

The Grammar Network

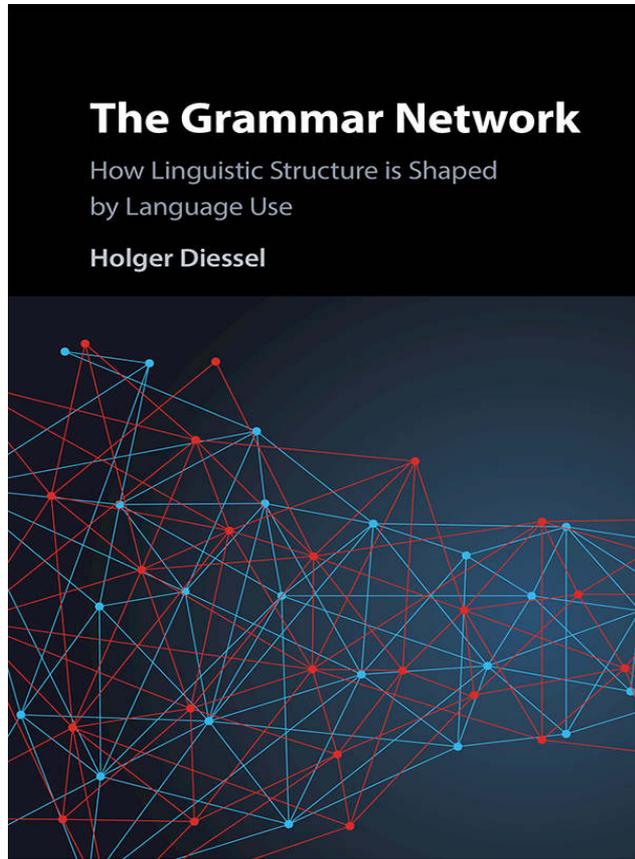
How linguistic structure is shaped by language use

Holger Diessel

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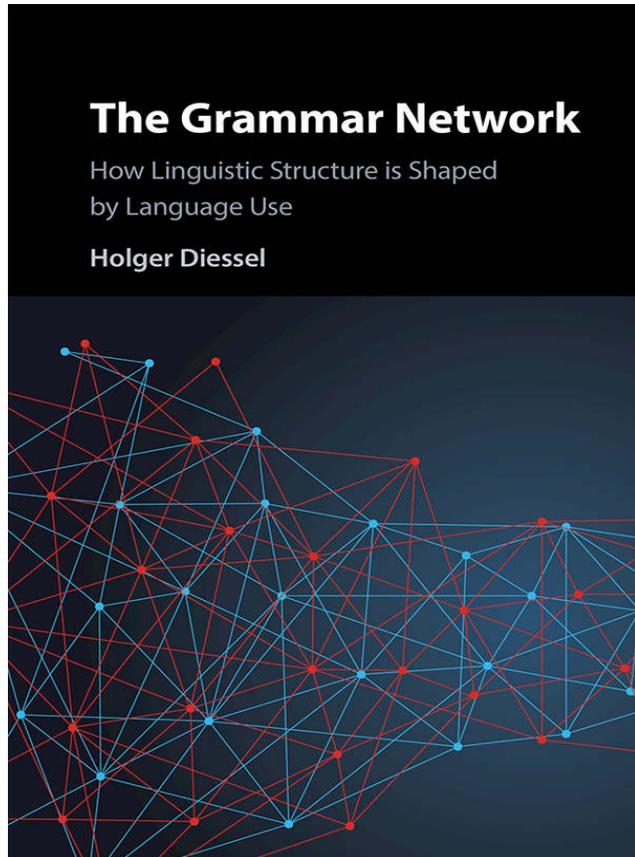
Lake Como Summer School 2019

The Grammar Network



Cambridge University Press, 2019

The Grammar Network

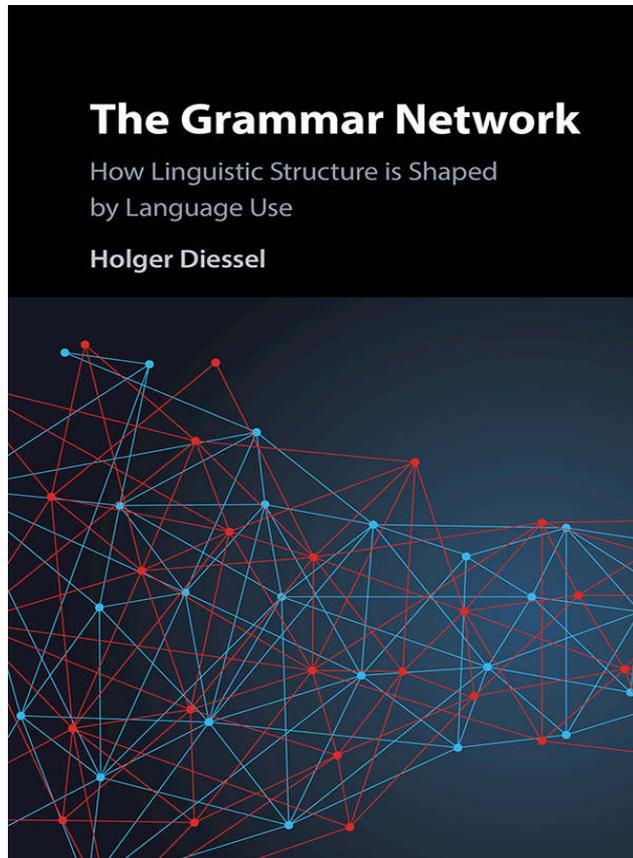


Central claim:

Grammar is best understood as a network shaped by language use.

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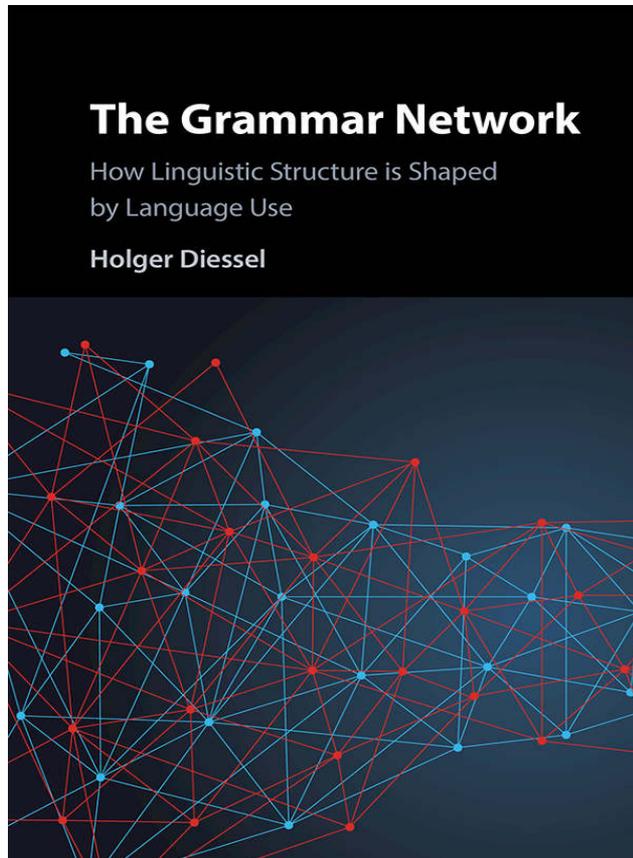
Cognitive scientists and some linguists have argued for a long time that grammar can be seen as “some kind of network”

...but the network view of grammar has never been developed into an explicit theory or model.

There are some network analyses in morphology (Bybee 1995) and construction grammar (Coft 2001)...

.... but most grammatical phenomena have never been analysed in the framework of a network model.

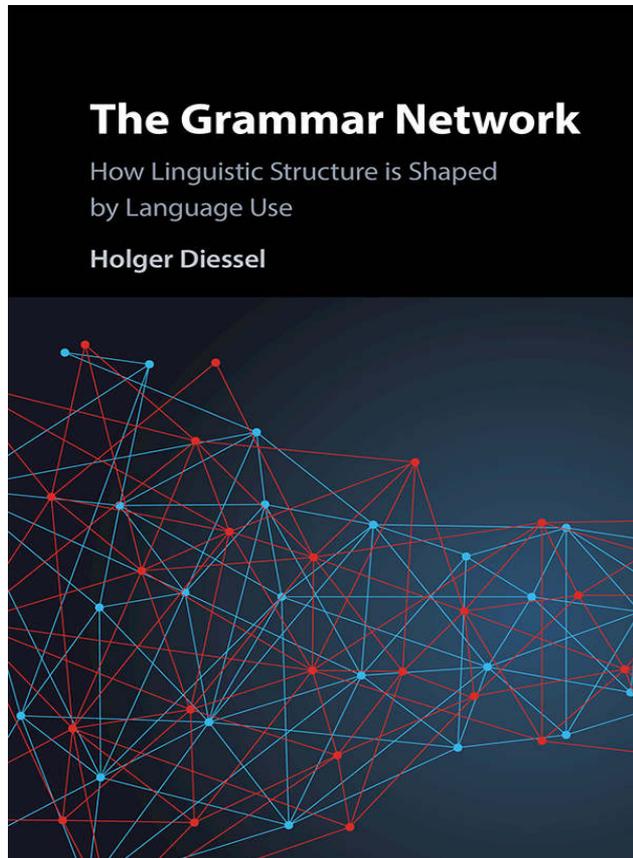
The Grammar Network



In my book I present a dynamic network model of grammar in which all aspects of linguistic structure are analysed by a set of **associative connections** that are shaped by **domain general processes** of language use.

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The Grammar Network

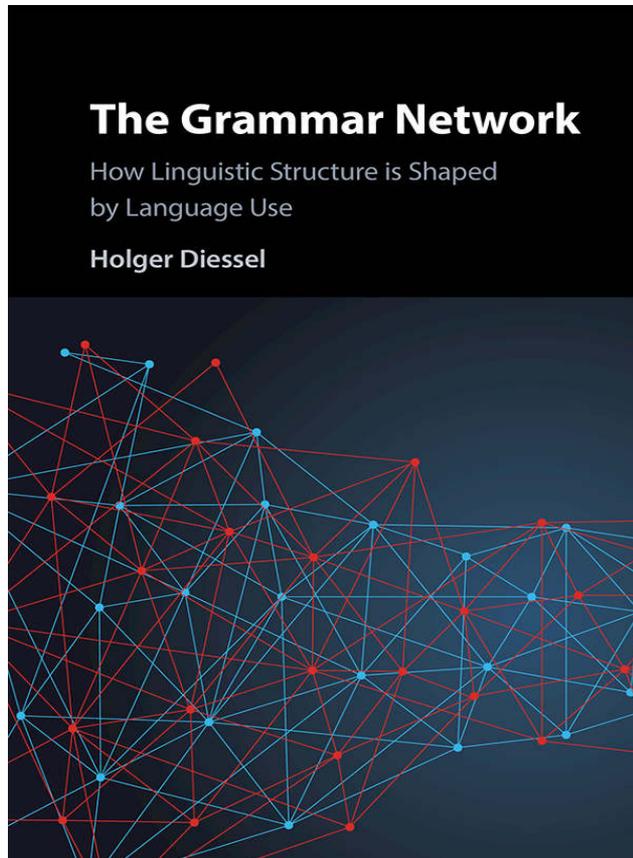


Cambridge University Press, 2019

The book draws on ...

