Negated disjunctive statements: the Italian perspective

Elena Pagliarini, Maria Teresa Guasti and Stephen Crain
Disjunction under clause-mate negation
(Szabolcsi 2002, 2004)

Il De Morgan law: \neg (A \lor B) \Rightarrow (\neg A) \land (\neg B)

English, Greek, Roumanian, Bulgarian, Korean

(1) John didn’t order milk or coffee ⇒

(2) John did not order milk AND John did not order coffee. (“CONJUNCTIVE INTERPRETATION”)

Japanese, Mandarin, Hungarian, Italian, Turkish, Chinese, Russian, Serbo-Croatian, Slovak, Polish, Hungarian

(4) John didn’t order milk or coffee ⇒

(5) John did not order milk OR did not order coffee. (“DISJunctive Interpretation”)
Disjunction under clause-mate negation: The Semantic Subset Principle (Crain, Ni & Coway, 1994)

Crain (2012): OR is +PPI in Mandarin and -PPI in English

\[-(A \lor B)\]
True: \([A, \neg B], [\neg A, B], [\neg A, \neg B]\]

\[-(A \lor B)\]
True: \((\neg A, \neg B)\)

Adult Japanese, Mandarin, Turkish

Positive setting: OR is +PPI

Negative setting: OR is -PPI

English and child Japanese, Mandarin, Turkish
Japanese-speaking children  
(Goro, 2004; Goro and Akiba, 2004) 

- TVJT, 30 children (Range age 3;7 - 6;3; mean 5;3) + 10 adults  
  - John didn’t take the carrot or the pepper

**PERCENTAGE OF REJECTION**

<table>
<thead>
<tr>
<th>Context</th>
<th>Target sentence</th>
<th>% rejection (children)</th>
<th>% rejection (adults)</th>
</tr>
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<tbody>
<tr>
<td>Didn’t eat the carrot OR Didn’t eat pepper</td>
<td>Not [A or B]́₄</td>
<td>75% (45/60)</td>
<td>0% (0/20)</td>
</tr>
<tr>
<td>Didn’t eat carrot AND Didn’t eat pepper</td>
<td>Not [A or B]́₄</td>
<td>22% (13/60)</td>
<td>80% (16/20)</td>
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</table>

- Children’s reason for rejection: “because the pig did eat one of the vegetables”; “because it is only one of the vegetables that the pig didn’t eat”.

(Chinese: Jing, Crain, Hsu, 2005; Russian: Verbuk, 2007; Turkish: Geckin et al., 2015)
Children vs. adults

- Japanese children adhere to De Morgan’s law and assign a “conjunctive interpretation”. Japanese children = English children and English adults

- Japanese adults do not adhere to De Morgan’s law and assign a “disjunctive interpretation”.
Study on Italian: Is OR +PPI?

What do adults do?

Regardless of adults, Italian-speaking children are predicted to initially analyze negation as taking scope over disjunction (- PPI)

Method: Modeled on Goro’s experiment
The experiment: TVJT
The experiment: TVJT

I part (story)

II part (TVJT)
Experiment

Conditions

(1)a. Il gatto non ha mangiato la carota o/e il peperone.
   b. The cat didn't eat the carrot OR/AND the green pepper.

2 + 2 Items
Context: the cat ate one of the vegetables, but not both/ silver medal).

2+2 Items
Context: the cat didn’t eat both vegetables/sad face).

4 fillers (Sentence: Il gatto ha mangiato tutto; The cat ate everything/gold metal).
Predictions: if OR +PPI in adult Italian

• Silver medal condition: \( \neg A \lor B \)
  – Children should reject the sentence (OR \( \neg \)PPI)
  – Adults should accept it

• Sad face: \( \neg A \lor B \)
  – Children should accept the sentence (OR -PPI)
  – Adults reject (via implicature)
Predictions: if OR – PPI in adult Italian

- Silver medal condition: \( \overline{A} \text{ and } B \)
  - Children should reject the sentence
  - Adults should reject it

- Sad face: \( \overline{A} \text{ and } B = \overline{A} \text{ and } \overline{B} \)
  - Children should accept the sentence
  - Adults should accept the sentence
**RESULTS**

19 children (Range 4;7 – 6;0, mean age 5;2, SD 6;5) + 13 adults
5 children not included because they always responded ‘yes’; 2 children did not understand the system of the rewards.

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<tr>
<td>Didn’t eat carrot OR Didn’t eat pepper</td>
<td>Not [A or B]ₙ</td>
<td>39,5% (15/38)</td>
<td>0%</td>
</tr>
<tr>
<td>SILVER MEDAL CONDITION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¬[A V ¬B]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Didn’t eat carrot AND Didn’t eat pepper</td>
<td>Not [A or B]ₙ</td>
<td>34% (13/38)</td>
<td>100%</td>
</tr>
<tr>
<td>SAD FACE CONDITION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¬[A ^ ¬B]</td>
<td></td>
<td></td>
<td></td>
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“OR” REJECTION OF SILVER MEDAL CONDITION
Children’s reason for rejection:
“because the puppet said that he didn’t eat this and this, but he ate only one”.

“not A and B = neither hold”
# Japanese and Italian

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<td>75% (45/60) JAP</td>
<td>0% (0/20) JAP</td>
</tr>
<tr>
<td></td>
<td>Not [A or B]ₜ</td>
<td>39.5 (15/38) IT</td>
<td>0% (0/26) IT</td>
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Children data

• Looking at individual performance in EXP I:

• Silver medal:
  – Adults: all accept
  – 10 children accept (like adults)
  – 6 children reject
  – 3 children mixed
Summary

Adult
“Disjunctive interpretation” → Italian is like Mandarin and Japanese
(1) John didn’t order a coke or a coffee.
(2) John did not order a coke OR did not order a coffee.

