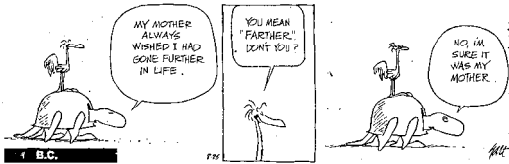# More on Words

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 referrring 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)
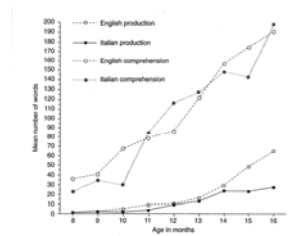
Figure 7.1 Growth of comprehension & production vocabulary from 8-16 months.

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)
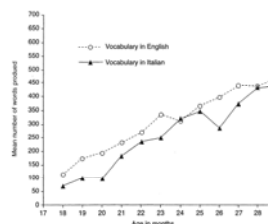
Figure 7.2 Vocabulary size as a function of age from 16-30 months in English & Italian children.

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

---

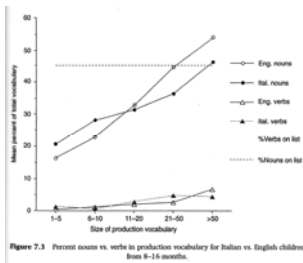## Cross-linguistic differences in types of words produced

- 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
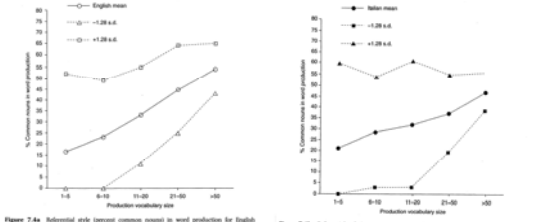
Variable	Language	Number of words in production vocabulary					
		1–5	6–10	11–20	21–50	>50	Total
% Nominals	English	80.6	75.4	70.7	72.8	73.6	75.5
	Italian	91.0	84.5	74.7	70.4	72.6	82.0
% Common nouns	English	16.4	22.9	32.9	44.5	54.1	30.2
	Italian	20.6	28.1	31.4	56.5	66.2	28.8
% People	English	32.3	24.8	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	3.1	3.7	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
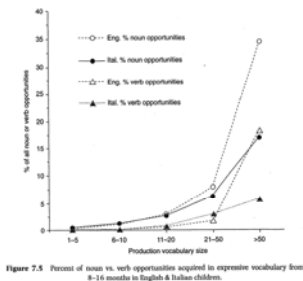
- Verbs stayed flat

Figure 7.3 Percent nouns vs. verbs in production vocabulary for Italian vs. English children from 8-16 months.

How much variation is there?

Figure 7.4a Referential style (percent common nouns) in word production for English children 8-16 months.

Figure 7.4b Referential style (percent common nouns) in Italian children from 8-16 months.

- 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

Variable	Language	Number of words in production vocabulary					
		1–5	6–10	11–20	21–50	>50	Total
% Nominals	English	80.6	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	56.5	66.2	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	3.1	3.7	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

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)

Table 7.2 Composition of receptive vocabulary from 8–16 months as a function of language and vocabulary size

Variable	Language	Number of words in receptive vocabulary						
		1–20	21–50	51–100	101–150	151–200	>200	Total
% Nominals	English	60.4	62.6	61.2	63.2	61.4	61.8	61.8
	Italian	66.8	67.0	63.7	64.2	60.4	60.7	63.8
% Common nouns	English	22.0	37.2	44.2	48.6	47.5	48.4	41.5
	Italian	31.7	44.5	47.0	49.2	47.8	48.2	45.2
% People	English	31.5	14.0	8.2	5.4	4.7	4.1	11.1
	Italian	29.4	14.8	8.6	6.4	4.8	4.0	10.9
% Sound effects	English	6.2	8.8	5.2	4.8	4.3	3.7	5.6
	Italian	5.1	7.0	5.4	4.5	3.7	3.5	4.9
% Routines	English	27.3	18.6	13.1	9.8	8.6	6.6	16.1
	Italian	25.2	18.7	12.5	9.9	8.4	6.4	13.3
% Verbs	English	6.8	10.0	14.6	15.0	16.6	16.0	13.2
	Italian	6.9	10.8	17.6	17.7	20.0	17.5	15.3
% Adjectives	English	2.8	5.2	6.7	6.9	7.2	7.8	6.1
	Italian	0.5	1.6	3.0	4.4	5.5	6.5	3.6
% Predicates (Verb + Adj)	English	9.7	15.2	21.3	21.9	23.9	23.8	19.3
	Italian	7.4	12.4	20.6	22.1	25.5	24.1	19.0
% Function words	English	2.5	3.6	4.1	4.9	5.8	7.1	4.5
	Italian	0.6	1.9	3.2	3.5	5.4	8.0	3.7

Receptive Vocabulary: 8-16 months

- Nouns outnumber verbs even in comprehension for both languages

- Supports developmental sequence from nouns to verbs in both languages

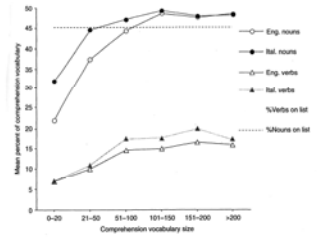- Small advantage for verbs in Italian due to just a few specific words?