- Linguistics (construction grammar, cognitive linguistics, historical linguistics, linguistic typology)
- Psychology (L1 acquisition, sentence processing, structural priming)

The Grammar Network



Cambridge University Press, 2019

This class provides a general overview of the network approach to grammar ...

... and explains how this approach can help to better understand some cross-linguistic phenomena.

Why should one think of grammar as a network?

Some believe that all we need is ...

- Data
- Basic Linguistic Theory (Dixon 2010)

But ...

- There are many unresolved issues in BLT
- We need to ask new questions

Why should one think of grammar as a network?

Background

Background

There is a long tradition to conceive of grammar as a self-contained, deductive system consisting of discrete categories and algorithmic rule.

This view has been challenged by usage-based linguists who have argued that grammar is derived from language use (e.g. Bybee 2010).

Grammar is a **dynamic system** of emergent categories and fluid constraints that are in principle always changing under the influence of **domain-general processes** of language use.

Background

This view of grammar calls into question some central assumptions of linguistic analysis that have long been taken for granted.

- It challenges the rigid division between the linguistic system and language use, or competence and performance.
- It abandons the structuralist dictum that the study of (synchronic) linguistic states must be separated from the study of language change.
- And it rejects the common assumption that syntactic analysis presupposes a set of predefined categories, such as subject or case, which Jackendoff characterized as a “toolkit” for the linguist.

Background

If grammar is dynamic, we cannot posit the existence of particular grammatical categories prior to syntactic analysis.

Rather, what we need to explain is how linguistic categories evolve, stabilize and change.

- If this is our goal, network models are more appropriate for grammatical analysis than the traditional approach because network models are well suited to explain dynamic processes.

Background

Network models are used in many scientific disciplines to study a wide range of phenomena:

- Ecosystems
- Social relations
- The brain
- Economic circuits
- Traffic systems
- Cognitive processes

Network models are used across disciplines for the analyzing dynamic and self-organizing processes.

Science needs a “general theory of networks” (Buchanen 2002).

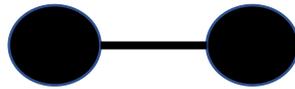
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Background



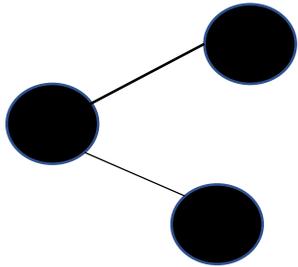
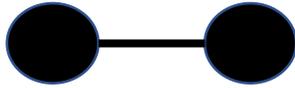
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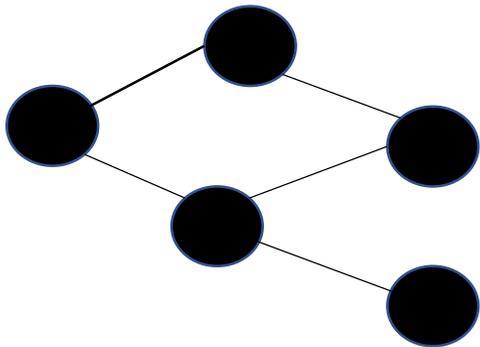
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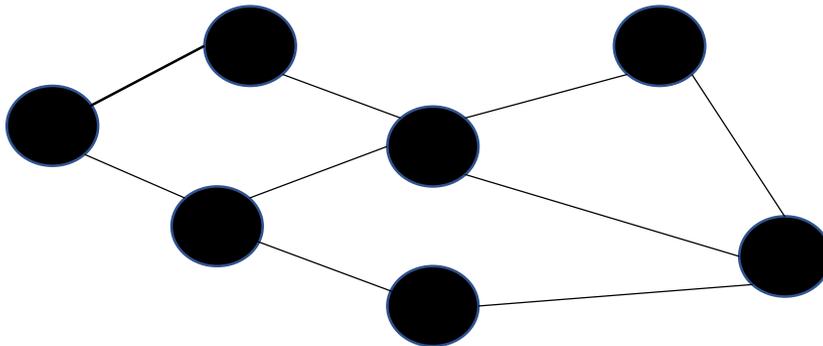
Background



Background



Background



Network models need to be theoretically motivated.

Background

In my book ...

- ... the “**architecture**” of the network is motivated by research on particular categories and constructions,
- ... the changes of the system are motivated by „**domain general process**“ that influence usage and development.

Course schedule

Course schedule

- Grammar, usage and cognition [background]
- Constructions as networks
- Argument structure, word classes
- Constituent structure, word order

Usage and cognition

Language and cognition

Language use is driven by the interlocutors' communicative intentions.

There are always alternative ways of expressing intentions.

	Alternative 1	Alternative 2
Pronunciations	<i>I will</i>	<i>I'll</i>
Words	<i>build</i>	<i>construct</i>
Constructions	<i>I sent Tom a letter</i>	<i>I sent a letter to Tom</i>

Speakers cannot only choose between existing means, they can also create novel forms and meanings; but linguistic creativity is constrained by linguistic convention.

Like speakers, listeners have to make decisions and choices.

Comprehension is a “constraint satisfaction process” (MacDonald et al. 1994).

Language and cognition

What determines speakers linguistic decisions and choices?

Language and cognition

What determines speakers linguistic decisions and choices?

- Explicitness
- Economy
- Expressivity
- Social interaction
- Constrains on processing
- Constraints on production
- Constraints on L1 acquisition
- Frequency

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There are so many different suggestions as to how grammar is shaped by usage that the whole approach is **arbitrary** and **ad hoc** (Newmeyer 2003).

Language and cognition

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There are so many different suggestions as to how grammar is shaped by usage that the whole approach is **arbitrary** and **ad hoc** (Newmeyer 2003).

What is needed is a more systematic approach that is immediately based on psychological research on “domain general processes”.

Language and cognition

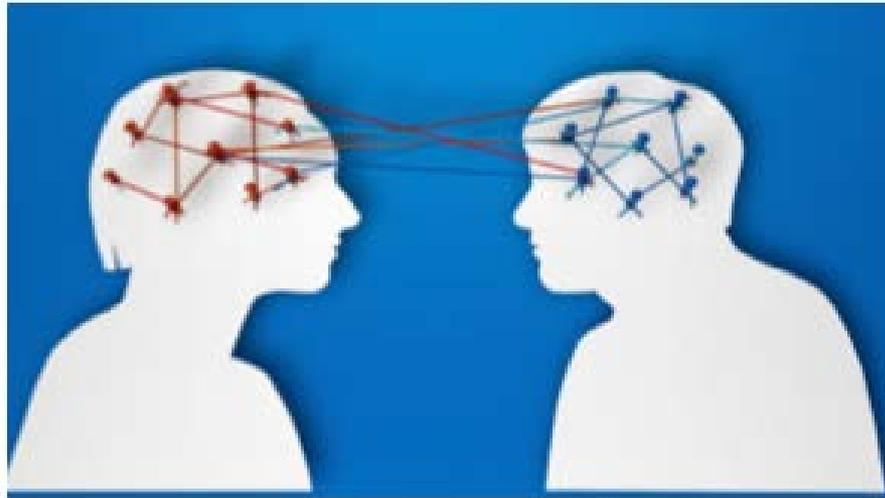
Domain-general processes may be divided into three basic domains:

- Social cognition
- Conceptualization
- Memory

Domain-general processes

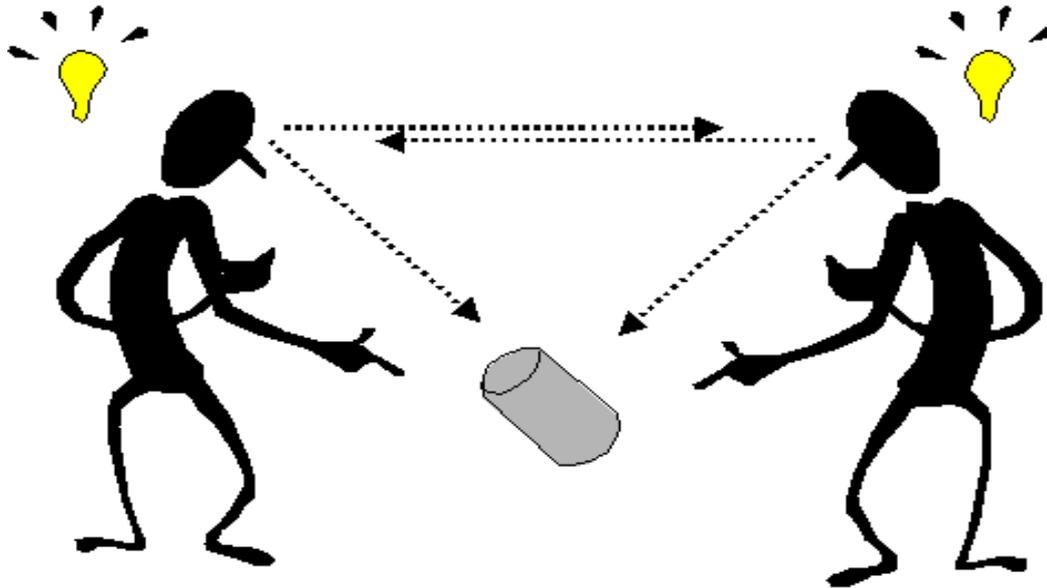
Social cognition

Language use is a form of social interaction which involves a set of cognitive processes that concern the ability to take another person's knowledge, intention, and perspective into account (Tomasello 1999 and many others).



