

LFRG, November 2014, MIT

# The semantics and acquisition of non-embedding reportatives

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## 1 Introduction

Young children have been shown to have difficulties with certain structures that involve A-movement such as passives and raising (Hirsch & Wexler 2006, Maratsos et al. 1985 a.o.). An important hypothesis is that children until around age 8 have difficulties projecting structure that involves A-movement out of a defective little vP (Wexler 2004).

As such, raising verb ‘seem’ is acquired late by typically-developing children (Wexler 2004 a.o.). As predicted under this hypothesis, the Dutch equivalents of ‘seem’, *schijnen* and *lijken*, are acquired late as well (Koring & Wexler 2009). Interestingly, however, *schijnen* and *lijken* do not seem to be acquired at the same point in time.

- Why is there a difference in timing of acquisition?

The goal for today’s talk is to explore the properties of these verbs to find out what causes the additional delay in acquisition of *schijnen*.

More in particular, the goals are to:

- Investigate the distribution of these verbs (their (un)embeddability)
- Account for the differences in distribution in terms of their evidential semantics
- Provide a modal analysis of the evidential verbs
- Define the additional complexity of *schijnen* in acquisition (and processing)

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I would like to thank Eric Reuland, Ken Wexler, Mathias Schenner, Johan Rooryck, Ferdinand de Haan, Pim Mak, Liliane Haegeman, Jeff Runner, Sophia Manika, Joost Zwarts, Hotze Rullmann, Sabine Iatridou, Jessica Rett, Rick Nouwen, Lisa Bylinina, Yasutada Sudo, Marta Castella and Anneloes Canestrelli for helpful comments.

## 2 Data on their distribution

- *Schijnen* and *lijken* are evidential; they encode for a different information source.

|                  |  |
|------------------|--|
| <i>Lijken:</i>   | there is direct, but unclear evidence for p<br>(van Bruggen 1980, cf. Rooryck 2000)    |
| <i>Schijnen:</i> | speaker has indirect reported evidence for p<br>(Vliegen 2011, cf. De Haan 1999, 2007) |

Haegeman (2006) showed that there are differences in distribution. In particular, *schijnen* is much more restricted in its distribution than *lijken* is.

### Modals

- (1) Hij kan soms erg aardiglijken/\*schijnen, maar dan  
 He can sometimes very nice SEEM<L/\*S>, but then  
 opeens wordt hij afstandelijk  
 suddenly becomes he distant  
 'At times he may seem very nice, but then all of a sudden he becomes distant.'  
 (Haegeman 2006a:497 (28a-b))

### Auxiliaries

- (2) Het postmodernisme heeft de grond onder de wetenschappelijke  
 The postmodernism has the ground under the scientific  
 traditie lijken/\*schijnen te willen wegvagen  
 tradition SEEM<L/\*S> to want away-sweep  
 'it seems as if postmodernism has tried to demolish the foundations of the  
 scientific tradition'  
 (Haegeman 2006a:497 (29a-b))

There are different ways to account for these ordering restrictions:

- (i) Restrictions on syntax (Cinque 1999, Cinque & Rizzi 2008, Haegeman 2006)
- (ii) Semantic clash (Ernst 2002, 2007, 2009, Nilsen 2003, 3004)

### 3 A cartographic account

(3) a. \*Gianni non *ce lo* sembra apprezzare abbastanza.

Gianni not to-us it seem-3SG appreciate enough

'It seems to us that Gianni does not appreciate it enough.'

b. Gianni non *ci* sembra apprezzarlo.

Gianni not to-us seem-3SG appreciate-it

'It seems to us that Gianni does not appreciate it.'

