More on Words

MY MOTHER ALWAYS WISHED I HAD GONE FURTHER IN LIFE.

YOU MEAN "FARTHER", DON'T YOU?

NO, I'M SURE IT WAS MY MOTHER.
Chapter 7

LDER
Lexical Development across languages

- Is lexical development the same for all languages?

- Language specific vs language universal patterns

- Compare English vs Italian, from 8-30 months
Universal Stages of Growth

- **Routines and Word Games**
  - Expressive vocabulary of 0-10 words
  - Categories like noun/verb not useful
  - Speech acts (performatives): vocal conventions used to achieve a social function
  - “bye”; “uh-oh”; “hi”

- **Reference**
  - Expressive vocabulary of 50-200 words
  - Most words are nominals; words that establish reference

- **Predication**
  - Verbs and adjectives
  - Reflect ability to encode relational meanings
  - Begin to increase in number after about 100 words

- **Grammar**
  - Grammatical function words
  - Growth after about 300-500 words
  - Early use may reflect memorized routines
  - After 400 words may reflect emergence of grammar
Really Universal?

- Changes in composition of vocabulary hypothesized to reflect universal developments in logical and conceptual substrates of meaning
  - One argument: nouns must precede verbs in development because nouns are easy to grasp; verbs are more difficult to perceive
- Some studies of Korean and Chinese suggest that verbs may develop earlier than nouns in these languages
Current Questions

- Do verbs necessarily start to develop relatively late? In all languages?
  - What about a language for which verbs may be more salient than in English? For example, Italian.

- What is the relationship between vocabulary size and grammatical function words?

- How to address these questions?
The CDI

- **MacArthur Communicative Development Inventory**
  - Parental report checklist
  - Developed for English; adapted for Italian

- **Two scales:**
  - **Words and Gestures (infant scale; 8-16 months)**
    - Part I: Checklist of 396 words
      - Parents indicate if the child understands the word; understands and produces the word
    - Part II: checklist of 63 communicative gestures
      - gestures for communication, play, imitation of parents and other adults, and activities with objects
  - **Words and Phrases scale (toddler scale; 16-30 months)**
    - Part I: Assesses productive vocabulary (content and function words)
      - 680 words (English); 670 words (Italian)
    - Part II: Grammatical Development
      - use of possessives, plurals, and tenses, etc.
Word Categories

- **Nominals (generally)**
  - Common nouns, proper nouns, places to go, sound effects (used to refer to animals, etc.)

- **Common nouns (specifically)**
  - Words that adults use to refer to concrete objects (i.e., exclude names for people, sound effects, places to go)

- **Proper nouns (specifically)**
  - Proper nouns and terms for people

- **Sound effects**
  - (vroom, meow)

- **Routines**
  - “hi” “bye” words referring to events: “breakfast” “nap”
  - Familiar commands (“don’t”)

- **Verbs**
  - Action words (uninflected)

- **Adjectives**
  - Descriptive words

- **Grammatical Function Words**
Who participated?

- English speaking children
  - 659 infants from 8-16 months of age
  - 1001 toddlers from 18-30 months of age

- Italian speaking children
  - 195 infants from 8-16 months of age
  - 386 toddlers from 16-30 months of age

- Equal numbers of boys and girls in each sample
- Across a spectrum of socio-economic levels
- Children were excluded if they had:
  - medical/neurological problems
  - Substantial exposure to a second language
Infants from 8-16 months

- Comprehension:
  - No differences between English and Italian infants

- Production:
  - Italian-speaking group lagged behind English-speaking group

- Overall, production lower than comprehension

- Huge individual differences (comprehension: mean 105, range 0-396)

Figure 7.1 Growth of comprehension & production vocabulary from 8–16 months.
Toddlers from 16-30 months

- Expressive vocabulary
- English-speaking children slightly ahead of Italian-speaking children
- Large individual differences
  - (at 24 months, mean of 300 words, range of 50-600)

*Figure 7.2* Vocabulary size as a function of age from 18–30 months in English & Italian children.
Making a fair comparison

- Due to differences in growth across English and Italian
- Huge variability in vocabulary size at any given age

Looking at vocabulary growth by age may be unfair
- Look at vocabulary growth by size of child’s vocabulary – *not* age of child
Italian Verb Advantage?