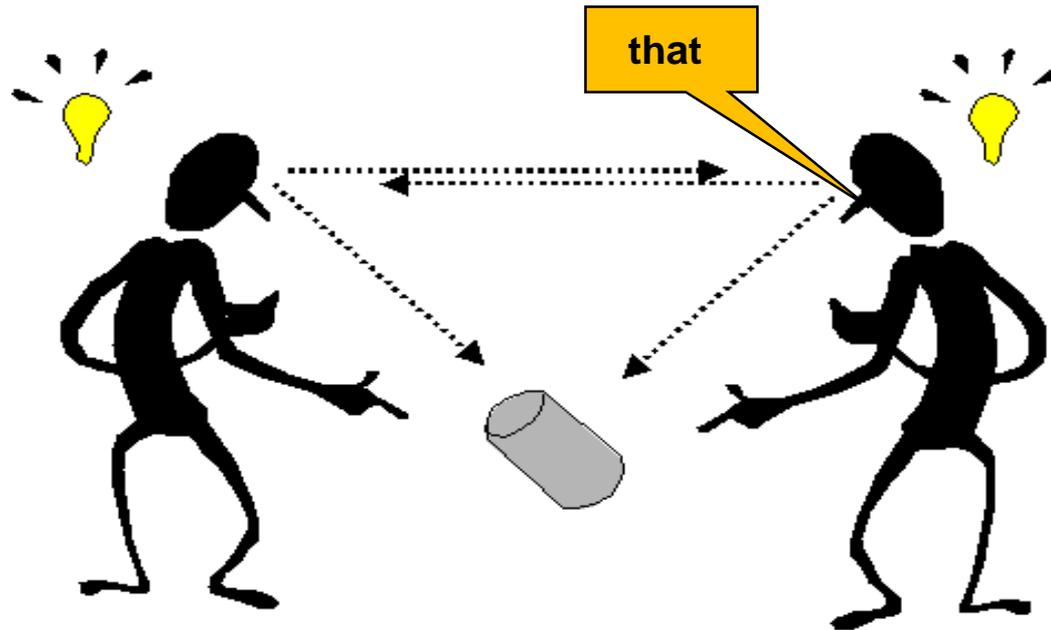
Theory-of-mind

Joint attention



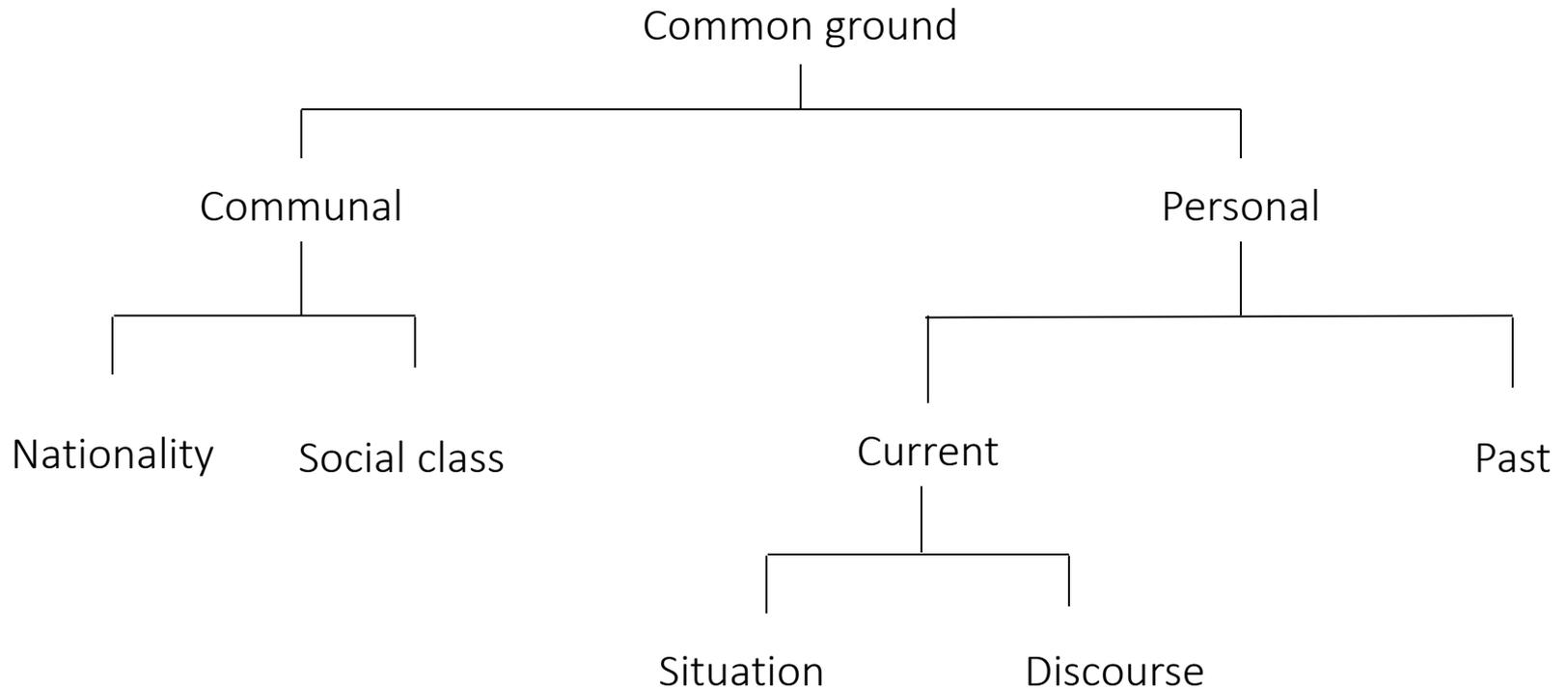
(Bruner 1983; Dunham and Moore 1995; Carpenter et al. 1998;
Tomasello 1995, 1999; Eilan et al. 2005)

Joint attention



(Bruner 1983; Dunham and Moore 1995; Carpenter et al. 1998;
Tomasello 1995, 1999; Eilan et al. 2005)

Common ground



(Clark 1996 and many others)

Common ground

Alternative referring terms:

Definite noun phrase:	<i>the man</i>
Indefinite noun phrase:	<i>a man</i>
Proper name:	<i>Peter</i>
Proximal demonstrative:	<i>this</i>
Distal demonstrative:	<i>that</i>
Stressed pronoun:	<i>HE</i>
Unstressed pronoun:	<i>he</i>
Pronominal affix:	<i>read-s</i>
Structural gap:	\emptyset

Speakers “tailor” their utterances according to the “hearer’s needs”.

“Audience design” (Clark and Brennan 1991)

Conceptualization

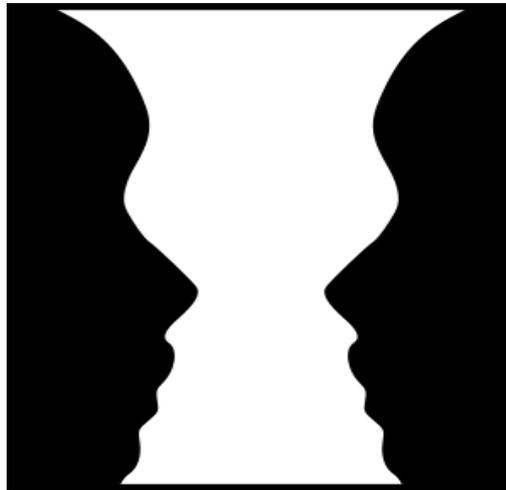
Conceptualization

“Semantics is conceptualization” (Langacker 2008).

Conceptualization

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Conceptualization is not a specific process of language but is also involved in (visual) perception (Gestalt psychology).



figure/ground

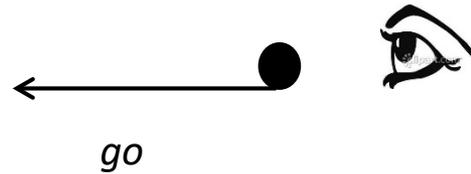
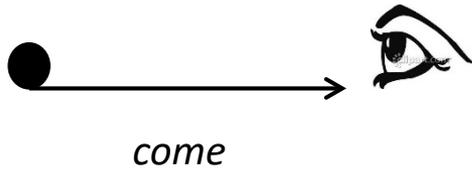
Meaning emerges from the cognitive structuring of experience.

Conceptualization

- (1) She came to school.
- (2) She went to school.

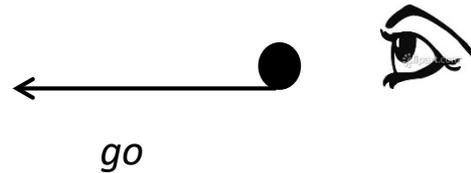
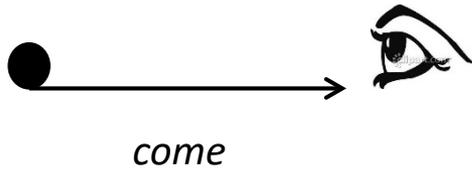
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Conceptualization

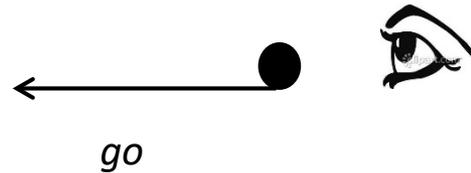
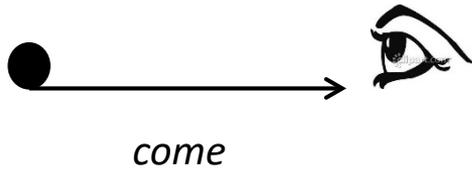
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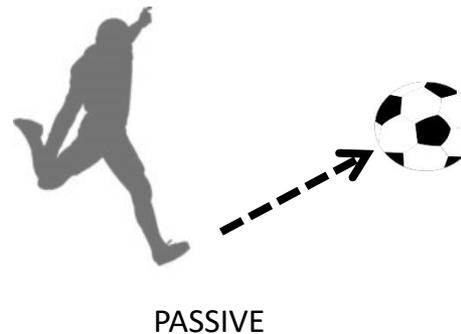
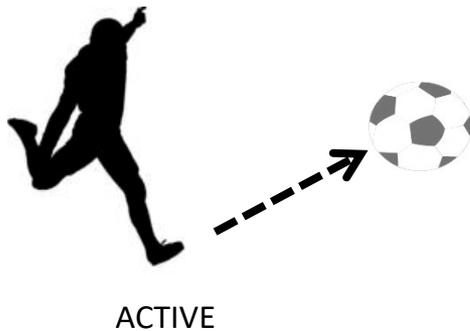
- (3) The man kicked the ball.
- (4) The ball was kicked (by the man).

Conceptualization

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- (2) She went to school.



- (3) The man kicked the ball.
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Memory

Memory

Traditional view: Memory is a 'place' where information is stored.