(Cinque 2004: 143 and cited in Haegeman 2006: 485)

- Italian *sembrare*: a lexical split, i.e. two items associated with different properties  
L-sembrare: does not license restructuring, no clitic-climbing, experiencer  
F-sembrare: licenses restructuring, clitic-climbing, no argument structure  
 (Cinque 2004)

(4) MoodP<sub>speech act</sub> > MoodP<sub>evaluative</sub> > **MoodP<sub>evidential</sub>** > ModP<sub>epistemic</sub> > TP (Past) > TP(Future) > MoodP<sub>irrealis</sub> > ModP<sub>alethic</sub> > AspP<sub>habitual</sub> > AspP<sub>repetitive(I)</sub> > AspP<sub>frequentative(I)</sub> > ModP<sub>volitional</sub> > AspP<sub>celerative(I)</sub> > TP(Anterior) > AspP<sub>terminative</sub> > AspP<sub>continuative</sub> > AspP<sub>retrospective</sub> > AspP<sub>proximative</sub> > AspP<sub>durative</sub> > AspP<sub>generic/progressive</sub> > AspP<sub>prospective</sub> > ModP<sub>obligation</sub> > ModP<sub>permission/ability</sub> > AspP<sub>completive</sub> > VoiceP > AspP<sub>celerative(II)</sub> > AspP<sub>repetitive(II)</sub> > AspP<sub>frequentative(II)</sub>  
 (Cinque 2004:133, (3))

(5) \*? *Lo* potrebbe sembrare capire (ma io sono sicura che non  
 It may-COND-3SG seem understand (but I am sure that not  
 abbia capito niente).  
 have-SUBJ-3SG understood nothing)  
 'He might seem to understand it (but I am sure he hasn't understood a thing).'

(6) *Potrebbe* sembrare capirlo (ma io sono sicura che non  
 may-COND-3SG seem understand-it (but I am sure that not  
 abbia capito niente).  
 have-SUBJ-3SG understood nothing)  
 (Haegeman 2006: 489)

- Interestingly, Haegeman observes that Italian *sembrare* corresponds to two different lexical items in Standard Dutch: *schijnen* and *lijken*.

- *Schijnen* is a functional verb inserted in Mood<sub>evidential</sub> (speaker-related) and *lijken* is a lexical verb. As such, *schijnen* is much more restricted in ordering than *lijken* is, as shown in section 2.
  - They both trigger restructuring

## 4 A semantic account

### Claim of this talk:

*Schijnen* cannot scope under modals and auxiliaries because it will lead to a semantic clash. In particular: *schijnen* is subjective and as such cannot scope under elements that force an evaluation

### 4.1 Subjectivity

#### (I) Subjectivity:

Speaker asserts Q in a context c

- (a) the modal base on which Q is based is subjective iff  $G_c = \{\text{speaker}\}$   
(i.e. it is only the worlds in the speaker's belief set that are quantified over. This is the solipsistic, special case.)
- (b) otherwise, the modal base on which Q is based is non-subjective  
Based on Ernst (2009), von Stechow and Gillies (2004/2011, 2008a) Papafragou (2006) and Portner (2009).

The listener cannot disagree with *schijnen*:

- (7) A:   Rose schijnt           goed te kunnen       surfen  
           Rose SEEMS<sub><s></sub>       good to can           surf  
           'I've heard that Rose is a good surfer'
- B:   No that's not true
- (i)   Rose is not a good surfer
  - #(ii) You weren't told that she is a good surfer

The listener can disagree with *lijken*:

(8) A: Rose lijkt to be a good surfer

B: Nee dat is niet waar

No that's not true

(i) Rose is not a good surfer

(ii) Rose doesn't *appear* to be a good surfer although she might be

- Both *schijnen* and *lijken* are interpreted with reference to an evidence holder/perspectival center (and in that sense "subjective"/speaker-related).
- Crucially, the perspectival center is necessarily the speaker for *schijnen*, but not for *lijken*.
- As such, a listener can disagree with *lijken*, but not with *schijnen* (see (7-8)).

## 4.2 PPI hood

Subjective elements have been proposed to behave like Positive Polarity Items (PPIs) (Giannakidou 2011, Ernst 2009 for speaker-related adverbs). As such, they cannot be embedded under nonveridical operators.

### (II) (Non)veridicality:

An operator "*F* is veridical if *Fp* entails or presupposes the truth of *p*. If inference to the truth of *p* under *F* is not possible, *F* is nonveridical" (Giannakidou 2011: p. 1674) (e.g. modals, negation, conditionals, question).