- Italian is a good test case to try to find out about early onset of verbs
  - Allows extensive word order variation
    - Variation in position helps children identify words
  - Pro-drop language; ~70% subjects omitted
    - Verbs often found in salient sentence initial or final positions
  - Rich verbal morphology
    - Italian children sensitive to verb agreement at an early age
Cross-linguistic differences in types of words produced

- Divide children into groups based on vocabulary size
- Italians seem to have an advantage for nominals (broadly defined), but not verbs

| Table 7.1 Composition of production vocabulary from 18–30 months as a function of language and vocabulary size |
|---|---|---|---|---|---|---|
| Variable | Language | Number of words in production vocabulary |
| | | 1–5 | 6–10 | 11–20 | 21–50 | >50 | Total |
| % Nominals | English | 80.4 | 75.4 | 70.7 | 72.8 | 73.6 | 75.5 |
| | Italian | 91.0 | 84.5 | 74.7 | 70.4 | 72.6 | 82.0 |
| % Common nouns | English | 16.4 | 22.9 | 32.9 | 44.5 | 54.1 | 30.2 |
| | Italian | 20.6 | 28.1 | 31.4 | 36.5 | 46.2 | 28.8 |
| % People | English | 32.3 | 24.8 | 16.5 | 10.7 | 6.5 | 21.1 |
| | Italian | 35.1 | 35.4 | 19.6 | 16.9 | 11.1 | 27.6 |
| % Sound effects | English | 30.7 | 27.1 | 20.4 | 15.5 | 7.7 | 22.7 |
| | Italian | 35.3 | 21.0 | 23.6 | 16.5 | 11.8 | 25.3 |
| % Routines | English | 14.2 | 19.5 | 18.7 | 15.0 | 9.1 | 15.5 |
| | Italian | 7.8 | 13.3 | 20.7 | 20.1 | 16.4 | 13.8 |
| % Verbs | English | 0.5 | 1.1 | 2.1 | 2.7 | 6.8 | 2.1 |
| | Italian | 1.3 | 0.7 | 2.8 | 4.1 | 4.5 | 2.3 |
| % Adjectives | English | 1.7 | 0.5 | 2.7 | 4.3 | 4.8 | 2.5 |
| | Italian | 0.0 | 0.4 | 0.5 | 1.0 | 2.1 | 0.5 |
| % Predicates (Verb + Adj) | English | 2.2 | 1.5 | 4.8 | 7.0 | 11.6 | 4.6 |
| | Italian | 1.3 | 1.0 | 3.3 | 6.0 | 6.6 | 2.8 |
| % Function words | English | 3.2 | 3.6 | 5.8 | 5.2 | 5.4 | 4.4 |
| | Italian | 0.0 | 1.1 | 1.3 | 3.5 | 4.0 | 1.4 |
Developmental Changes: Nouns and Verbs

- 45% is proportion of entire checklist that is common nouns; 14% for verbs
- If acquisition of nouns (or verbs) were constant or random – proportion should be flat line
- Common nouns increased in importance with vocabulary growth from 8-16 months
- Verbs stayed flat
How much variation is there?

- Referential Style – use of nouns
- Similar developmental and stylistic factors at work for both languages
Really no Italian verb advantage?

- CDI list contains fewer verbs (14%) than nouns (45%) – so a difference between nouns and verbs for total vocabulary not surprising.

- Compute
  - Noun opportunity score (nouns reported / 182)
  - Verb opportunity score (verbs reported / 55)

- Nouns still grow faster than verbs – in both languages!

Figure 7.5 Percent of noun vs. verb opportunities acquired in expressive vocabulary from 8–16 months in English & Italian children.
Production summary

- Nouns and verbs grow (occupy greater proportion of vocabulary as vocabulary size increases)

- What shrinks?
  - Proper nouns
  - Sound effects
  - Routines

- Proper nouns, routines shrink more in English (cultural differences?)

- In both groups, early growth of nouns, consistent with developmental sequence from reference stage to predication stage

![Table 7.1 Composition of production vocabulary from 18–30 months as a function of language and vocabulary size](image)
Receptive Vocabulary: 8-16 months

- No verb advantage in production

- What about in comprehension?

- For common nouns:
  - Proportion larger for comprehension than production
  - Italian-speaking children ahead of English-speaking children

- For verbs:
  - Italian-speaking children ahead of English-speaking children (by a little bit)
Receptive Vocabulary: 8-16 months

- Nouns outnumber verbs even in comprehension for both languages.

- Supports developmental sequence from nouns to verbs in both languages.

- Small advantage for verbs in Italian due to just a few specific words?