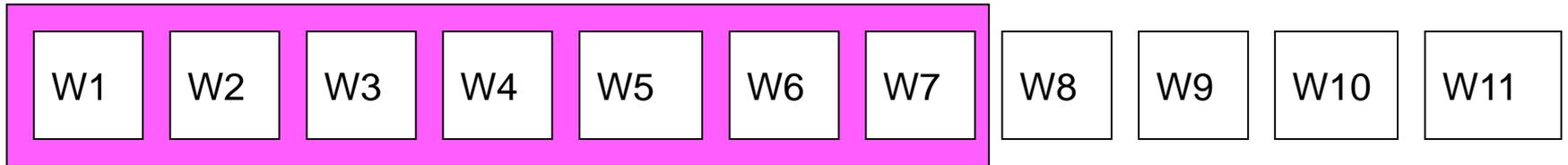
Current view: The term memory subsumes a set of cognitive processes that concern the organization and processing of knowledge (Oberauer 2002; Cowan 2005; Jonides et al. 2005).

Traditional view: There two basic memory stores, e.g long-term memory and working memory.

Alternative view: Memory is a „unitary system“ with an integrated attention mechanism that corresponds to working memory (Oberauer 2002; Cowan 2005).

Working memory

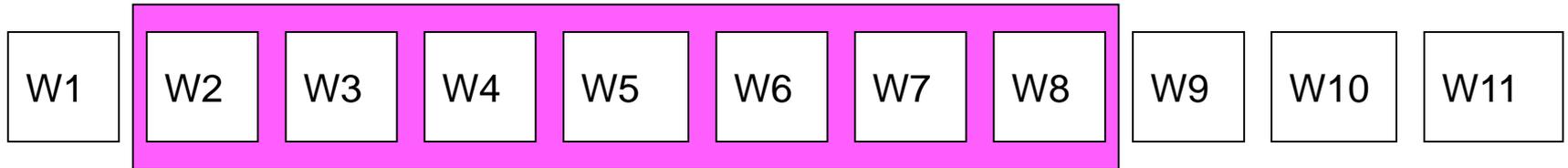
Viewing window



Frazier and Fodor (1978)

Working memory

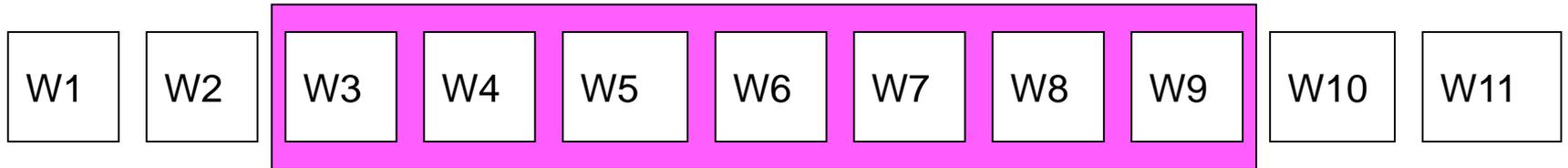
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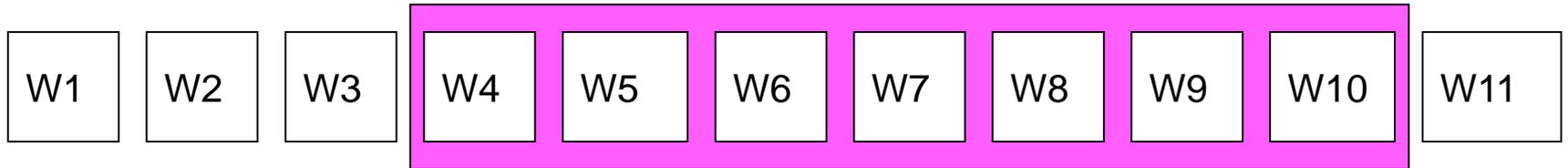
Viewing window



Frazier and Fodor (1978)

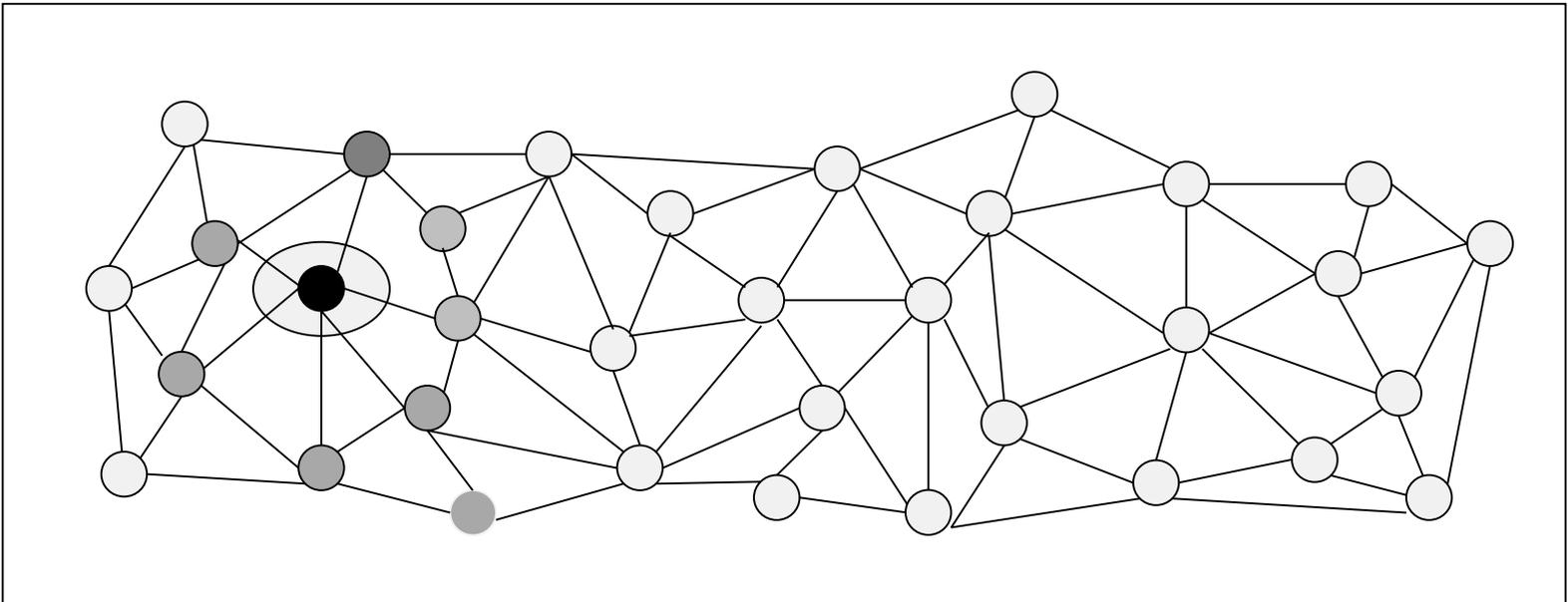
Working memory

Viewing window



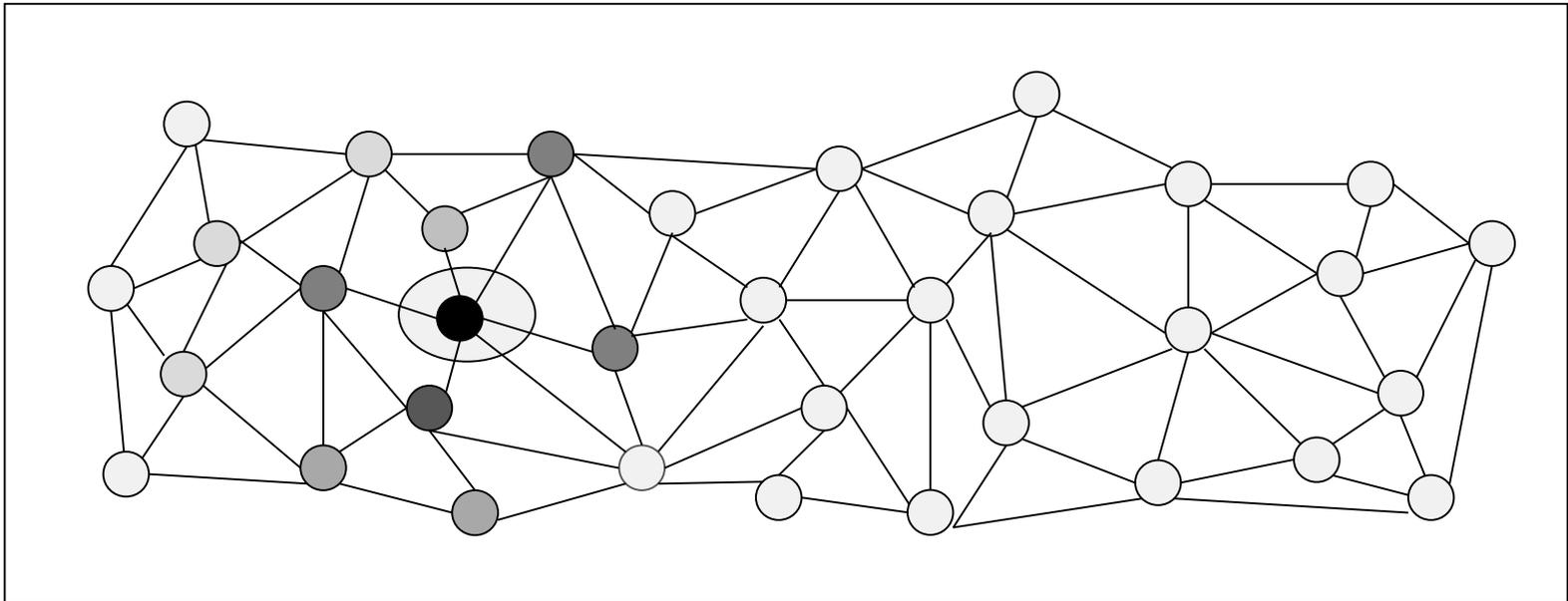
Frazier and Fodor (1978)