- Indeed, *schijnen* cannot be embedded under nonveridical operators whereas *lijken* can be

### Negation

(9a) Sophia lijkt            niet    thuis te zijn

Sophia SEEMS<sub><L></sub>    not    home to be

'Sophia doesn't appear to be at home'

(i) *lijken* > negation: It appears to be the case that Sophia is not home (current situation has perceptual similarities to not-p situation)

(ii) negation > *lijken*: It doesn't *appear* to be the case that Sophia is home (current situation does not have similarities to p-situation, e.g. speaker concludes from Sophia's car missing that Sophia doesn't appear to be home, although in

fact she might be)

(9b) Sophia schijnt niet thuis te zijn

Sophia SEEMS<sub><S></sub> not home to be

'Sophia is not said to be at home'

(i) *schijnen* > negation: It is the case that the speaker has heard that Sophia is not at home

(ii) #negation > *schijnen*: It is not the case that the speaker has heard that Sophia is home

*Conditionals* (also observed by Haegeman 2006)

(10) Als de koorts lijkt/\*schijnt te stijgen, dan moet je hem

If the fever SEEMS<sub><L/\*S></sub> to increase, then must you him

paracetamol geven

paracetamol give

'If the fever seems to be increasing, you should give him paracetamol

*Questions*

*In a context in which only A can see the house, B might ask:*

(11a) Lijkt Sophia thuis te zijn?

Seems<sub><L></sub> Sophia home to be

Does it appear to be the case that Sophia is home?

*In a context in which A knows that B talked to C (a friend of Sophia), A might want to ask B:*

(11b) \*Schijnt Sophia thuis te zijn?

Seems<sub><S></sub> Sophia home to be?

Intended: Have you heard that Sophia is home?

### 4.3 Accounting for ordering restrictions

- Modals are nonveridical operators. The fact that *schijnen* cannot be embedded under modals, but *lijken* can, therefore follows from the difference in subjectivity.
- In addition, perfect aspect (with a bounded event in its scope) forces a description of a past evaluation and could differ from the speaker's own evaluation at the time

of utterance (cf. Iatridou et al. 2001). As such, *schijnen* is incompatible with perfect aspect.

- There is thus no need to postulate different syntactic positions; the distributional differences follow from a difference in the semantics of the two verbs.
- *Schijnen* is incompatible in contexts that require the description of possible evaluations that are not necessarily the speaker's own evaluation. I.e. *schijnen* cannot scope under elements that force describing hypothetical evaluations.

But note:

- Factive predicates are not *nonveridical*, but they are incompatible with *schijnen* as well (observed by Haegeman 2006):

(12) Het is verrassend dat Superman jaloers lijkt/\*schijnt te zijn op Lois  
 It is surprising that Superman jealous SEEMS<sub><L/\*S></sub> to be of Lois  
 'It's surprising that Superman seems to be jealous of Lois'  
 (adapted from Papafragou 2006)

- Factive predicates *do* force an evaluation.
- Current line of thinking (with Lisa Bylinina): A verb like *schijnen* fixes the perspectival center to speaker and is non-shiftable. This is incompatible with elements that introduce another judge/perspectival center.

## 5 Shifting evidence

### 5.1 Subjective *lijken*

Interestingly, *lijken* can be made subjective by adding an experiencer argument to-me:

(13) Sophia lijkt me thuis te zijn  
 Sophia seems<sub><LM></sub> to-me home to be  
 'Sophia must be at home'

*Lijkt-me*: the speaker has inferential evidence for p

- *Lijkt-me* is subjective

The listener cannot disagree with *lijkt-me*:

- (14) A: Rose *lijkt-me* to be a good surfer  
 B: No that's not true  
 (i) Rose is not a good surfer  
 #(ii) You didn't infer that she is a good surfer