Figure 7.6 Percent nouns vs. verbs in comprehension for English vs. Italian infants from 8–16 months.
First produced words in English and Italian

- (percentage of children in sample who produced a word, rank-ordered)
- Non-nominals: *
- Verbs capitalized

English
- No verbs in top 50
- Most of top ten are routines, sound effects, names for people

Italian
- One verb in top 50
- Most of top ten are routines, sound effects, names for people

If all non-nominals treated as verbs, then Italian actually has fewer “verbs” in top 10 words

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Table 7.3 First 50 words in production for English vs. Italian infants

<table>
<thead>
<tr>
<th>Rank</th>
<th>English Word</th>
<th>% sample</th>
<th>Italian Word</th>
<th>Translation</th>
<th>% sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>daddy</td>
<td>54.9</td>
<td>mamma</td>
<td>mommymommy</td>
<td>49.7</td>
</tr>
<tr>
<td>2.</td>
<td>mummy</td>
<td>52.9</td>
<td>papapapay</td>
<td>46.7</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>bye</td>
<td>43.1</td>
<td>bau-bau (dog sound)</td>
<td>41.5</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>*bi</td>
<td>39.3</td>
<td>*poppa (food/mealtime)</td>
<td>36.9</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>*uh-oh</td>
<td>35.5</td>
<td>nonna grandma</td>
<td>32.8</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>bau-bau</td>
<td>31.9</td>
<td>brum-brum (vehicle sound)</td>
<td>28.7</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>ball</td>
<td>30.9</td>
<td>acqua water</td>
<td>27.2</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>dog</td>
<td>30.6</td>
<td>nonno grandpa</td>
<td>23.1</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>*no</td>
<td>28.5</td>
<td>*nanna (sleep/bedtime)</td>
<td>21.5</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>bottle</td>
<td>25.2</td>
<td>no</td>
<td>21.5</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>woof</td>
<td>24.9</td>
<td>miao (cat sound)</td>
<td>21.0</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>baby</td>
<td>24.6</td>
<td>*grease thanks</td>
<td>20.5</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>*yum-yum</td>
<td>24.1</td>
<td>*ciao hi/bye</td>
<td>17.9</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>grr</td>
<td>23.5</td>
<td>*caccu-settete (hiding game)</td>
<td>16.9</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>kitty</td>
<td>21.8</td>
<td>palla ball</td>
<td>16.4</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>vroom</td>
<td>20.2</td>
<td>muuh (cow sound)</td>
<td>15.9</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>book</td>
<td>19.9</td>
<td>*non c'e' più (it is no more)</td>
<td>14.9</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>bird</td>
<td>19.6</td>
<td>scarpe shoes</td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>duck</td>
<td>18.8</td>
<td>cocode (rooster sound)</td>
<td>13.8</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>balloon</td>
<td>18.4</td>
<td>bebel-bebel (sheep sound)</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>cat</td>
<td>18.2</td>
<td>(child's own name)</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>*night-night</td>
<td>17.1</td>
<td>ih-oh (donkey sound)</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>quick</td>
<td>17.0</td>
<td>*bimbo child</td>
<td>12.3</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>shoe</td>
<td>17.0</td>
<td>*prento (hello on phone)</td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>meow</td>
<td>16.6</td>
<td>*bun boom</td>
<td>11.3</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>banana</td>
<td>16.3</td>
<td>grr (lion sound)</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>*hot</td>
<td>16.0</td>
<td>qua-qua (duck sound)</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>juice</td>
<td>15.4</td>
<td>(babysitter's name)</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>eye</td>
<td>14.8</td>
<td>*cic-cic (bird sound)</td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>grandma</td>
<td>14.3</td>
<td>*si yes</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>moo</td>
<td>14.2</td>
<td>*tutti (train sound)</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>*thank-you</td>
<td>14.0</td>
<td>*zitto hush/quiet</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>*up</td>
<td>14.0</td>
<td>*(fare) popo/pipi (make/pee/pee)</td>
<td>9.7</td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>cookie</td>
<td>13.5</td>
<td>clop-clop (horse sound)</td>
<td>9.2</td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>nose</td>
<td>13.5</td>
<td>*bua hurt/owie</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>smooch</td>
<td>13.4</td>
<td>(dare) toto (give)</td>
<td>8.2</td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>cracker</td>
<td>12.3</td>
<td>*mio my/mine</td>
<td>8.2</td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>grandpa</td>
<td>12.3</td>
<td>pane bread</td>
<td>8.2</td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>*shh</td>
<td>12.0</td>
<td>biscotto cookie</td>
<td>7.7</td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>bath</td>
<td>11.8</td>
<td>cane dog</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>keys</td>
<td>11.8</td>
<td>ciuccio pacifier</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>bubbles</td>
<td>11.4</td>
<td>*zio uncle</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>*down</td>
<td>11.4</td>
<td>latte milk</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>car</td>
<td>11.2</td>
<td>orologio watch/clock</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>*yes</td>
<td>11.0</td>
<td>zia aunt</td>
<td>6.2</td>
<td></td>
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<tr>
<td>46.</td>
<td>cheese</td>
<td>10.9</td>
<td>banana banana</td>
<td>5.6</td>
<td></td>
</tr>
<tr>
<td>47.</td>
<td>bear</td>
<td>10.7</td>
<td>*basta enough/stop</td>
<td>5.6</td>
<td></td>
</tr>
<tr>
<td>48.</td>
<td>*hello</td>
<td>10.6</td>
<td>bambola dell</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>49.</td>
<td>fish</td>
<td>10.4</td>
<td>*DARE to give</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>50.</td>
<td>*allgone</td>
<td>10.3</td>
<td>gatto cat</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>51.</td>
<td>hat</td>
<td>10.3</td>
<td>melo apple</td>
<td>5.1</td>
<td></td>
</tr>
</tbody>
</table>

