

## Inflectional Morphology

### OVERVIEW

A common developmental profile seen in young children forming plurals or past tense forms of irregular nouns and verbs involves a period of making overgeneralisation errors. This was interpreted as indicating that several representational systems are required to account for the learning of inflectional morphology. In recent years, this interpretation has been criticised. Computational architectures in the form of Artificial Neural Networks seem to be capable of learning linguistic systems like the English past tense within the confines of a single representational system. It has been argued that this new approach has profound implications for our view of the nature of linguistic representations.

### Readings

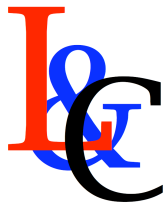
- \*Whitney, P. (1998) *The Psychology of Language*. Boston, Houghton Mifflin. Chapter 10 (327–331).
- \*McLeod, P., Plunkett, K., & Rolls, E. T. (1998). Introduction to connectionist modelling of cognitive processes. Oxford: Oxford University Press. Chapter 8.
- Pinker, S. (1994) *The Language Instinct*. New York. Morrow. Chapter 10.
- \*Gleitman, L. R., & Liberman, M. (Eds.) (1995) *An Invitation to Cognitive Science: Language* (2nd ed.). (Vol. 1). Cambridge, MA: MIT Press. Chapter 5.
- Plunkett, K. (1997). Theories of Early Language Acquisition. *Trends in Cognitive Sciences*, 1(4), 146–153.

### The past-tense debate

Initially, evidence for overregularisation errors indicated a stage of development when children indiscriminately regularised irregular verbs. More recent evidence suggests that the phenomenon is more circumscribed than was originally thought. The neuropsychological evidence also depicts a complicated picture of breakdown.

### Readings

- Bybee, J., & Slobin, D. I. (1982). Rules and schemas in the development and use of the English past tense. *Language*, 58, 265–289.



# Language & Cognition

## Morphology and Grammar

### Tutorial

- Clahsen, H., Rothweiler, M., Woest, A., & Marcus, G. (1992). Regular and irregular inflection in the acquisition of German noun plurals. *Cognition*, 45, 225–255.
- Kuczaj, S. (1977). The acquisition of regular and irregular past tense forms. *Journal of Verbal Learning and Verbal Behavior*, 16, 589–600.
- Marcus, G. F., Ullman, M., Pinker, S., Hollander, M., Rosen, T. J., & Xu, F. (1992). Overregularization in language acquisition. *Monographs of the Society for Research in Child Development*, 57(4).
- Marcus, G. (1995). Children's overregularization of English plurals: a quantitative analysis. *Journal of Child Language*, 22(2), 447–459.
- Marslen-Wilson, W., & Tyler, L. K. (1998). Rules, representations and the English past tense. *Trends in Cognitive Sciences*, 2(11), 428–435.
- Marslen-Wilson, W. D., & Tyler, L. K. (1997). Dissociating types of mental computation. *Nature*, 387, 592–594.
- Prasada, S., & Pinker, S. (1993). Generalisation of Regular and Irregular Morphological Patterns. *Language and Cognitive Processes*, 8(1), 1–56.
- Ullman, M. T., Corkin, S., Coppola, M., Hickok, G., H., G. J., Koroshetz, W. J., & Pinker, S. (1997). A neural dissociation within language: Evidence that the mental dictionary is part of declarative memory, and that grammatical rules are processed by the procedural system. *Journal of Cognitive Neuroscience*, 9(2), 266–276.

### Computational Models

Investigation of the mental representation of inflectional morphology has benefited enormously from the construction of different types of computational models. Advantages of building a model include examining whether the theory is coherent and offering an opportunity to generate novel empirical predictions.

### Readings

- MacWhinney, B. & Leinbach, A. J. (1991) Implementations are not conceptualizations: Revising the verb learning model. *Cognition*, 40, 121–157.
- Pinker, S., & Prince, A. (1988). On language and connectionism: Analysis of a parallel distributed processing model of language acquisition. *Cognition*, 28, 73–193.



# Language & Cognition

## Morphology and Grammar

### Tutorial

- Plunkett, K. (1995) Connectionist Approaches to Language Acquisition. In P. Fletcher & B. MacWhinney (eds). *Handbook of Child Language*. Cambridge: Cambridge University Press (see pp. 38–50).
- Plunkett, K. & Marchman, V. (1993) From rote learning to system building: acquiring verb morphology in children and connectionist nets. *Cognition*, 48, 1–49.
- Rumelhart, D. E., & McClelland, J. L. (1986). On learning the past tense of English verbs. In J. L. McClelland, D. E. Rumelhart, & P. R. Group (Eds.), *Parallel distributed processing: Explorations in the Microstructure of Cognition, Vol. 2: Psychological and Biological Models* (pp. 216–271). Cambridge, MA: MIT Press.

## Sentence Processing

### OVERVIEW

At the sentence level, languages that rely on word order information for the assignment of grammatical role (subject, direct object, indirect object), require the listener to compute a structural analysis of the input. Theories concerning the nature of the computations performed are highly dependent on the theory of linguistics espoused by the investigator. This theory-laden approach has had a profound effect on psychologists investigating sentence processing.