- *Lijkt-me* should (and *does*) display PPI hood

#### Conditionals

- (15) \*Als de koorts mij *lijkt* te stijgen, dan moet je  
 If the fever to-me SEEMS<LM> to increase, then must you  
 hem paracetamol geven  
 him paracetamol give  
 'If I infer that the fever is increasing, you should give him paracetamol

#### Negation

- (16) Marko *lijkt* me niet ziek te zijn  
 Marko SEEMS<LM> to-me not ill to be  
 'I infer that Marko is not ill'  
 (i) *lijkt-me* > negation: I infer that Marko is not ill: From the fact that I saw  
 him yesterday working out in the gym, I infer that he is not ill  
 (ii) #negation > *lijkt-me*: It is not the case that I infer that Marko is ill

#### Questions

- (17a) \**Lijkt* Marko me ziek te zijn?  
 SEEMS<LM> Marko to-me ill to be?  
 'Do I infer that Marko is ill?'
- (17b) *Lijkt* Marko je ziek te zijn?  
 SEEMS<LM> Marko to-you ill to be?  
 'Does Marko seem to you to be ill?'

#### Modals

- (18a) \*Marko kan me soms een heel slecht humeur lijken te hebben  
 Marko can to-me sometimes a very bad mood seem<LM> to have



- (18b) Marko kan soms een heel slecht humeur lijken te hebben  
 Marko can sometimes a very bad mood seem-⟨L⟩ to have  
 ‘Marko can sometimes appear to be in a bad mood’

### *Auxiliaries*

- (19) \*Het postmodernisme heeft mij de grond onder de  
 The postmodernism has to-me the ground under the  
 wetenschappelijke traditie lijken te willen wegvagen  
 scientific tradition SEEM-⟨LM⟩ to want away-sweep

### *Factive predicates*

- (20) \*Het is verrassend dat Superman mij jaloers lijkt te zijn op Lois  
 It is surprising that Superman to-me jealous seems to be of Lois  
 ‘It’s surprising that Superman seems to me to be jealous of Lois.’

Importantly, *lijkt-me* takes an experiencer argument. Its unembeddability is hard to account for in a cartographic approach as it has the distribution of a functional head that is high up in the structure, yet it is a verb with argument structure.

## 5.2 Shared *schijnen* (with Lisa Bylinina)

- Interestingly, *schijnen* is not entirely unembeddable.
- It does allow embedding under certain elements

Shifted interpretations require licensing (Schlenker 1999, Anand 2006, Sudo 2012 a.o.)

- a. Verbs of communication (like Cuzco Quechua reportative *-si* (Faller 2014))
- b. Interrogative flip (like Cuzco Quechua reportative *-si* (Faller 2014))

### Indexical shifting in Uyghur

- (21) Ahmet [men ket-tim ] di-di  
 Ahmet [1sg leave-past.1sg] say-past.3  
 (i) Shifted: ‘Ahmet said that Ahmet left.’  
 (ii) Non-shifted: \*‘Ahmet said that I left.’  
 (Sudo 2012: 203)

(22) Jan zegt/schrijft dat het schijnt te gaan regenen  
 John says/writes that it seems<sub><S></sub> to go rain  
 'John<sub>i</sub> says/writes that he<sub>i</sub>'s heard it will rain'

(23) Interrogative flip:

A: Je schijnt flink te hebben gedronken gisteren  
 A: You SEEM<sub><S></sub> heavy to have drunk yesterday  
 A: 'You are said to have been drinking heavily yesterday.'

B: Ik? Gedronken? Wat schijn ik dan te hebben gedronken?  
 B: I? Drunk? What SEEM<sub><S></sub> I then to have drunk?  
 B: 'Me? Drinking? What is it that I am said to have been drinking?'

- *Schijnen* does not embed under verbs like 'think' or 'know' (non-shifters as known from work on shifted interpretations of indexical pronouns (e.g. Sudo 2012)).