* non-nominal according to Cognik & Choi; bold = verb
**First comprehended words in English and Italian**

- (percentage of children in sample who comprehended a word, rank-ordered)
- Non-nominals: *
- Verbs capitalized

**English**
- Some verbs in top 50
- Most of top ten are routines, sound effects, names for people

**Italian**
- Some verbs in top 50
- Most of top ten are routines, sound effects, names for people

**If all non-nominals treated as verbs, then Italian actually has fewer “verbs” in top 10 words**
For young children (8-16 months)

- Both languages develop similarly
  - Despite cross-linguistic differences in input and salience of verbs
  - First words are sound effects, nouns, routines, names for people
  - Nouns predominate and grow fast, in comprehension and production, in both languages
  - Verbs emerge earlier and grow faster in comprehension than production – but are consistently outnumbered by nouns
  - Grammatical function words are very rare among first words
Toddlers (16-30 months)

- Examined four word categories
  - Common nouns (~40% of list)
    - Animals, toys, food and drink, clothing, body parts, household objects, furniture, rooms
  - Predicates (~24% of list)
    - Verbs and adjectives
  - Closed-class words (~14% of list)
  - Social terms (~10% of list)
    - Sound effects, names for people, routines
English-speaking children

- Preponderance of common nouns
- Slow growth of predicates
- Rarity of closed-class words
- Sharp, non-linear drop in social words

**Figure 7.7a** Vocabulary composition for English children from 18–30 months.
Italian-speaking children

- Preponderance of common nouns
- Slow growth of predicates
- Rarity of closed-class words
- Sharp, non-linear drop in social words

Figure 7.7b  Vocabulary composition for Italian children from 18–30 months.
English and Italian are similar

*Figure 7.7a* Vocabulary composition for English children from 18–30 months.

*Figure 7.7b* Vocabulary composition for Italian children from 18–30 months.
Common Nouns

- Similar shape of growth curve in English and Italian
- Develop for English-speaking children faster
- Italian-speaking children catch up, and even slightly overtake the English speakers

*Figure 7.8* Common nouns as a proportion of total vocabulary size (dotted line = checklist ceiling).
Predicates

- English-speaking children enjoy early advantage
- Italian-speaking children catch up
- No differences after about 100 words

Figure 7.9  Predicates as a function of total vocabulary size (dotted line = checklist ceiling).
What about just verbs?

- Slight advantage for English-speaking children
- Contrary to predictions of a verb advantage in Italian

Figure 7.10  Verbs as a function of total vocabulary size (dotted line = checklist ceiling).
Social Terms

- Italian-speaking children have advantage in social terms (for 7 of 8 age categories)

- Could reflect cultural difference
  - Italian-speaking children may be closer to extended family
    - More relatives to name
    - More opportunities for routines

Figure 7.11  Social terms as a proportion of total vocabulary size (dotted line = checklist ceiling).
Closed-class Items

- Italian-speaking children ahead of English-speaking children at most vocabulary sizes
- English-speaking children catch up at about 600 words

Figure 7.12 Closed-class words as a proportion of total vocabulary size (dotted line = checklist ceiling for English (15%) and Italian (13.7%)).
Summary for Toddlers

- **Nouns and verbs**
  - Small differences favoring English-speaking children
  - Does not support prediction of a verb advantage in Italian!

- **Social words**
  - Italian-speaking children have larger repertoire

- **Closed-class words**
  - Small advantage for Italian-speaking children
Conclusions

- **Nouns vs verbs**
  - No evidence for earlier emergence of verbs or predicates in Italian compared to English
  - Slight advantage in English for nouns and verbs may reflect cultural differences

- **Function words**
  - Rare in both languages early (<200 words)
  - Growth correlated with overall vocabulary size
    - Linear growth in Italian
    - Non-linear growth in English

- **Differences between English/Italian (CDI) and Korean/Chinese (free production) may reflect methods; testing Korean with CDI revealed similar pattern as for English and Italian**
  - Free speech vs. parental checklist may reflect what children prefer to use, not what they are able to use
Advice for paper