Moving focus of attention



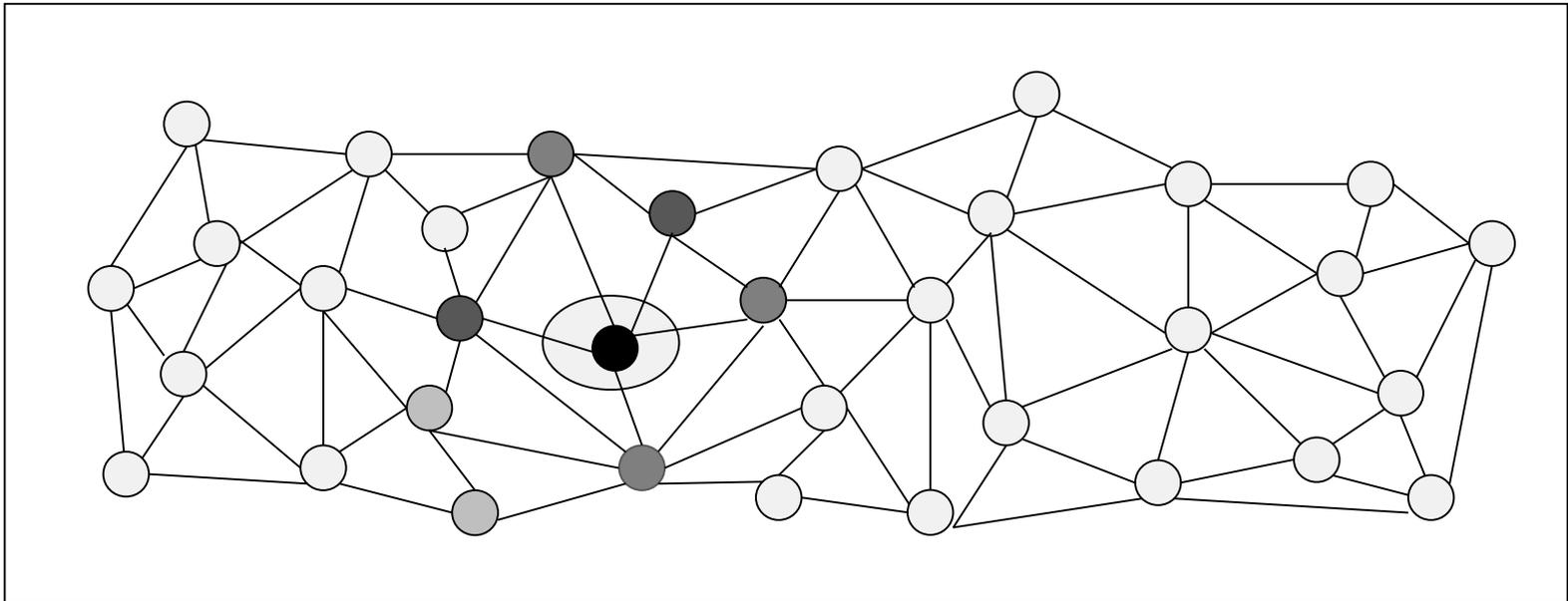
Cowan (2005)

Moving focus of attention



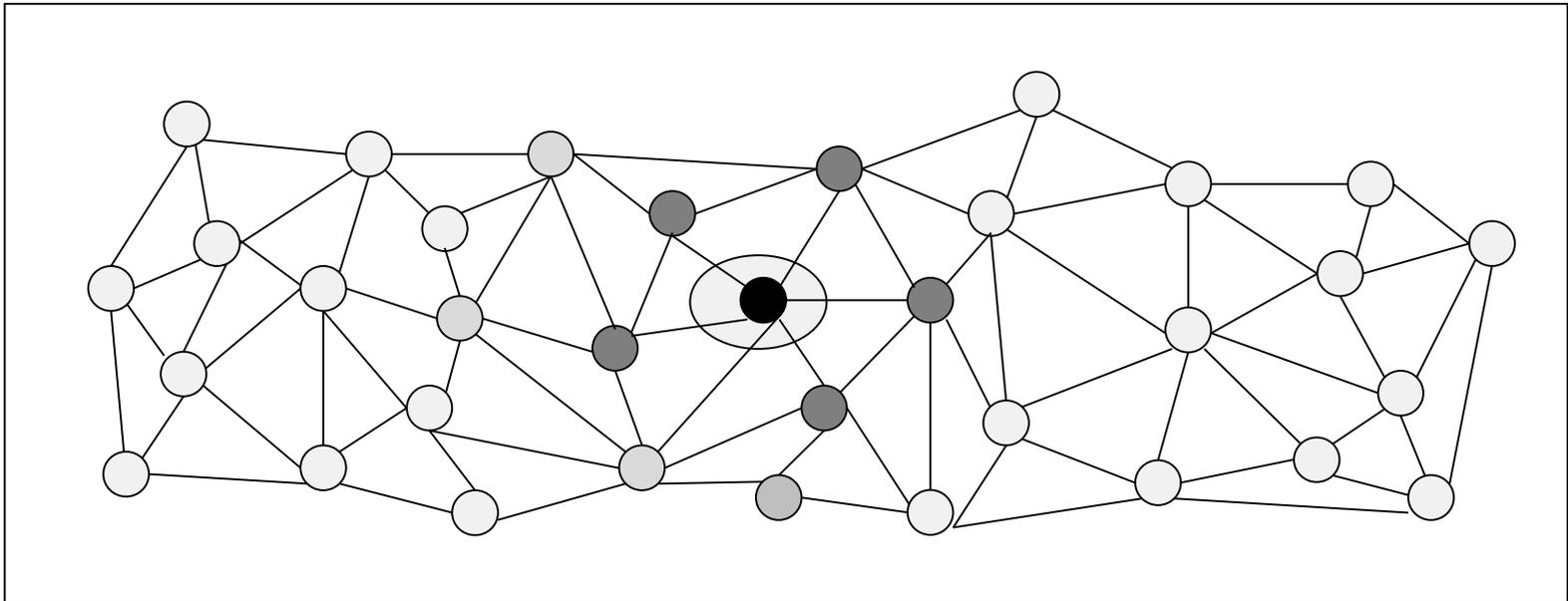
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Moving focus of attention



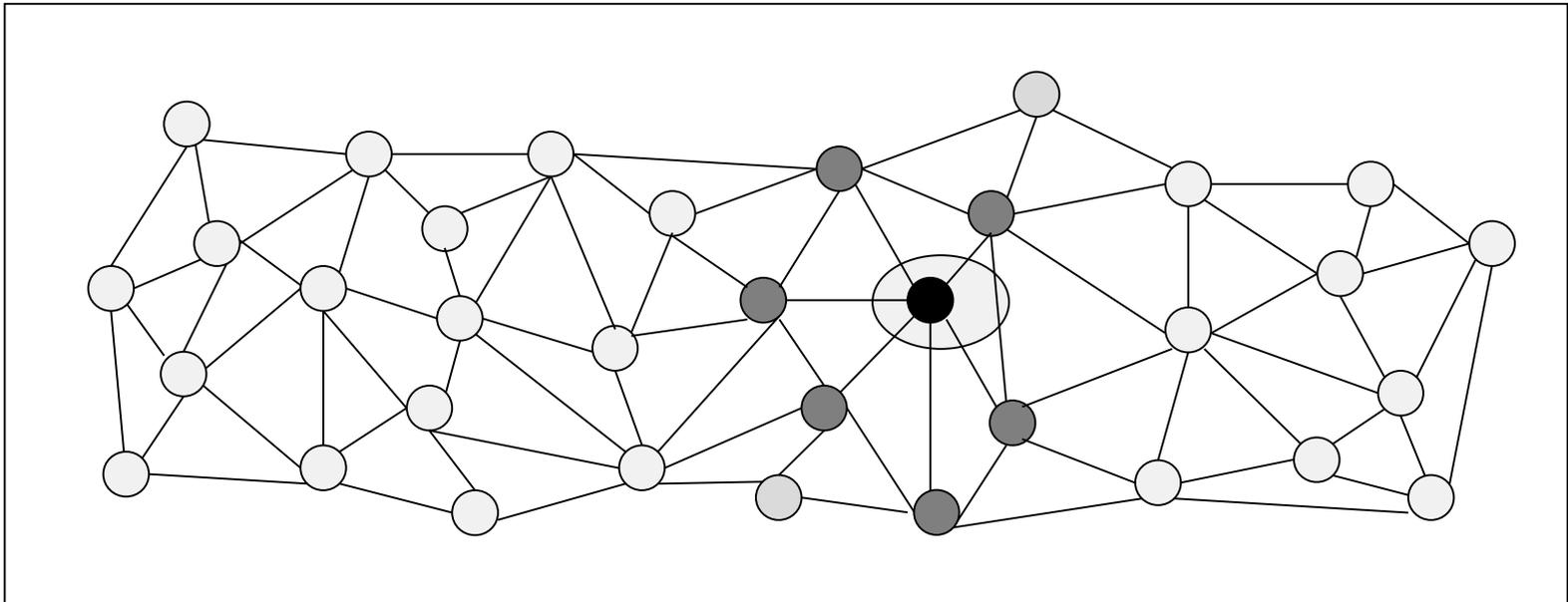
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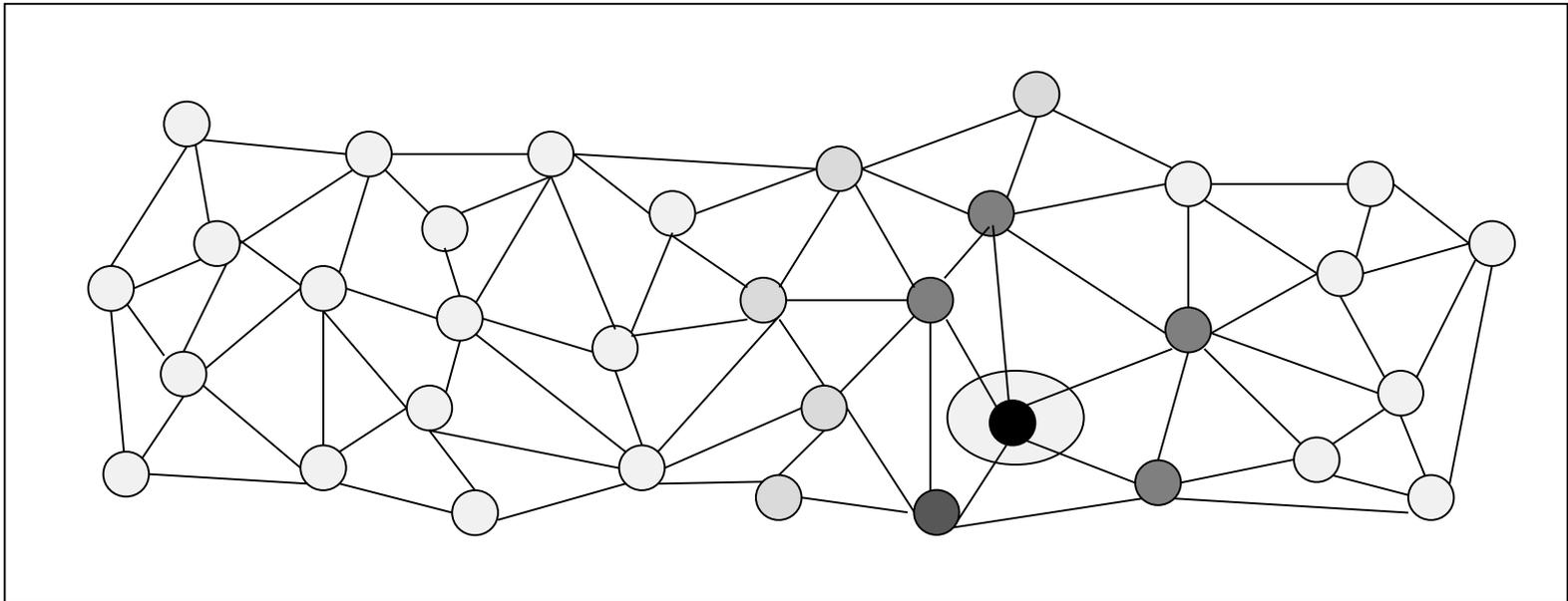
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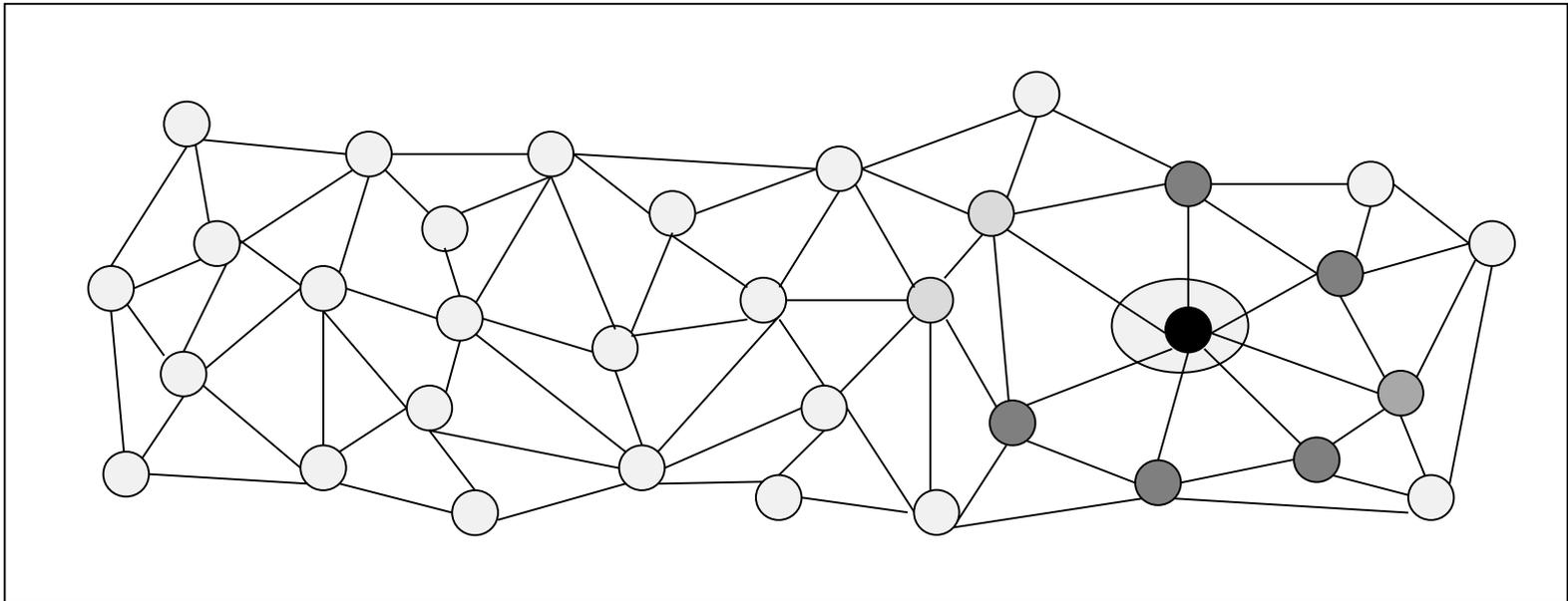
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Moving focus of attention