(24) ??Jan denkt dat het schijnt te gaan regenen  
 John thinks that it seems<sub><S></sub> to go rain  
 'John thinks that he's heard it will rain'

(25) ??Jan weet dat het schijnt te gaan regenen  
 John knows that it seems<sub><S></sub> to go rain  
 'John knows that he's heard it will rain'

Puzzle: Why does it allow embedding under *say*, but not *think*? Why do certain evidentials and epistemic modals seem to allow embedding under *think* or *know*?

## 6 Evidential modals

### 6.1 Intermezzo: certainty vs. source

Following Izvorski (1997), Matthewson et al. (2007), Faller (2011) among others, I will analyze *schijnen* and *lijken* as modals using Kratzer's possible worlds framework (1977 and subsequent work).

- Does this mean that they are the same as epistemic modals? No

Conceptually, modality (speaker's judgment of certainty of  $p$ ) and evidentiality (source of information of the speaker) are distinct (De Haan 1999, Aikhenvald 2004, Schenner 2010ab).

At the same time, certainty and source of information are related: the source one has for  $p$  will influence the judgment of the truth of  $p$  (e.g. Willett 1988); however this is not a direct relationship (Schenner 2010ab, De Haan 1999).

Analyzing the evidential verbs using the same tools as used to analyze modals does not mean that they are the same.

*Schijnen* and *lijken* differ from epistemic modals in what the conversational background consists of:

- Realistic conversational backgrounds: representing evidence of things (evidence is taken to be factual)
- Informational conversational backgrounds: representing information content (Kratzer 2010)
- In contrast to typical epistemic modals, *lijken* and *schijnen* quantify over worlds in an informational conversational background.

(26) Anneloes schijnt thuis te zijn, maar ik geloof er niets van  
 Anneloes seems<sub><S></sub> home to be, but I believe there nothing of  
 'I've heard that Anneloes is at home, but I don't believe it'

(27) Anneloes lijkt thuis te zijn, maar dat is niet zo  
 Anneloes seems<sub><L></sub> home to be, but that is not so  
 'Anneloes appears to be at home, but she's not'

## 6.2 Defining their semantics

### (III) Semantics of *schijnen*:

- $f_r(i) = \{p \mid p \text{ is the content of what is said at } i\}$  (adapted from Faller, 2011)
- $[[\text{Schijnen}(p)]]^{c_i} = 1$  iff  $\forall x \in G_c: \forall w \in f_r(i): [[p]]^{c_w} = 1$  and  $G_c = \{\text{speaker}\}$  thus *schijnen* is subjective

(i.e. the speaker has reported evidence about  $p$  and in all worlds corresponding with this evidence  $p$  is true)

#### (IV) Semantics of *lijken*:

- $f_{pe}(i) = \{p \mid \text{the event described by } p \text{ is perceived at } i\}$  (adapted from Faller 2011)
- $[[\text{Lijken}(p)]]^{ci} = 1$  iff  $\forall x \in G_c: \exists w \in \max_{gs}(\cap f_{pe}(i)): [[p]]^{c,w} = 1$  and  $G_c$  (potentially) contains more than one member and is thus non-subjective  
(i.e. the speaker (the members of the group) has perceptual evidence for  $p$  and what is perceived resembles a situation in which  $p$  is true)

#### (V) Semantics of *lijkt-me*:

- $[[\text{lijkt-me}(p)]]^{ci} = 1$  iff  $\forall x \in G_c: \exists w \in \max_{gd}(\cap f_e(i)): [[p]]^{c,w} = 1$  and  $G_c = \{\text{speaker}\}$   
thus *lijkt-me* is subjective  
(i.e. speaker has inferential evidence for  $p$  and  $p$  is thus a good possibility)

## 7 Experiments

Wrap-up:

- *Schijnen* is much more restricted in distribution than *lijken*
- *Schijnen* is subjective and as such behaves as a PPI
  - *Lijkt-me* is subjective as well and displays PPI behavior
- Subjectivity as a candidate for the additional complexity

### 7.1 Acquisition (with Hannah De Mulder)

Research question:

Do subjective elements come in later than non-subjective ones?

