Sentence Processing II

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Discourse I - properties of

NPs

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(1)

No head injury is too trival to ignore

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(1) No head injury is too trival to ignore

(2) INTERPRETATION 1: **No** head injury should be ignored no matter how trivial

(3) INTERPRETATION 2: **All** head injuries should be ignored no matter how trivial

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- (5) INTERPRETATION 1: **No** donut should be eaten no matter how fattening
- (6) INTERPRETATION 2: **All** donuts should be eaten no matter how fattening

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So "No head injury is too trivial to ignore" actually means "All head injuries should be ignored no matter how trivial".

Lexical semantics + world knowledge \Rightarrow Wrong interpretation.

"Goodenough" theory of language comprehension (Fernanda Ferrara)

We process language in a relatively shallow way, doing just enough processing to extract a contextually-relevant meaning, but no more.

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(7) The cat chased the mouse

(8) The mouse was chased by the cat

Which is more complex and why?

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(9)

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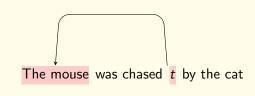
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Difficulty with passives

- Semantically non-canonical word order: the patient comes before the agent
- They are derived via syntactic movement (movement of NP the mouse from after the verb chased)

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'Canonical' = 'typical' / 'standard'
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We can refer to **syntactic** and **semantic** canonicity.

In **syntactically canonical** sentences, the subject comes before the object.

(10) The teenager SUBJ likes parties OBJ

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In **semantically canonical** sentences, there is an **alignment** between the Subject and the Agent argument (and Object and Patient)

- (11) The man AG ate the donut PAT
- (12) The dog AG chased the cat PAT

Discourse I - properties of

In some cases the subject may not be an Agent, but it will definitely have more agency than the object

(13)The boy AG/FXP smelt the rose TH

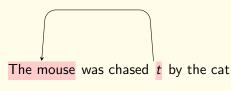
So Subject maps to the most agentive argument, while Object maps onto the least agentive argument.

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(14)

Examples of non-canonical sentences



Syntactically canonical - subject comes before verb

Semantically non-canonical - subject maps to least agentive argument

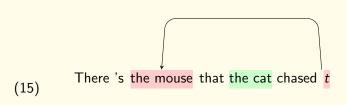
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Syntactically non-canonical - Object comes before Subject Semantically canonical - Subject maps to Agent argument

- 1. John gave her Oi a book Od (DITRANSITIVE)
- 2. John gave a book _{Od} to her _{Oi} (PREPOSITIONAL DATIVE)

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Discourse I - properties of

For three place predicates, which is the canonical word order?

- 1. John gave her Oi a book Od (DITRANSITIVE)
- 2. John gave a book Od to her Oi (PREPOSITIONAL DATIVE)
- 3. John read a book Od [in the park]
- 4. John wore a blue blazer Od [for the party]

Prepositional dative assumed to be canonical as its basic structure (V + Od + Prepositional Phrase) is far more frequent

Canonicity across languages

Discourse I - properties of

1. English is SVO (40%)

- 2. Japanese is SOV (35%)
- 3. Classical Arabic is VSO (15%)
- 4. Fijian is VOS (10%)
- 5. Xavante is OSV (<1%)
- 6. Hixkarayana is OVS (<1%)

Strong tendency for S > O (75% of world's languages) and weaker tendency for V > O(65%)

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Some languages allow words to come in almost any order, e.g. Latin & Finnish.

However, even these have a preferred word order, e.g. it has been argued that the basic Latin word order is OSV.

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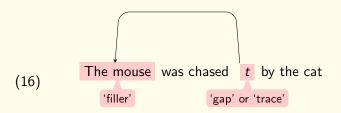
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Syntactically non-canonical sentences are assumed by many linguists to result from a movement process:



Exercise

Discourse I - properties of

Are the following sentences syntactically canonical? For non-canonical sentences specify the filler and the gap?

- 1. It was the boy that the girl pushed
- 2. The boy apparently pushed the girl into the puddle
- 3. The boy that the girl pushed was upset
- 4. The boy was pushed by the girl
- 5. The boy that pushed the girl was naughty
- 6. It was the boy that pushed the girl

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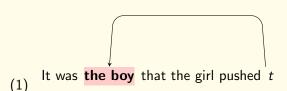
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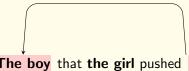
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(2) **The boy** apparently pushed **the girl** into the puddle



The boy that **the girl** pushed t was upset (3)

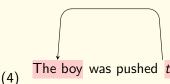
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- The boy was pushed t by the girl
- (5) **The boy** that pushed **the girl** was naughty
- (6) It was the boy that pushed the girl

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Difficulty affected by movement.

Difficulty is greater when movement is longer.

Effect of difficulty is even greater in language-impaired individuals.

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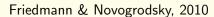
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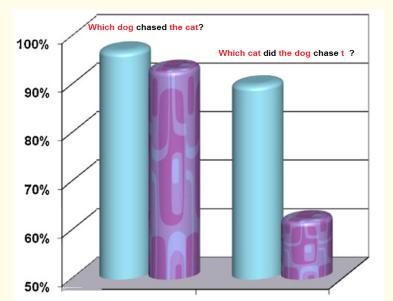
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- (17)The boy [that pushed the girl] was naughty
- The boy pushed the girl [that was naughty] (18)

Position of embedding

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Multiple centre-embedding is a nightmare!
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- (19) The girl [that the boy [that the teacher scolded]] pushed] hurt her knee
- (20) There's **the boy** [that the teacher scolded _] [_ that pushed **the girl**] [that _ fell and hurt her knee].

almost impossible to understand?

mechanisms and processing mechanisms.