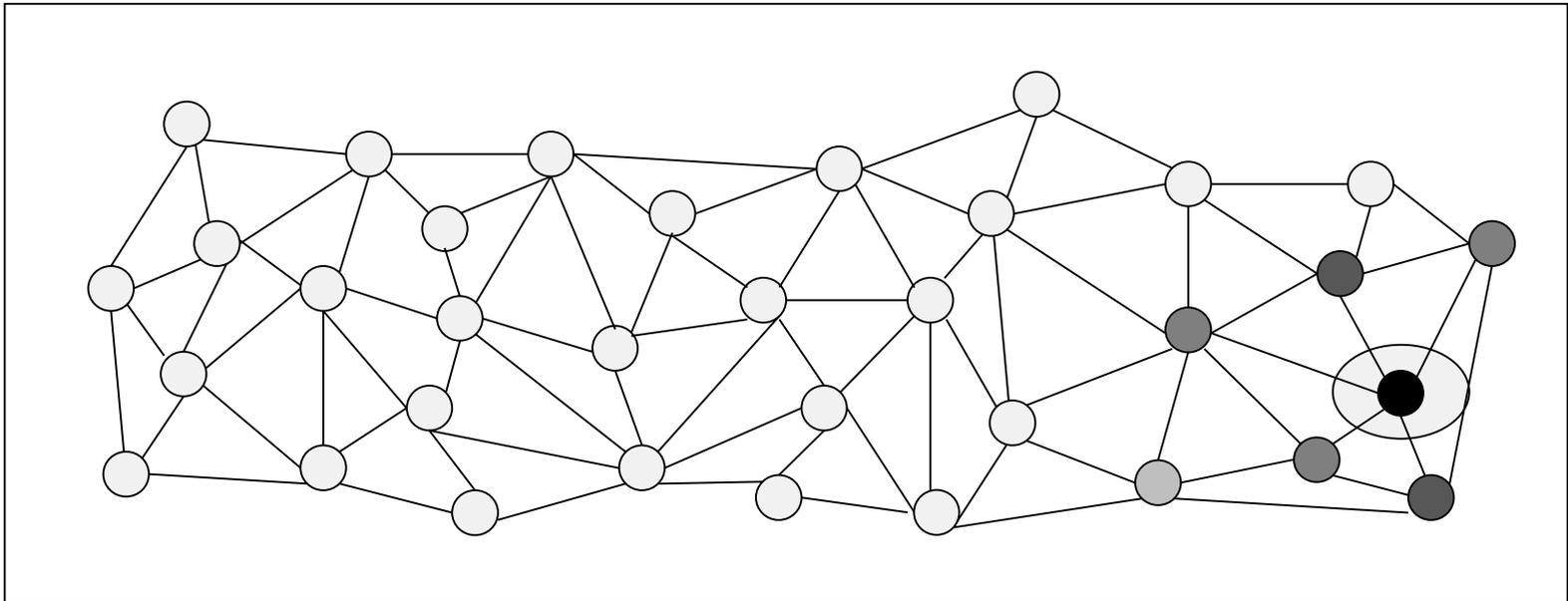
Cowan (2005)

Moving focus of attention



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Moving focus of attention

Cowan's theory of a moving focus of attention is very similar to Chafe's theory of the "flow of consciousness" (Chafe 1994).

Moving focus of attention

Cowan's theory of a moving focus of attention is very similar to Chafe's theory of the "flow of consciousness" (Chafe 1994).

Chafe (1994): The flow of consciousness affects both language use and language development (e.g. word order, information structure constructions).

Priming

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Two basic types of priming (in language):

Priming

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- Lexical priming
- Structural priming

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Lexical priming: cat -> dog

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Lexical priming: cat -> dog

 cat -> rat

Priming

Structural priming:

- Weiner and Labov (1983)
 - (1) a. The man was seen by the woman.
b. The pigs were fed by the farmer.

Priming

Structural priming:

- Weiner and Labov (1983)
 - (1) a. The man was seen by the woman.
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- Bock (1986)
 - (2) a. The foreigner was hit by a car.
b. The foreigner was loitering by the broken traffic light.

Priming

Structural priming:

- Weiner and Labov (1983)

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b. The pigs were fed by the farmer.

- Bock (1986)

- (2) a. The foreigner was hit by a car.
b. The foreigner was loitering by the broken traffic light.

- Hare and Goldberg (1999)

- (3) a. John provided Bill with news.
b. John gave the ball to Pete.

➤ Structural priming provides strong evidence for the network view of grammar.

Related processes

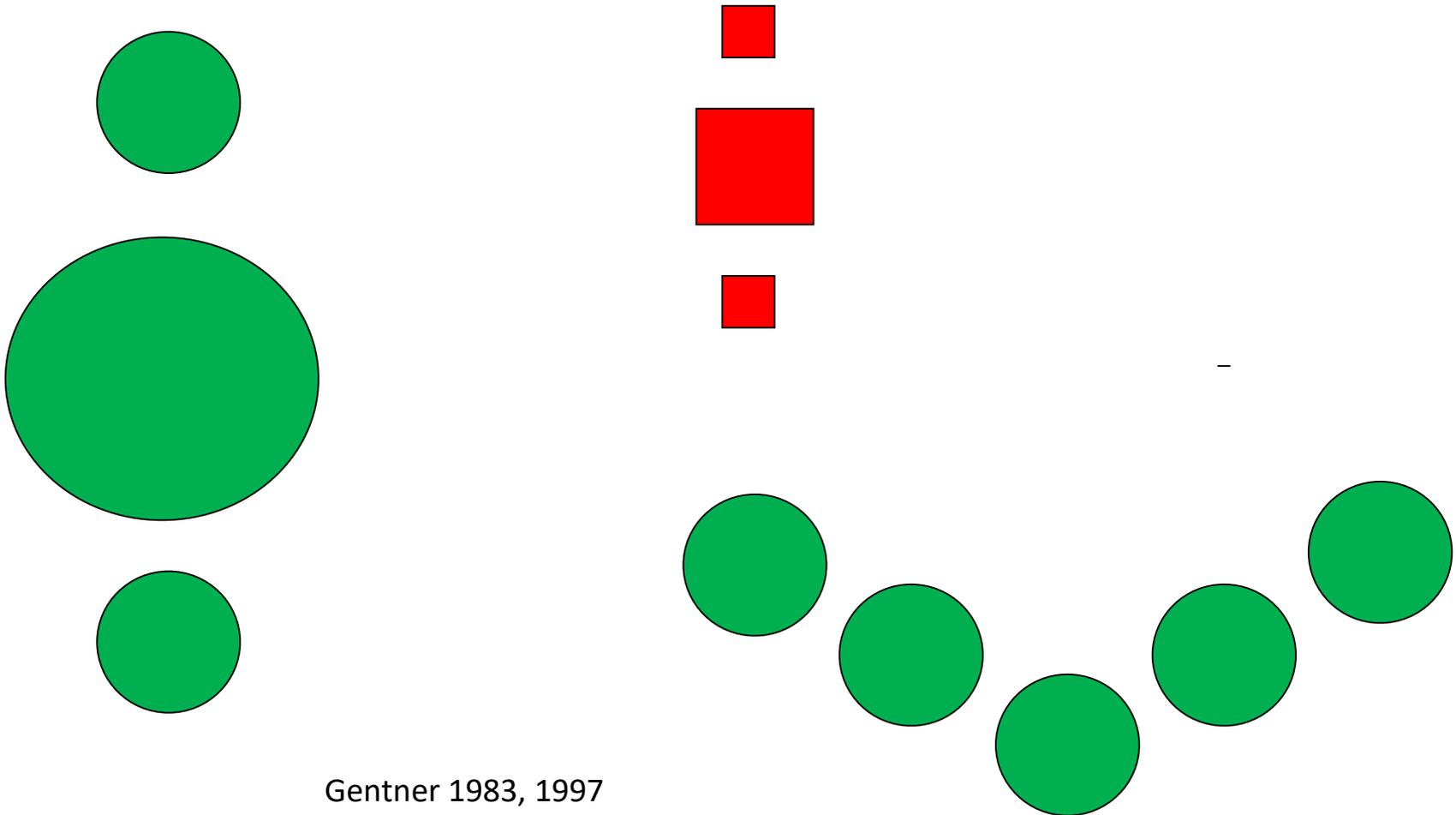
Structural
priming

Analogy

Categorization

- All of the processes are driven by similarity.

