers: 23

Non target answers: 3 (burrow, friend, pen)

144. The rocket left earth and went up and up into outer.... space

Target answers: 52

Non target answers: 0

145. The rocket went up into outer.... space

Target answers: 32

Non target answers: 0

146. The rubbish goes in a rubbish.... bin

Target answers: 27

Non target answers: 1 (bag)

147. The sky is coloured.... blue

Target answers: 34

Non target answers: 0

148. The speed of a snail is.... slow

Target answers: 29

Non target answers: 0

149. The sun shines in the.... sky

Target answers: 15

Non target answers: 13 (afternoon, day x 7, house, morning x 2, north, window)

150. There are 7 days in a.... week

Target answers: 30

Non target answers: 0

151. There are 12 months in a.... year

Target answers: 41

Non target answers: 2 (week)

152. There are 60 minutes in an.... hour

Target answers: 29

Non target answers: 0

153. They played football with a foot.... ball

Target answers: 32

Non target answers: 1 (at)

154. They washed the dirty dog until he was.... clean

Target answers: 33

Non target answers: 0

155. Three and one makes.... four

Target answers: 25

Non target answers: 0

156. To fetch some water, Jack and Jill went up the.... hill

Target answers: 32

Non target answers: 0

157. To finish the story I turned the last.... page

Target answers: 31

Non target answers: 1 (----)

158. To make a snowman you need.... snow

Target answers: 41

Non target answers: 0

159. To make the trick work the magician waves his magic... wand

Target answers: 26

Non target answers: 2 (stick)

160. Twinkle twinkle little.... star

Target answers: 37

Non target answers: 0

161. Two and one makes.... three

Target answers: 34

Non target answers: 1 (four)

162. We all sat down and the teacher told the class a funny.... story

Target answers: 18

Non target answers: 10 (class, joke x 8, trick)

163. We live on the planet.... earth

Target answers: 22

Non target answers: 2 (mars)

164. We went to the beach and we had a swim in the cold... sea

Target answers: 15

Non target answers: 27 (beach, water x 26)

165. When babies are hungry they.... cry

Target answers: 31

Non target answers: 4 (eat x 3, milk)

166. When David cleans he sweeps the.... floor

Target answers: 28

Non target answers: 3 (carpet, dust, kitchen)

167. When I have a cold I have to blow my.... nose

Target answers: 37

Non target answers: 2 (face, ----)

168. When I wake up I open my eyes and get out of.... bed

Target answers: 38

Non target answers: 0

169. When it snows every thing turns the colour.... white

Target answers: 20

Non target answers: 1 (around)

170. When Mary got home she unlocked the door with her.... key

Target answers: 37

Non target answers: 1 (hand)

171. When Mum is tired she likes to sit down in an arm.... chair

Target answers: 25

Non target answers: 0

172. When you want to see in the dark you can turn on a.... light

Target answers: 26

Non target answers: 4 (torch)

173. While sleeping I had a strange.... dream

Target answers: 27

Non target answers: 3 (feeling, nightmare, noise)

174. Wool comes from.... sheep

Target answers: 34

Non target answers: 0

175. Worms live under the.... ground

Target answers: 30

Non target answers: 4 (earth, log, soil x 2)

176. You can build a house with.... bricks

Target answers: 40

Non target answers: 0

177. You can see my white teeth when I open my.... mouth

Target answers: 28

Non target answers: 0

178. You can see through a window when it is made of.... glass

Target answers: 33

Non target answers: 0

179. You get hungry if you have no.... food

Target answers: 30

Non target answers: 1 (dinner)

180. You paint with a paint.... brush

Target answers: 32

Non target answers: 1 (pot)

Sentences ordered by rate of non-target word production

Sentences are sorted by the likelihood that the predicted (target) word will be produced, listing first those sentences with the lowest 'miss' rate (values in parentheses indicate the number of times each sentence was presented) - that is, the most consistent sentence frames are presented first. Due to the modest sample size, differences beyond the second decimal place are ignored here:

- 0 (52) The rocket left earth and went up and up into outer.... space
- 0 (41) To make a snowman you need.... snow
- 0 (40) You can build a house with.... bricks
- 0 (39) I eat with a knife and.... fork
- 0 (38) A fire feels very... hot
- 0 (38) When I wake up I open my eyes and get out of.... bed
- 0 (37) A clown always has a big smile on his.... face
- 0 (37) The dog was very happy and so he wagged his.... tail
- 0 (37) Twinkle twinkle little.... star
- 0 (36) I tell the time with a wrist.... watch
- 0 (36) The dog wagged his.... tail
- 0 (35) 'quack quack' said the duck
- 0 (35) A postbox is coloured.... red
- 0 (35) I have a tooth brush and some tooth paste to clean my.... teeth
- 0 (35) The opposite of bad is.... good
- 0 (35) The opposite of black is.... white
- 0 (34) Mum sat down in an arm.... chair
- 0 (34) The next number after one and two and three is.... four
- 0 (34) The sky is coloured.... blue
- 0 (34) Wool comes from.... sheep
- 0 (33) Every week we go to the library to read a.... book
- 0 (33) I like to paint on paper with a paint.... brush
- 0 (33) Jane skips with a skipping.... rope
- 0 (33) They washed the dirty dog until he was.... clean
- 0 (33) You can see through a window when it is made of.... glass
- 0 (32) My pet barks - it is a.... dog
- 0 (32) The rocket went up into outer.... space
- 0 (32) To fetch some water, Jack and Jill went up the.... hill
- 0 (31) A baby dog is called a puppy
- 0 (31) Jack and Jill went up the.... hill
- 0 (31) Paul's dog can run very.... fast
- 0 (31) The baker made a loaf of.... bread
- 0 (30) The opposite of hot is.... cold
- 0 (30) The pirate found silver and.... gold
- 0 (30) There are 7 days in a.... week
- 0 (29) I have a tooth brush to clean my.... teeth
- 0 (29) I sit down and eat my dinner with a knife and.... fork
- 0 (29) The football team scored a.... goal
- 0 (29) The speed of a snail is.... slow
- 0 (29) There are 60 minutes in an.... hour
- 0 (28) A man wearing a crown is called.... king
- 0 (28) I can tell what time it is when I look at my wrist.... watch
- 0 (28) I wear socks on my.... feet
- 0 (28) You can see my white teeth when I open my.... mouth
- 0 (27) After the number one is two and after the number two is.... three
- 0 (27) I can look around and see things with my.... eyes
- 0 (27) Leaves grow on the big.... trees
- 0 (27) The farmer look after his animals down on his.... farm
- 0 (25) If it rains I will get.... wet

- 0 (25) My dog wags his.... tail
 0 (25) Three and one makes.... four
 0 (25) When Mum is tired she likes to sit down in an arm.... chair
 0 (24) A window is made of.... glass
 0 (23) I can find a post box - a post box is coloured.... red
 0 (23) I see with my.... eyes
 0 (23) Robert spent his money at the sweet.... shop
 0 (23) The colour of a banana is.... yellow
 0 (22) I don't have a coat so when it rains I will get.... wet
 0 (21) A woman wearing a crown is called.... queen
 0 (21) My hand is at the end of my.... arm
 0 (20) I am thirsty and I want a.... drink
 0 (16) Ben clapped his.... hands
 .02 Eight and one makes.... nine
 .02 Every day I comb my.... hair
 .02 Mark heard the story of Goldilocks and the three.... bears
 .03 A cow lives in a field and eats the long green.... grass
 .03 A giraffe has a long.... neck
 .03 A joke makes me.... laugh
 .03 A kitten grows up to be a.... cat
 .03 Birds use wings to.... fly
 .03 Goldilocks and the three.... bears
 .03 Grass is coloured.... green
 .03 He crossed the river in a rowing.... boat
 .03 Humpty Dumpty had a great.... fall
 .03 I smell with my.... nose
 .03 If I hear a funny joke it makes me smile and.... laugh
 .03 If my hands are cold I wear my.... gloves
 .03 In the sky I can see the moon come out at.... night
 .03 Jane went to the baker and he then made a loaf of.... bread
 .03 Jim likes to eat fish and.... chips
 .03 Mark drinks coca.... cola
 .03 Mary unlocks the door with her.... key
 .03 On a bright sunny day the sky is coloured.... blue
 .03 One game for friends to play is hide and.... seek
 .03 Seven days make a.... week
 .03 Sometimes we go out and eat some fish and.... chips
 .03 The fire engine came and the fire man put out the.... fire
 .03 The opposite of dark is.... light
 .03 They played football with a foot.... ball
 .03 To finish the story I turned the last.... page
 .03 Two and one makes.... three
 .03 When Mary got home she unlocked the door with her.... key
 .03 You get hungry if you have no.... food
 .03 You paint with a paint.... brush
 .04 At night I go to bed and fall.... asleep
 .04 Ben ran faster and faster so he could try and win the.... race
 .04 I put a hat on my.... head
 .04 The farmer lives on a.... farm

