

The acquisition of the weak-strong distinction

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RUG

Outline

- The weak-strong distinction (Milsark (1977), Keenan (2002))
- The acquisition of quantification and the weak-strong distinction
- The Dutch quantifier *allemaal*
- Experimental data
- Conclusion and discussion



A formal characterization of the weak-strong distinction

- Milsark (1977):
 - (1) There are many doctors in the room
 - (2) *There are all doctors in the room

- Keenan (2002): *subclasses of English determiners*:
 - ▶ Weak dets can be characterized as intersective ones, strong dets as co-intersective:
 - (3) D is *co-intersective* (or *generalized universal*)
iff $DAB = DXY$ whenever $A - B = X - Y$, all A, B, X, Y
 - (4) D is *intersective* (or *generalized existential*)
iff for all A, B $DAB = D(A \cap B)(E)$



Conservativity and the weak-strong distinction

- Keenan (2002):
 “A function D from P_E into $[P_E \rightarrow X]$, X any set, is *conservative* iff for all $A, B, C \subseteq E$, $D(A)(B) = D(A)(C)$ whenever $A \cap B = A \cap C$ ”
- “THEOREM 5 (Keenan (1993): The set of conservative functions over E is precisely the boolean closure of the intersective together with co-intersective functions”



The weak-strong distinction & the acquisition of quantification

- Roeper & DeVilliers (1993): spreaders; misinterpretation of the quantificational domain (a more semantic based account has been proposed by Phillip (1995))



The weak-strong distinction & quantification

Geurts (2003)

- Every boy is riding an elephant
 $\langle \textit{every} \rangle [x, y : \textit{boy}(x), \textit{elephant}(y), x \textit{rides} y]$
- This is “the child’s semantic representation before pragmatic processing sets in. This representation leaves the domain of quantification undetermined . . . so that there is more elbow-room for pragmatic inferencing.”



The weak-strong distinction & quantification

Drozd (2001)

- Drozd (2001) Weak Quantifier Hypothesis
- Westerståhl (1985): Many Scandinavians have won the Nobel prize in literature
 - ▶ There are many Scandinavians that have won the Nobel prize in literature
 - ▶ Many winners of the Nobel prize in literature are Scandinavians



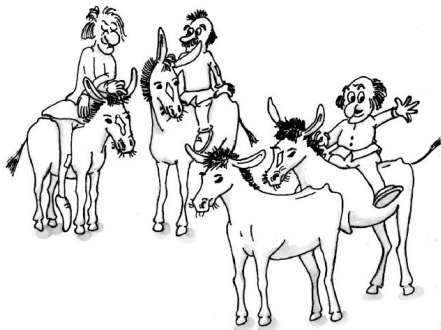
The acquisition of quantification



Is every farmer riding a donkey? (picture taken from Guasti (2002))



The acquisition of quantification



Is every farmer riding a donkey? (picture taken from Guasti (2002))

Child answer: no, not that one (pointing at the empty donkey)



The acquisition of quantification



Is every farmer riding a donkey? (picture taken from Guasti (2002))

However, also possible: yes, “many donkeys are ridden” (Smits & Hollebrandse, 2004).



The Dutch quantifier *allemaal* (1)

- Able to quantify over both subject and object:
 - (5) De jongens dragen allemaal een koffer
The boys are carrying all a suitcase
 - (6) Een jongen draagt de koffers allemaal
A boy is carrying the suitcases all



The Dutch quantifier *allemaal* (2)

- Able to occur as a weak or as a strong quantifier:
 - (7) De meisjes dansen allemaal
The girls are dancing all
 $\text{allemaal}_{strong} (A,B)$ is true iff $A - B = 0$
 - (8) Er fietsen allemaal papegaaien
There are bicycling allemaal (many) parrots
 $\text{allemaal}_{weak} (A, B)$ is true iff $|A \cap B| \geq 2$



An experimental design; predictions

- **Hypothesis:** Difficulties with understanding quantified sentences can not only be found in children unable to correctly localize the domain of the quantifier, but also in children unable to correctly interpret the domain of the quantifier (i.e. a consequent strong or weak reading)
- **Question:** Is a child able to make a distinction between a weak and/or strong use of “allemaal”?
- **Expectation:** In line with earlier research (Drozd (2001), Geurts (2003)) children prefer a weak reading, i.e. an intersective in stead of a co-intersective reading, of “allemaal”.



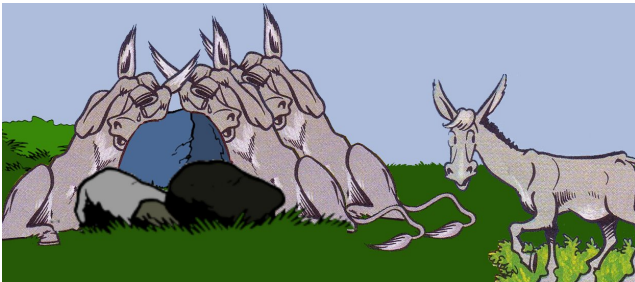
An experimental design; setup weak-strong experiment

- Condition: syntactic position of the quantifier (prenominal or floated)
- 39 subjects (aged 4 - 6)
- Method: Truth Value Judgment Task
- Total of test sentences: 18 (12 test items, 3 no-fillers, 3 yes-fillers)