### Readings

- \*Whitney, P. (1998) *The Psychology of Language*. Boston, Houghton Mifflin. Chapters 2 (45-59) and 7 (203-222).
- \*Harley, T. (2007) *The Psychology of Language*. (3rd Ed), Hove, Psychology Press. Introduction to syntax: p 34-43; Sentence processing: p287-313.
- \*Pinker, S. (1994) *The Language Instinct*. New York. Morrow. Chapters, 4, 7 & 8.
- Altmann, G. T. M. (1997) *The Ascent of Babel*. Oxford. OUP. Chapters 7, 8 and 10.
- Gleitman, L. R., & Liberman, M. (Eds.) (1995) *An Invitation to Cognitive Science: Language* (2nd ed.). (Vol. 1). Cambridge, MA: MIT Press. Chapters 8 and 10.

### Syntactic Parsing



# Language & Cognition

## Morphology and Grammar

### Tutorial

Many sentences encountered are ambiguous. Studying the comprehension of such sentences informs our understanding of syntactic processing.

Cuetos, F., & Mitchell, D. C. (1988). Cross-linguistic differences in parsing: Restrictions on the use of the late closure strategy in Spanish. *Cognition*, 30, 73–105.

Elman, J. L. (1990). Finding structure in time. *Cognitive Science*, 14, 179–211.

Ferreira, F., & Clifton, C.J. (1986). The independence of syntactic processing. *Journal of Memory and Language*, 25, 348–368.

Frazier (1987), "Sentence processing: A tutorial review", in Coltheart, M., *Attention and Performance XII: The Psychology of Reading*, Lawrence Erlbaum Associates

Frazier & Rayner (1982) "Making and correcting errors during sentence comprehension: Eye movements in the analysis of structurally ambiguous sentences", *Cognitive Psychology* 14, 178–210.

Seidenberg, M. S., & MacDonald, M. C. (1999). A probabilistic constraints approach to language acquisition and processing. *Cognitive Science*, 23, 569–588.

Slobin, D. I. (1966). Grammatical transformations and sentence comprehension in childhood and adulthood. *J. Verb. Learn. Verb. Behav.* 5:219–227.

Tanenhaus, M.K., Spivey-Knowlton, M.J., Eberhard, K.M. & Sedivy, J.E. (1995). Integration of visual and linguistic information in spoken language comprehension. *Science*, 268, 1632–1634.

Trueswell, J.C., Tanenhaus, M.K., & Garnsey, S.M. (1994). Semantic influences on parsing: Use of thematic role information in syntactic ambiguity resolution. *Journal of Memory and Language*, 33, 285–318.

### Interactions between Semantics and Syntax

Most recent work has been concerned with determining the extent to which the syntactic processor can be characterised as a separate module whose internal workings are unaffected by, say, semantic processing.

### Readings

Altmann, G. T. M. (1998). Ambiguity in sentence processing. *Trends in Cognitive Sciences*, 2(4), 146–152.



# Language & Cognition

## Morphology and Grammar

### Tutorial

- Clifton, C., & Ferreira, F. (1987) Modularity in Sentence Comprehension. In J. Garfield (ed.) *Modularity in knowledge representation and natural language understanding*. Cambridge, MA: MIT Press
- \*Fodor, J. A. (1983) *The Modularity of Mind*. Cambridge:MA, MIT Press. pp.47–101
- Frazier, L., Clifton, C., & Randall, J. (1983) Filling gaps: Decision principles and structure in sentence processing. *Cognition* 13, 187–222.
- Gibson, E., & Pearlmutter, N. J. (1998). Constraints on sentence comprehension. *Trends in Cognitive Sciences*, 2(7), 262–268.
- Marslen-Wilson, W. D. (1975) Sentence perception as an interactive parallel process. *Science*, 189, 226–228
- Osterhout, L., McLaughlin, J., & Bersick, M. (1997). Event-related potentials and human language. *Trends in Cognitive Sciences*, 1(6), 203–209.
- Pickering, M. J., & Branigan, H. P. (1999). Syntactic priming in language production. *Trends in Cognitive Sciences*, 3(4), 136–141.
- Rayner, K. M., Carlson, L. & Frazier, L. (1983) The interaction of syntax and semantics during sentence processing: Eye movements in the analysis of semantically biased sentences. *Journal of Verbal Learning and Verbal Behavior*, 22, 358–374.
- Tyler, L. K., & Marslen-Wilson, W. D. (1977). The on-line effects of semantic context on syntactic processing. *Journal of Verbal Learning and Verbal Behavior*, 16, 68–92.



### **Essay Questions or Presentation Topics**

1. Evaluate the current status of the notion of 'rule' as a representational entity.
2. In what manner does the construction of computational models facilitate our understanding of human language? Illustrate with reference to models of the acquisition of the English Past Tense.
3. What do dissociations between regular and irregular verbs tell us about the nature of the systems underlying these forms.
4. Provide a cross-linguistic analysis of inflectional morphological systems. What can it tell us about the nature of the underlying mental representations?
5. Is it appropriate to characterise syntactic knowledge as involving a separate processing module?
6. Is word recognition achieved before the syntactic structure of an utterance is computed?
7. How do we recognise words in sentences?