- .04 The fire man put out the.... fire
.04 The magician waves his magic.... wand
.04 The rubbish goes in a rubbish.... bin
.05 Four and one makes.... five
.05 I go to sleep in my.... bed
.05 I wave goodbye with my.... hand
.05 Paul's dog plays in the park and it can run very.... fast
.05 Sue lives in a.... house
.05 There are 12 months in a.... year
.05 When I have a cold I have to blow my.... nose
.05 When it snows every thing turns the colour.... white
.06 'Choo-choo' goes the train
.06 A giraffe is a tall animal with a great long.... neck
.06 At the end of my hand I have four fingers and one.... thumb
.06 I hear with my.... ears
.06 The moon comes out at.... night
.06 The number which always comes after three and four is.... five
.07 I like to play hide and.... seek
.07 In the spring leaves start growing on the big high.... trees
.07 To make the trick work the magician waves his magic... wand
.08 Cars drive on the.... road
.08 I cut my food with a.... knife
.08 In winter we wear a coat because it is so.... cold
.08 We live on the planet.... earth
.09 A snail takes a long time to move because it is very.... slow
.09 I am going to drive a.... car
.09 The number which always comes after seven and eight is.... nine
.1 While sleeping I had a strange.... dream
.10 I have four fingers and one.... thumb
.10 Just in time the football team scored the winning.... goal
.10 The opposite of long is.... short
.10 When David cleans he sweeps the.... floor
.11 Birds flap and flap their wings and.... fly
.11 Mark put the lights on the Christmas.... tree
.11 My teeth are in my.... mouth
.11 Pam was happy and put on her bright new socks and.... shoes
.11 When babies are hungry they.... cry
.12 A cow eats grass
.12 Leaves blow in the.... wind
.12 Stir the tea with a tea.... spoon
.12 The rabbit ran down his rabbit.... hole
.12 Worms live under the.... ground
.13 Chris drank his orange.... juice
.13 Chris squeezed some oranges and had some orange.... juice
.13 I can fly in a.... plane
.13 I like to read a.... book
.13 When you want to see in the dark you can turn on a.... light
.14 In the middle of the fire it feels very.... hot
.14 Teacher told the class a.... story

- .15 Ben ran fast and won the.... race
 .15 If the sun is hot and bright I put a hat on my.... head
 .15 Sue has her own little room in a great big.... house
 .16 Every day in the morning I comb and brush my.... hair
 .16 The cinema shows a.... film
 .16 The leaves on the trees are coloured.... green
 .17 Ann likes stawberries and.... cream
 .18 I am tired at the end of the.... day
 .18 The opposite of fat is.... thin
 .19 A dog and a cat and a mouse all walk on four.... legs
 .19 Pam put on her socks and.... shoes
 .2 Ann always likes to eat a big bowl of strawberries and.... cream
 .2 I go to the cinema and watch a funny.... film
 .21 At school we were told how to sing a.... song
 .21 Sometimes I go to a swimming.... pool
 .22 A bicycle has two round wheels
 .22 A whale swims in the.... sea
 .22 People with lots of money are called.... rich
 .25 That shiny new bike in the bike shop has two round.... wheels
 .25 The hammer hit the.... nail
 .26 I drink tea from a tea.... cup
 .29 A clown has a happy face
 .3 Add some sugar and then stir the tea with a tea.... spoon
 .3 My feet are at the end of my.... legs
 .30 Do you think Mark likes to drink a glass of coca.... cola
 .36 We all sat down and the teacher told the class a funny.... story
 .38 After winter comes the.... spring
 .43 An elephant is very big and has two great big.... ears
 .45 He went to the disco for a.... dance
 .46 The sun shines in the.... sky
 .5 A square has four straight.... sides
 .54 If you eat too much you will get.... fat
 .64 We went to the beach and we had a swim in the cold... sea

The memorability of sentences

Sentences ordered by their memorability (the proportion of occasions when the produced word could not be remembered subsequently, where serial order of recall was not required). Values in parentheses denote the number of times the sentences were presented:

- 0 (18) Just in time the football team scored the winning.... goal
 0 (16) Ann likes stawberries and.... cream
 0 (16) Teacher told the class a.... story
 .05 A cow lives in a field and eats the long green.... grass
 .05 Do you think Mark likes to drink a glass of coca.... cola
 .05 In winter we wear a coat because it is so.... cold
 .06 Ann always likes to eat a big bowl of strawberries and.... cream
 .06 I can tell what time it is when I look at my wrist.... watch

- .06 I have a tooth brush and some tooth paste to clean my.... teeth
- .06 I have four fingers and one.... thumb
- .06 Jack and Jill went up the.... hill
- .06 The farmer lives on a.... farm
- .06 We all sat down and the teacher told the class a funny.... story
- .06 When you want to see in the dark you can turn on a.... light
- .07 A woman wearing a crown is called.... queen
- .07 Every day in the morning I comb and brush my.... hair
- .07 Mum sat down in an arm.... chair
- .08 A window is made of.... glass
- .08 An elephant is very big and has two great big.... ears
- .08 Every day I comb my.... hair
- .08 I am thirsty and I want a.... drink
- .08 Paul's dog plays in the park and it can run very.... fast
- .09 In the sky I can see the moon come out at.... night
- .09 Sue lives in a.... house
- .09 The rocket left earth and went up and up into outer.... space
- .09 When I wake up I open my eyes and get out of.... bed
- .09 When Mary got home she unlocked the door with her.... key
- .09 When Mum is tired she likes to sit down in an arm.... chair
- .1 I like to paint on paper with a paint.... brush
- .10 I can find a post box - a post box is coloured.... red
- .10 The number which always comes after three and four is.... five
- .11 A giraffe is a tall animal with a great long.... neck
- .11 I sit down and eat my dinner with a knife and.... fork
- .11 Pam was happy and put on her bright new socks and.... shoes
- .11 That shiny new bike in the bike shop has two round.... wheels
- .11 The magician waves his magic.... wand
- .11 To fetch some water, Jack and Jill went up the.... hill
- .12 The fire engine came and the fire man put out the.... fire
- .12 The fire man put out the.... fire
- .12 The rocket went up into outer.... space
- .13 A clown has a happy face
- .13 Ben ran fast and won the.... race
- .13 Mark drinks coca.... cola
- .14 A snail takes a long time to move because it is very.... slow
- .14 I eat with a knife and.... fork
- .14 Pam put on her socks and.... shoes
- .15 After winter comes the.... spring
- .15 I go to sleep in my.... bed
- .15 In the spring leaves start growing on the big high.... trees
- .15 The dog wagged his.... tail
- .15 The football team scored a.... goal
- .15 The speed of a snail is.... slow
- .16 A baby dog is called a puppy
- .16 In the middle of the fire it feels very.... hot
- .16 Mark put the lights on the Christmas.... tree
- .16 One game for friends to play is hide and.... seek
- .16 Sue has her own little room in a great big.... house

- .17 Eight and one makes.... nine
- .17 If it rains I will get.... wet
- .17 Jim likes to eat fish and.... chips
- .17 On a bright sunny day the sky is coloured.... blue
- .17 Stir the tea with a tea.... spoon
- .17 When I have a cold I have to blow my.... nose
- .18 Birds flap and flap their wings and.... fly
- .18 I like to read a.... book
- .18 My feet are at the end of my.... legs
- .18 The moon comes out at.... night
- .18 The opposite of dark is.... light
- .18 Worms live under the.... ground
- .18 You can see my white teeth when I open my.... mouth
- .19 Mark heard the story of Goldilocks and the three.... bears
- .19 Sometimes we go out and eat some fish and.... chips
- .2 A clown always has a big smile on his.... face
- .2 Cars drive on the.... road
- .2 If the sun is hot and bright I put a hat on my.... head
- .2 People with lots of money are called.... rich
- .2 To make the trick work the magician waves his magic... wand
- .2 We went to the beach and we had a swim in the cold... sea
- .20 Robert spent his money at the sweet.... shop
- .21 A cow eats grass
- .21 Ben ran faster and faster so he could try and win the.... race
- .21 Every week we go to the library to read a.... book
- .21 Goldilocks and the three.... bears
- .21 Grass is coloured.... green
- .21 My pet barks - it is a.... dog
- .21 The opposite of fat is.... thin
- .21 You paint with a paint.... brush
- .22 A kitten grows up to be a.... cat
- .22 A whale swims in the.... sea
- .22 Add some sugar and then stir the tea with a tea.... spoon
- .22 I can look around and see things with my.... eyes
- .22 The farmer look after his animals down on his.... farm
- .22 The pirate found silver and.... gold
- .22 We live on the planet.... earth
- .23 He crossed the river in a rowing.... boat
- .23 Jane went to the baker and he then made a loaf of.... bread
- .23 The opposite of black is.... white
- .23 The sky is coloured.... blue
- .23 Three and one makes.... four
- .24 Chris squeezed some oranges and had some orange.... juice
- .24 He went to the disco for a.... dance
- .24 I cut my food with a.... knife
- .24 My teeth are in my.... mouth
- .24 Paul's dog can run very.... fast
- .24 Two and one makes.... three
- .25 A fire feels very... hot