An experimental design; testitems

- De ezels huilen allemaal
The donkeys cry all
“The donkeys are all crying”



- ▶ Adult answer: no, no that one
- ▶ Child answer: yes (intersective reading)



An experimental design; testitems

- Er dansen allemaal meisjes
There dance all girls
“There are dancing many girls”

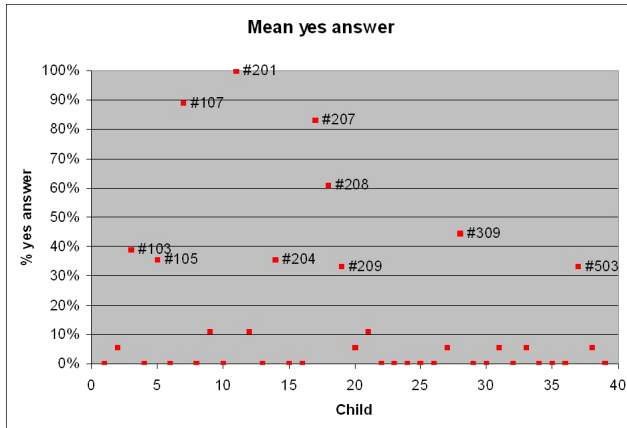


- ▶ Adult answer: yes
- ▶ Child answer: yes (intersective reading)



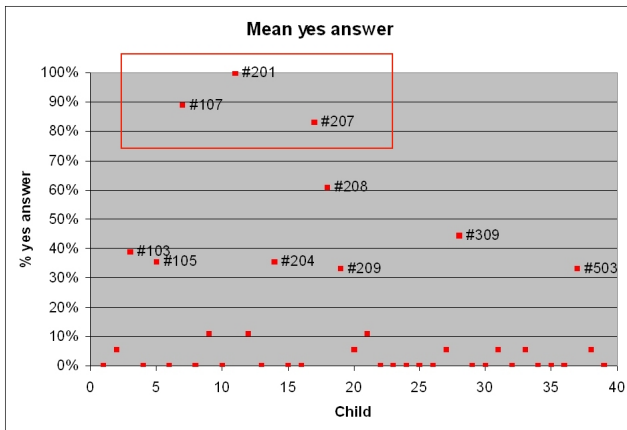
Results

- Children interpret *allemaal* always as a weak quantifier
- Children interpret *allemaal* always as a strong quantifier



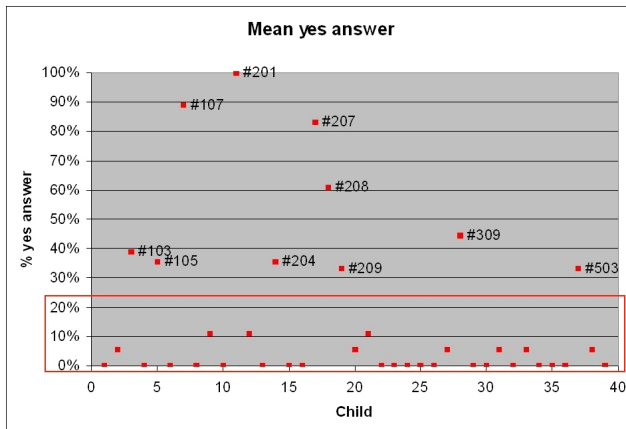
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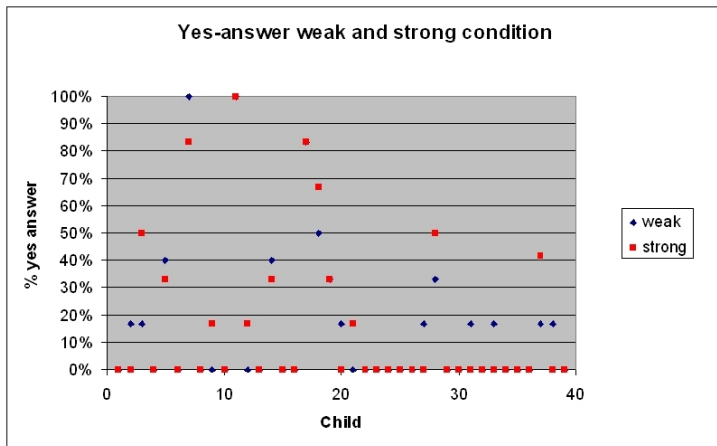
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Results

- Children interpret *allemaal* depending on its syntactic position (cf. the adult interpretation)



Results - summarized

Group	Quantifier	S/W	weak interpretation	strong interpretation
I (n =36)	allemaal	weak	9%	91%
		strong	10%	90%
	alle	strong	10%	90%
		mean:	10%	90%
II (n =3)	allemaal	weak	94%	6%
		strong	89%	11%
	alle	strong	89%	11%
		mean:	91%	9%



Conclusions

- Children obey conservativity
- Children do not distinguish intersecitivity from co-intersectivity in the case of the Dutch quantifier *allemaal*
- Summarizing, in the case of the ambiguous *allemaal* the logical component is complex, forcing adults to make a choice between intersepective and co-intersepective. In an early stage of learning how to interpret, i.e. learning the mapping model between natural language, logic and the "real" world, children avoid making this choice.



Or ... more specific

- In contradiction to suggestions made in earlier research, children do master co-intersectivity, i.e. do master the strong reading of a quantifier.