Children
Divided into 2 groups:
– a group assigns a “conjunctive interpretation” (in line with the Semantic Subset Principle and according to De Morgan Law); (6 children)

– a group assigns a “disjunctive interpretation” and is adult-like. (10 children)
  – «And» and «or» are distinct

Why are Italian children differently than Japanese or Mandarin children?
Is the presence of «and» and «or» in the same experiment affecting children’s performance

- 16 adults
- 19 children (range 4;10 – 5;7, mean age 5;3, SD 3,03)

- Only «or», 4 items per condition (silver medal and sad face)
Language acquisition: Italian-speaking children

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<tr>
<td>Didn’t eat carrot OR Didn’t eat pepper</td>
<td>¬A ∨ ¬B</td>
<td>Not [A or B],</td>
<td>50 %</td>
</tr>
<tr>
<td>Didn’t eat carrot AND Didn’t eat pepper</td>
<td>¬A ∧ ¬B</td>
<td>Not [A or B],</td>
<td>41 %</td>
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**Silver medal**
- Adults: 1 always reject
- 10 children accept and are adult-like
- 8 children reject
- 1 child mixed
**Language acquisition: Italian-speaking children**

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<td>Didn’t eat carrot OR Didn’t eat pepper</td>
<td>¬A ∨ ¬B</td>
<td>50 %</td>
<td>8 %</td>
</tr>
<tr>
<td></td>
<td>Not [A or B]s</td>
<td>39.5% EXP1</td>
<td>0% EXP1</td>
</tr>
<tr>
<td>Didn’t eat carrot AND Didn’t eat pepper</td>
<td>¬A ∧ ¬B</td>
<td>41 %</td>
<td>79 %</td>
</tr>
<tr>
<td></td>
<td>Not [A or B]s</td>
<td>34% EXP1</td>
<td>100% EXP1</td>
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Silver medal  
Adults: 1 always reject  
10 children accept and are adult-like  
8 children reject  
1 child mixed
Summary

- SILVER MEDAL: adults data: OR is +PPI in Italian

- Children: one group of Italian children is adult like

- One group is adopting –PPI value for OR
ITALIAN VS. JAPANESE

Results of Italian speaking children are not as sharp as the results of Japanese speaking children.

Possible explanations:
✓ Developmental explanation.
✓ Cross-linguistic difference, something peculiar about Italian.
We noticed a possible effect of tense, which turned out to be something else
Experiment with adults: ¬A V B

• Betting mode with past tense (20 adults)
• Prediction with future (21 adults)

• SET UP for the betting mode:
• Presentation of the relevant items and the possible actions
• Scenario hidden. Something happens.
• Bet on what has happened using the past
• «the child has not receive the orange or the melon»
• Display of the scenario. Verification
The elephant has not received chocolate or nuts.
Experiment with adults: \neg A \lor B

- SET UP for the prediction mode:
- Presentation of the relevant items and the possible actions
- Prediction using future: «the child will not receive the orange or the melon»
- Scenario hidden. Something happens
- Display of the scenario. Verification
Material and methods

• 20 adults for the prediction mode and 20 for the betting mode

• 6 items per conditions
  – 6 not A or B (silver medal)
  – 6 not A or B (sad face)
<table>
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<th>Outcome / Medal</th>
<th>Target sentence</th>
<th>% rejection Betting</th>
<th>% rejection Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Didn’t eat carrot OR Didn’t eat pepper</td>
<td>$\neg A \lor \neg B$</td>
<td>Not $[A \lor B]_s$</td>
<td>85%</td>
</tr>
<tr>
<td>Didn’t eat carrot AND Didn’t eat pepper</td>
<td>$\neg A \land \neg B$</td>
<td>Not $[A \land B]_s$</td>
<td>7 %</td>
</tr>
</tbody>
</table>
Discussion: adults

• The high rejection of «not A or not B» is not expected if OR + PPI
• But there are some intervention/licensing effects noticed by Szabolczi (2002)

• Janos nem hitva **fet/** gyakran Katit vagy Marit
• *John didn’t always/often call Kati or Mary*
• **Not> always/often>or**

• Which holds for Italian:
• Gianni non ha **spesso** chiamato Katia o Maria

• One may assume that prediction or betting modes introduce another operator that shields OR
Another similar fact

• «Lui si era imposto di non leggere più alcun quotidiano o di ascoltare la radio» (from L’ultimo custode di Martigli 2013)
• *He obliged himself of not reading any newspaper or listening to the radio*

• Not A and not B

• «Lui si era imposto di non mangiare il gelato o di bere la birra»
• *He obliged himself of not eating ice-cream or drink bear*

• Not A or not B
Discussion: children

• Why many children are adults? Negative concord

• Il pupazzo non ha mangiato né la carota né il peperone

• The puppet didn’t eat neg the carrot neg the pepper

• Not A and not B
• **Non** penso che Gianni parli inglese o tedesco
  • *I don’t think that J. speaks English or German*
  • «I think that J. doesn’t speak English or German»

• Not A and not B

• Penso che Gianni **non** parli inglese o tedesco
  • *I think that J. doesn’t speak English or German*
  • «I think that J. doesn’t speak English or German»

• Not A or not B
Conclusion

• Italian OR has the +PPI value
• There is evidence that some children start with OR having –PPI value (in compliance with the Subset principle)

• Cross-linguistic difference: negative concord is a trigger for +PPI

• OR can scope below negation if an operator shields it or some element needs to be licensed