*lijken* (DIR) > *schijnen* (HS); *lijkt-me* (I)

Issues in studies on the acquisition of evidentiality:

- Semantically complex items (Rett & Hyams 2013)
- They do not contribute the main content of the utterance
  - Potential over- or underestimation of the child's performance

Design (inspired by Jeschull & Roeper 2009):

Comparison of the child's understanding of evidentials to source-monitoring skills in two minimally different tasks.

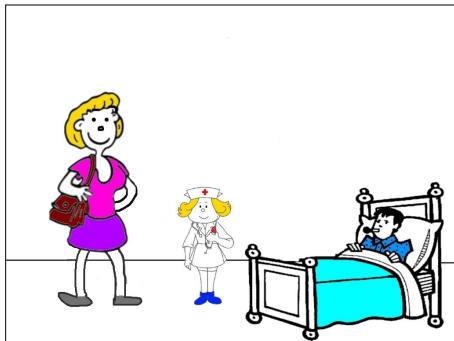
Child is asked to judge a certain course of events in the presence of conflicting sources of information (outcome is unknown to any participant).

- Which source is decisive in the child's judgment?
- Can the child be forced to use a particular source of information by adding an evidential verb to the test question? I.e. is there an additional positive (or potentially negative) value of adding an evidential verb.
- Non-linguistic question: no "correct" answer
- Linguistic question: requires you to base your answer on a particular source of information
- All children took part in both the linguistic and the non-linguistic task. The order of the tasks was counterbalanced across participants.

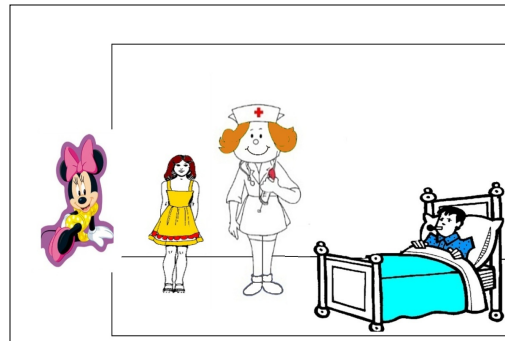
Participants: 120 six- to nine-year-old Dutch-speaking children (52 boys) divided over four age groups (six-, seven-, eight- and nine-year-olds) participated in the experiment.

Stimuli:

**Fig 1.** Example item for *lijken* and *lijkt-me*



**Fig 2.** Example item for *schijnen*



Example story *lijken*:

(28) Here you see mother and her daughter Julia. Mother is a nurse in the hospital. Today Julia has gone with her mother to the hospital. She is even dressed in a nurse's uniform. There is a patient in the hospital bed. Look, Julia is already holding the syringe.

T (linguistic): *Who lijkt to be going to give the injection?*

(interrogative flip)

T (non-linguistic): *Who is going to give the injection, you think?*

Additional sentence *lijkt-me*:

(29) *But then, Julia doesn't know where to inject the patient. Mom, who is a nurse, does know where to inject the patient.*

T (linguistic): *Who lijkt je to be going to inject the patient?* (interrogative flip)

T (non-linguistic): *Who is going to give the injection, you think?*

Example story *schijnen*:

(30) *Here you see mother and her daughter Julia. Mother is a nurse in the hospital. Today Julia has gone with her mother to the hospital. There even is a patient in the hospital bed who needs an injection.*

Minnie: *Mickey once told me how this story ends. Mother explains to Julia where to inject the patient and then Julia injects the patient.*