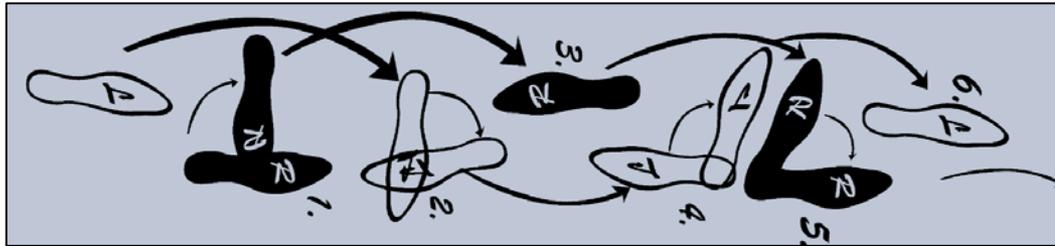
Similarity



Gentner 1983, 1997

Automatization

From controlled to automated behaviors (Logan 1988; Chein and Schneider 2003)

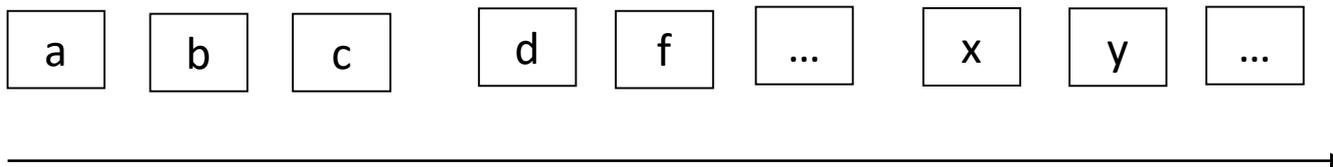


Automatization strengthens the associations between (linguistic) elements in memory.

The product of automatization is a “chunk” (Simon 1972).

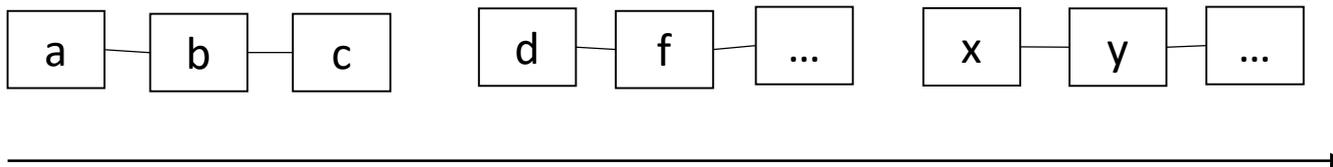
Automatization

Chunking is crucial to memory and processing (Miller 1956; Gobet et al. 2011).