How can a sentence be grammatically well-formed but

Miller & Chomsky (1963) - separation between grammatical

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LEMMA

Transitive Vb
Laugh + at + PERSON / THING
Laugh + about + THING



Opposite of "cry"

LEXEME

/la:f/ laugh

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1. Mary fixed the bike

2. Ali donated a book to the library

3. Ali donated a book

4. Angie gave Peter a book

5. Angie gave a book to Peter

6. Angie gave a book

7. Janet said her prayers

8. Janet said that she was sorry

9. Erica asked a question

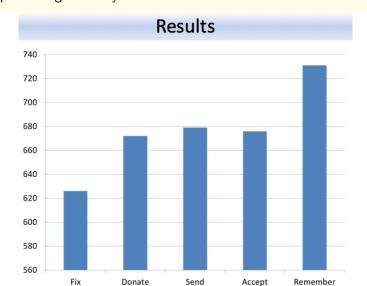
10. Erica asked about the interview

11. Erica asked Mary a question

12. Erica asked whether Mary was tired

13. Erica asked Mary to be quiet

Shapiro et al. (1987) used a lexical decision task to test processing difficulty after the verb.



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1. Ali remembered the milk

- 2. Ali remembered that she had to buy the milk
- 3. Ali remembered to buy the milk
- 4. Ali remembered how to make ice milk lollies
- 5. Ali remembered his mother making him ice milk lollies
- Ali remembered when his mother used to make him ice milk lollies

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Effect of number of arguments, or subcategorisation complexity?

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Because animate entities (people, animals) have volition, they make good agents.

Agents typically occur in subject position.

(21)The boy ate the sausage

Animacy

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Because inanimate entities (e.g. objects) do not have volition, they do not make good agents.

Non-agents typically occur in object position.

(22)The boy ate **the sausage**

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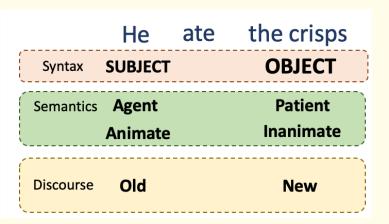
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Animacy

Discourse I - properties of

Because of these correspondences, animacy cues can help children determine who did what to whom, e.g.

Which are easiest?

- The boy that the rock squashed _ was large
- 2. The car that the man drove was fast
- 3. The cow that the pig chased was spotted

Discourse I - properties of

MPc

Different argument slots also have particular discourse properties. The subject position often contains discourse-old information, e.g.

(23)I like John. **He**'s a nice guy.

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(24) Have you heard about John? He won the **lottery**

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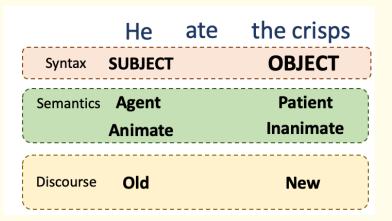
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Complex structures are a lot easier to process when subjects have typical discourse properties (i.e. they are pronominal)

(25)There's **the dog he** chased

Subject is pronominal = EASY

(26)There's **the dog the boy** chased

Subject is a full Noun Phrase = DIFFICULT

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(27) Which dog was he chasing ?

Subject is pronominal = EASY

(28) Which dog was the boy chasing ?

Subject is a full Noun Phrase = DIFFICULT

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We can manipulate difficulty be combining animacy and discourse cues

(29)There's **the hammer he** dropped

Supportive animacy and discourse cues

(30)There's **the boy** that the girl chased _

Unsupportive animacy and discourse cues

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Animacy and discourse can actually "trump" syntactic complexity, e.g.

(31)There's **the hammer he** dropped

Noncanonical structure, but supportive animacy/discourse cues

(32)There's **the girl** that _ chased **the boy**

Canonical structure, but unsupportive animacy/discourse cues

Kidd et al. (2007) found that kids were actually better at repeating (31) than (32)

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Syntactic priming

- REPEAT "The car was hit by the lorry"
- Now describe the picture below
- REPEAT "The woman gave the flowers to the boy"
- Now describe the picture below

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- Now describe the picture below



- REPEAT "The woman gave the flowers to the boy"
- Now describe the picture below

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- Now describe the picture below



- REPEAT "The woman gave the flowers to the boy"
- Now describe the picture below



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We have a natural tendency to recycle the structure of preceding utterances. This is demonstrated by structural priming studies.

- 1. The participant hears a structure
- The participant describes a picture which can either be produced with the preceding structure or a different structure

Participants use preceding structures at above-chance level.

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Syntactic priming is a much studied phenomenon.

Consequence of an implicit structural learning mechanism (Peter et al. 2015).

Structural priming is widely employed in intervention (Leonard, 2011).

However, language-impaired children may be less susceptible to structural priming (Kidd, 2012)

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You can manipulate the complexity of sentences via the following:

- 1. Length of movement
- 2. Position of embedding (centre or final)
- 3. Representational properties of verbs
- 4. Animacy
- 5. Discourse properties of arguments (Noun or Pronoun)
- 6. Properties of preceding sentences (structural priming)

We can therefore create difficulty gradients. But how do we use these in clinics?

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Complete the following sentences

- 1. It's a game of two _____
- 2. Her presentation was all over _ _ _ _ _
- 3. What's a nice girl like you _ _ _ _ _ _
- 4. Who'd a _ _ _ _ ?

How many possibilities were there? What kind of factors influenced your completions?

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