- .25 At night I go to bed and fall.... asleep
- .25 Four and one makes.... five
- .25 I have a tooth brush to clean my.... teeth
- .25 If I hear a funny joke it makes me smile and.... laugh
- .25 When it snows every thing turns the colour.... white
- .26 A giraffe has a long.... neck
- .26 After the number one is two and after the number two is.... three
- .26 Chris drank his orange.... juice
- .26 The cinema shows a.... film
- .26 The leaves on the trees are coloured.... green
- .26 The rabbit ran down his rabbit.... hole
- .27 The next number after one and two and three is.... four
- .27 The opposite of hot is.... cold
- .28 Humpty Dumpty had a great.... fall
- .28 I put a hat on my.... head
- .28 The baker made a loaf of.... bread
- .28 They washed the dirty dog until he was.... clean
- .29 'quack quack' said the duck
- .29 At the end of my hand I have four fingers and one.... thumb
- .29 Wool comes from.... sheep
- .29 You can see through a window when it is made of.... glass
- .3 I am going to drive a.... car
- .30 A dog and a cat and a mouse all walk on four.... legs
- .30 A man wearing a crown is called.... king
- .30 A postbox is coloured.... red
- .30 I don't have a coat so when it rains I will get.... wet
- .30 If my hands are cold I wear my.... gloves
- .31 Leaves blow in the.... wind
- .31 My hand is at the end of my.... arm
- .32 At school we were told how to sing a.... song
- .32 I wave goodbye with my.... hand
- .32 The number which always comes after seven and eight is.... nine
- .32 They played football with a foot.... ball
- .32 When babies are hungry they.... cry
- .33 Birds use wings to.... fly
- .33 I go to the cinema and watch a funny.... film
- .33 I hear with my.... ears
- .33 If you eat too much you will get.... fat
- .35 I drink tea from a tea.... cup
- .35 The hammer hit the.... nail
- .35 There are 7 days in a.... week
- .36 The sun shines in the.... sky
- .36 Twinkle twinkle little.... star
- .37 The opposite of long is.... short
- .38 Mary unlocks the door with her.... key
- .38 The dog was very happy and so he wagged his.... tail
- .39 Sometimes I go to a swimming.... pool
- .39 The rubbish goes in a rubbish.... bin
- .4 Jane skips with a skipping.... rope

- .4 You get hungry if you have no.... food
- .40 I see with my.... eyes
- .41 I tell the time with a wrist.... watch
- .41 You can build a house with.... bricks
- .42 I am tired at the end of the.... day
- .43 I can fly in a.... plane
- .43 I smell with my.... nose
- .44 My dog wags his.... tail
- .45 A square has four straight.... sides
- .45 Leaves grow on the big.... trees
- .45 While sleeping I had a strange.... dream
- .46 A bicycle has two round wheels
- .46 A joke makes me.... laugh
- .47 The colour of a banana is.... yellow
- .48 The opposite of bad is.... good
- .48 To make a snowman you need.... snow
- .48 When David cleans he sweeps the.... floor
- .5 I like to play hide and.... seek
- .52 Seven days make a.... week
- .53 I wear socks on my.... feet
- .56 Ben clapped his.... hands
- .59 'Choo-choo' goes the train
- .61 There are 12 months in a.... year
- .64 To finish the story I turned the last.... page
- .67 There are 60 minutes in an.... hour