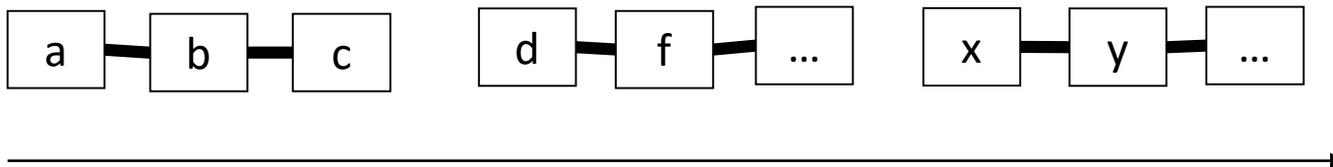
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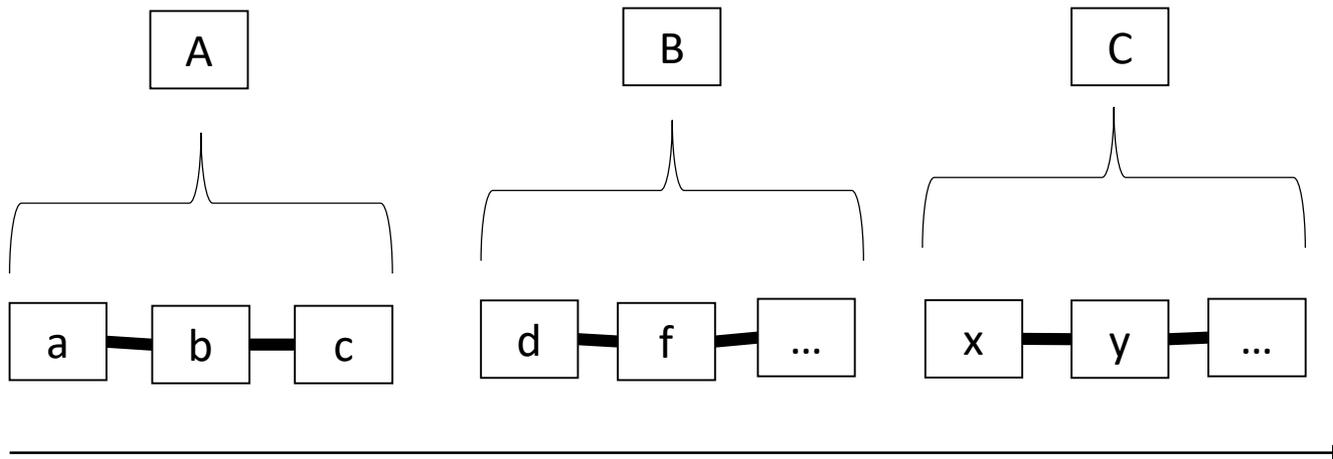
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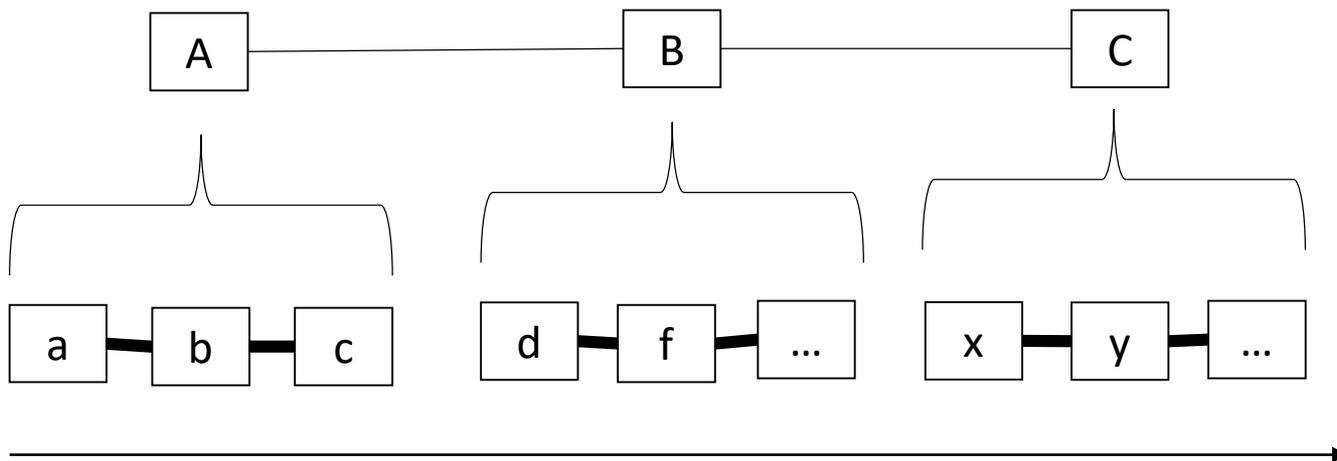
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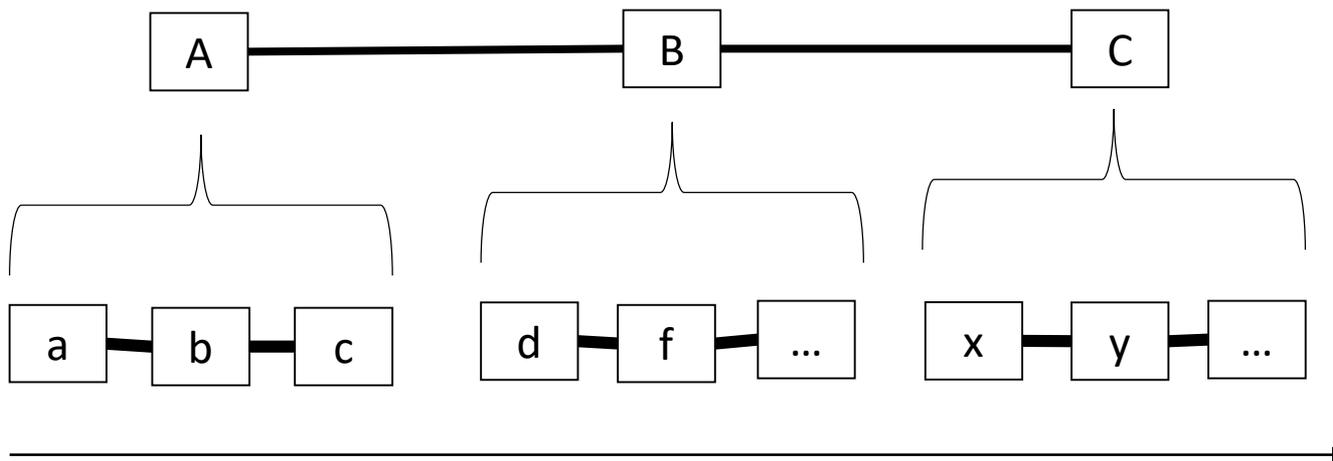
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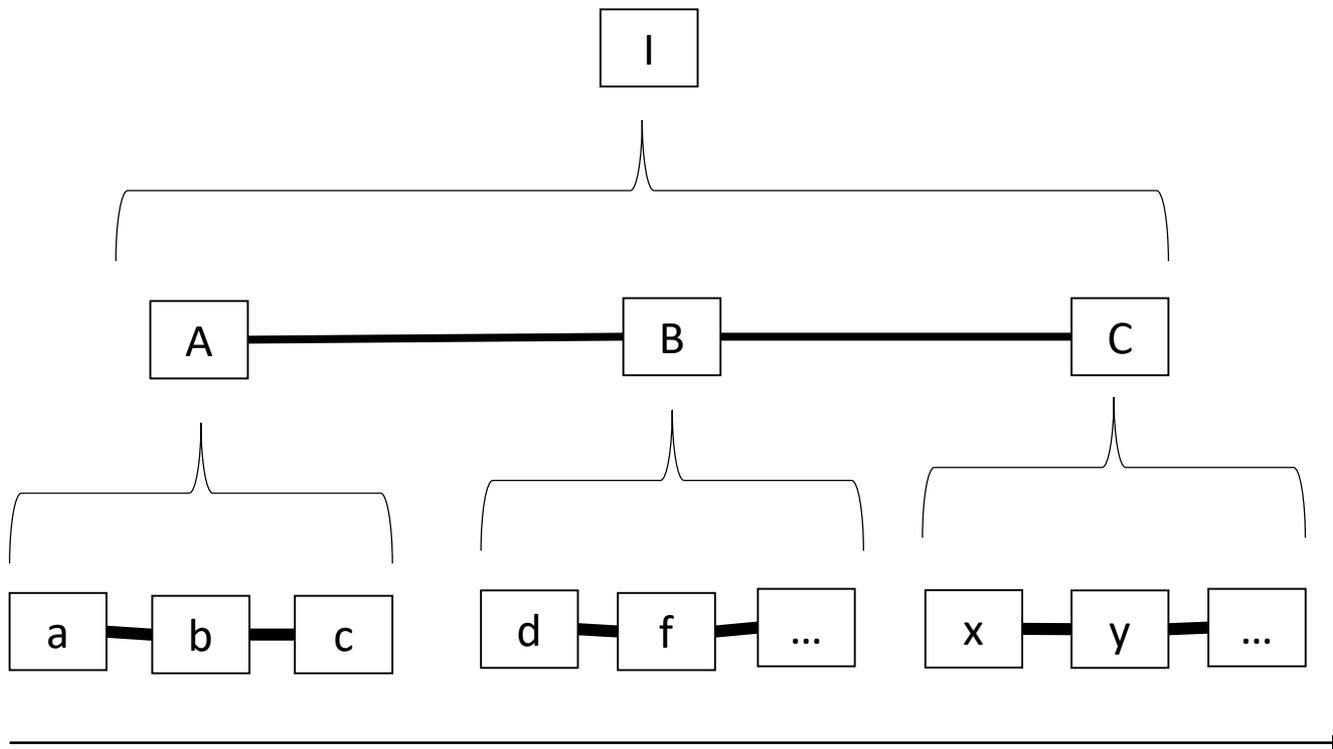
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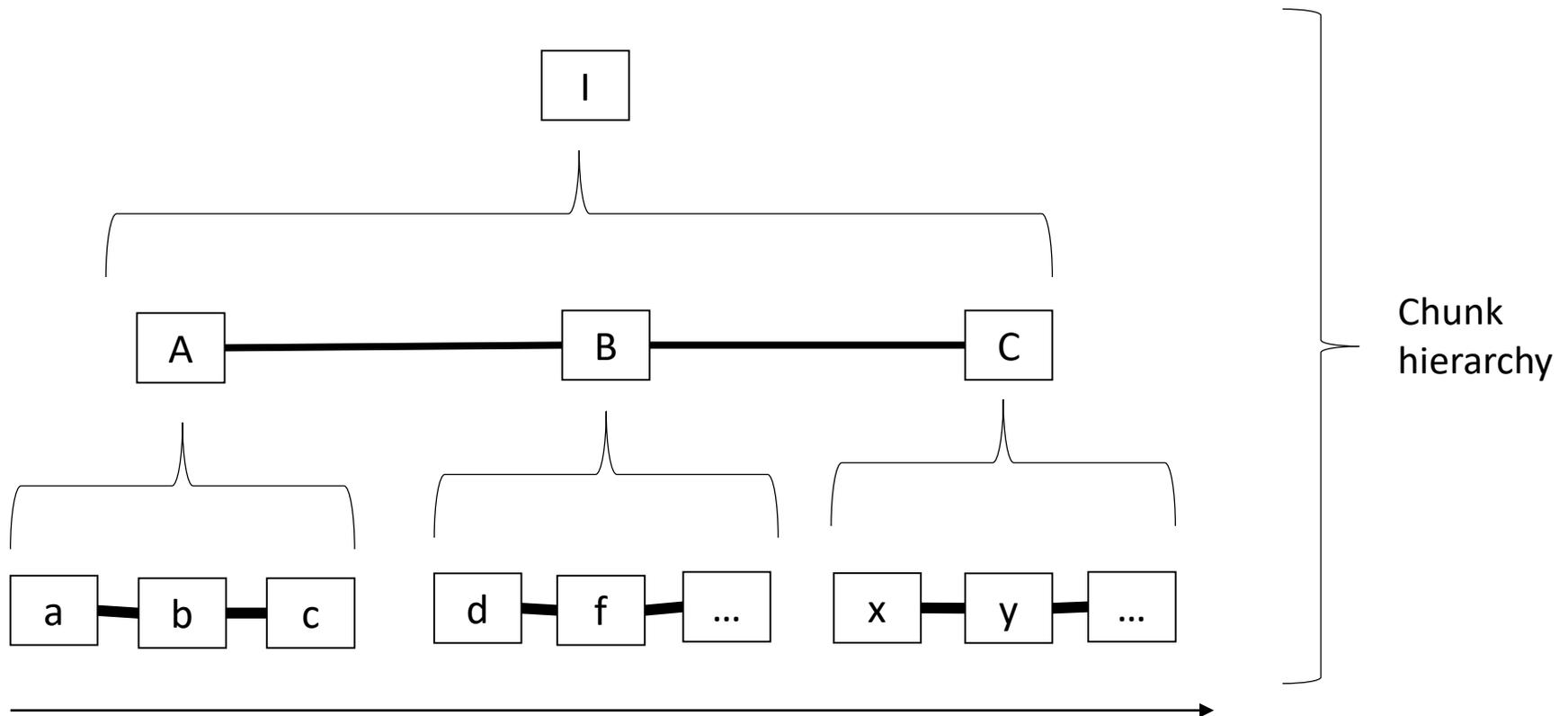
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Cognitive processes

SOCIAL COGNITION	<ul style="list-style-type: none">• Joint attention• Common ground• Audience design
CONCEPTUALIZATION	<ul style="list-style-type: none">• Figure/ground segregation• Metaphor and metonymy• Deixis and perspective• Force dynamics
MEMORY-RELATED PROCESS	<ul style="list-style-type: none">• Attention and flow of consciousness• Categorization, abstraction, analogy• Lexical and structural priming• Exemplar learning and automatization

Diessel (2019)

Competing motivations

The various processes are in competition with each other.

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More important is the distinction between:

- **other-oriented processes** (social cognition)
- **self-oriented processes** (memory)

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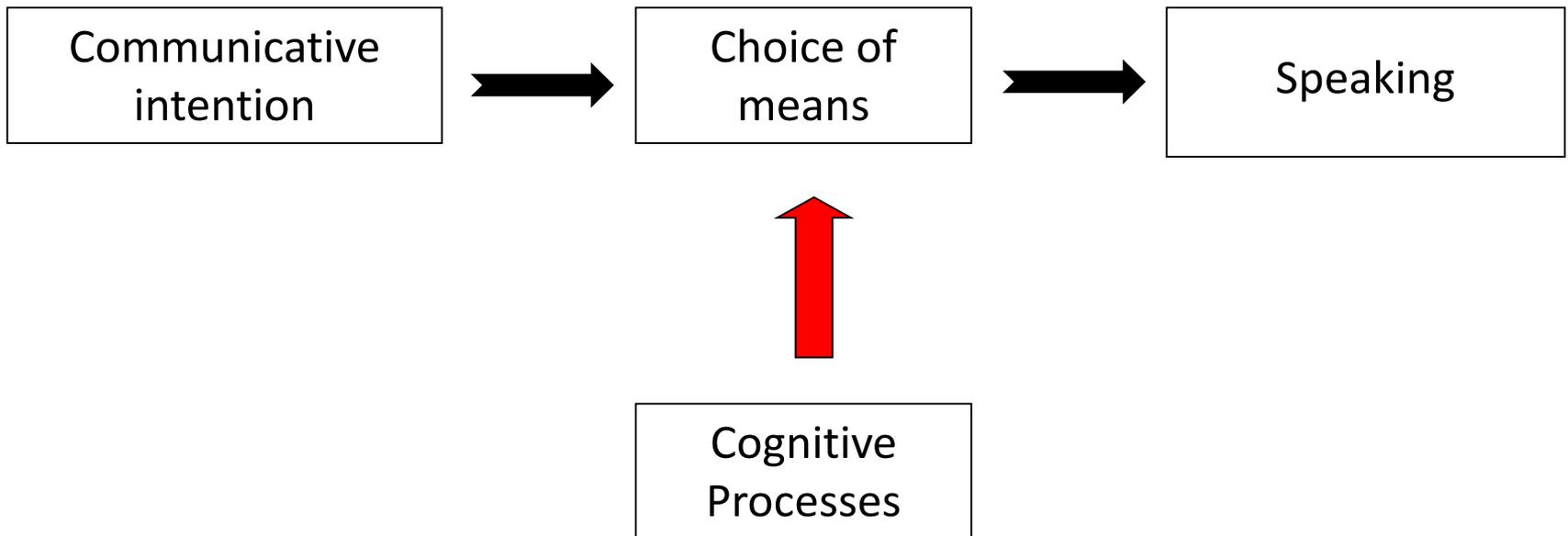
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- Self-oriented processes (memory)

Keysar and colleagues: Speakers' choice of referring terms is determined by an intricate interplay between other- and self-oriented processes (Keysar et al. 2000).

Hanna et al (2003): A similar competition occurs in comprehension.

Conclusion

The linguistic decision-making process



Linguistic decisions are also influenced by social factors (Weinrich et al. 1968; Labov 1972; Trudgill 1974)