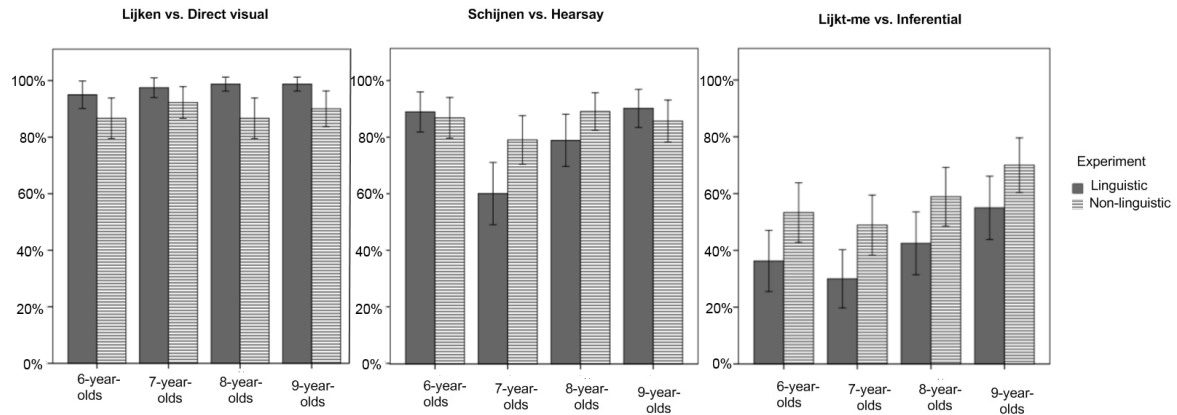
T (linguistic): *Who schijnt to be going to give the injection?* (interrogative flip)

T (non-linguistic): *Who is going to give the injection, you think?*

#### Analysis:

- Children's answers in response to the *who* questions without an evidential verb served as a baseline for the child's inclination to answer in a particular way in a situation in which she is not guided by an evidential term (see Fig. 3).
- The model shows that there is a significant effect of task  $F(5, 2) = 24.221, p < .0001$ .
  - Children score significantly higher on *lijken* (direct visual) than on the direct visual condition ( $t = -2.078 (0.013), p < .05$ , Cohen's  $d = 0.02$ ).
  - Children scored significantly lower on *lijkt-me* (inferential) than on the (non-linguistic) inferential condition ( $t = 3.502 (0.061), p < .0001$ , Cohen's  $d = 0.14$ ).
  - Children do not score differently on *schijnen* (hearsay) vs. (non-linguistic) hearsay ( $t = 1.135 (0.026), p = .256$ , Cohen's  $d = 0.009$ ).

**Fig. 3:** Mean percentage of correct answers for the children on the linguistic task compared to the mean percentage of 'correct' answers on the non-linguistic task (i.e. answers pointing to the character who is going to do it according to the emphasized source).



### Conclusion:

- Children have an explicit awareness of the evidential term *lijken* (direct evidence), but there is no evidence for children's explicit awareness of the evidential verbs *schijnen* (hearsay) and *lijkt me* (inferential).
- In fact, there is a negative effect of *lijkt me* (inferential) indicating that children make fewer inferences when answering a question that includes *lijkt-me* than when they were not guided by an evidential term in the question.
  - Does the child understand *lijkt-me* as *lijken*?

## 7.2 Processing

Question: Does the difference in semantics affect processing?

- Extra computation (subjectivity) → slows down processing on the word
- No need for the reader to evaluate → speeds up processing on the embedded proposition

Sample: 50 native Dutch adult speakers

Method: Self-paced reading

- (31) Het is Koninginnedag en de koninklijke familie brengt dit jaar een bezoek aan Den Helder. Hannah en Vera zijn daar ook. Hannah zegt tegen Vera:  
 "Maxima/SEEMS<sub><L/S></sub>nu/weer/zwanger/te zijn."

(It's Queen's Day and this year the Royal family is visiting Den Helder. Hannah and Vera are there as well. Hannah says to Vera: "Maxima/seems/now/again/pregnant/to be.")

### Results:

Main effect on region 0:  $\beta=0.023$ ,  $SE=0.008$ ,  $t=2.88$ ,  $p(\text{MCMC})<.005$ , one-tailed

Main effect on region 3:  $\beta=0.023$ ,  $SE=0.014$ ,  $t=-1.70$ ,  $p(\text{MCMC})<.05$ , one-tailed



### Conclusions:

- Longer reading times for *schijnen* than *lijken* on the verb itself
- Shorter reading times for *schijnen* than *lijken* on the embedded proposition

### Subjectivity comes at a cost:

It affects distribution, acquisition and processing  
Match between computation and processing



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