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

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

Rank	English		Italian		
	Word	% sample	Word	Translation	% sample
1.	daddy	54.9	mamma	mommy	69.7
2.	mommy	52.9	papa	daddy	66.7
3.	*bye	43.1	bau-bau	(dog sound)	61.1
4.	*hi	39.5	*pappa	(food/mealtime)	56.9
5.	*uh-oh	35.5	nonna	grandma	52.8
6.	baa-baa	31.9	brum-brum	(vehicle sound)	28.7
7.	ball	30.9	acqua	water	27.2
8.	dog	30.6	nonno	grandpa	23.1
9.	*no	28.5	*nanna	(sleep/bedtime)	21.5
10.	bottle	25.2	no	no	21.5
11.	woof	24.9	miao	(cat sound)	21.0
12.	baby	24.6	*grazie	thanks	20.3
13.	*yum-yum	24.1	*ciao	hi/bye	17.9
14.	grr	23.5	*cucu-settete	(hiding game)	16.9
15.	kitty	21.8	palla	ball	16.4
16.	vroom	20.2	mmoh	(cow sound)	15.9
17.	book	19.9	*no-no	(no more)	14.9
18.	bird	19.6	scarpe	shoes	14.4
19.	duck	18.8	coccode	(rooster sound)	13.8
20.	balloon	18.4	heh-heh	(sheep sound)	12.8
21.	cat	18.2	(child's own name)		12.8
22.	*night-night	17.1	th-th	(donkey sound)	12.8
23.	quack	17.0	bimbo	child	12.5
24.	shoe	17.0	*pronto	(hello on phone)	11.8
25.	meow	16.6	*bum	boom	11.3
26.	banana	16.3	grr	(lion sound)	10.8
27.	*hot	16.0	qua-qua	(duck sound)	10.8
28.	juice	15.6	(babysitter's name)		10.1
29.	eye	16.9	cip-cip	(bird sound)	10.1
30.	grandma	14.3	*si	yes	10.1
31.	moo	14.2	tutto	(train sound)	10.1
32.	*thank-you	14.0	*zitto	hush/quiet	10.1
33.	*up	14.0	(her) pappo	(make) pee/poo	9.7
34.	cookie	13.5	clip-clap	(horse sound)	9.2
35.	nose	13.5	bua	hurt/ouch	8.7
36.	*ouch	13.4	(daro) tato	(give) spanking	8.2
37.	cracker	12.3	auto	my/mine	8.2
38.	grandpa	12.3	pane	bread	8.2
39.	*shh	12.0	biscotto	cookie	7.7
40.	ball	11.8	cane	dog	7.2
41.	keys	11.8	ciuccio	pacifier	7.2
42.	bubbles	11.4	zio	uncle	7.2
43.	*down	11.4	latte	milk	6.7
44.	car	11.2	orologie	watch/clock	6.7
45.	*yes	11.0	sedi	seat	6.2
46.	cheese	10.9	banana	banana	5.6
47.	bear	10.7	treno	enough/stop	5.6
48.	*hello	10.6	bambola	doll	5.1
49.	fish	10.4	*DARE	to give	5.1
50.	*allgone	10.3	gatto	cat	5.1
51.	hat	10.3	mela	apple	5.1

* non-nominal according to Gopnik & Choi; bold = verb

Table 7.4 First 50 words in comprehension from 8–16 months for English vs. Italian infants

Rank	English		Italian		
	Word	% sample	Word	Translation	% sample
1.	mommy	95.0	mamma	mommy	91.3
2.	daddy	93.5	papa	daddy	88.2
3.	*bye	88.6	(child's own name)		82.6
4.	*no	88.4	*ciao	hi/bye	82.6
5.	*peekaboo	84.3	*pappa	(food/mealtime)	81.1
6.	bath	76.2	*cucu-settete	(hiding game)	81.0
7.	ball	76.2	acqua	water	79.0
8.	bottle	75.0	*no	no	77.9
9.	*hi	74.0	palla	ball	75.9
10.	*allgone	71.9	bau-bau	(dog sound)	75.6
11.	dog	70.8	nonna	grandma	75.6
12.	book	68.7	cane	dog	74.9
13.	*night-night	68.5	biberon	bottle	71.8
14.	diaper	67.4	telefono	telephone	70.3
15.	*KISS	66.2	*bravo	good	67.7
16.	*uh-oh	65.1	nonno	grandpa	66.7
17.	*pattycake	62.6	scarpe	shoes	66.2
18.	juice	61.9	*BERE	to drink	65.4
19.	shoe	61.9	miao	(cat sound)	64.5
20.	baby	61.6	latte	milk	64.1
21.	grandma	61.3	latte	(sleep/bedtime)	63.6
22.	outside	61.0	*nanna	mouse	63.4
23.	car	60.1	bimba	hand	63.1
24.	*EAT	59.7	banba	(enough/stop)	62.6
25.	kitty	59.8	pane	bread	62.6
26.	*DRINK	58.5	(her) bagno	(have/do) bath	62.1
27.	keys	58.1	gatto	cat	62.1
28.	*DON'T	55.8	bimbo	child	60.5
29.	comb	55.4	*DARE	to give	59.5
30.			*MANGIARE	to eat	59.1
31.	*HUG	54.9	piede	foot	59.0
32.	banana	54.4	*BACIARE	to kiss	58.4
33.	cookie	54.2	*BALLARE	to dance	57.9
34.	bathtub	53.2	automobile	car	57.9
35.	balloon	52.9	*non c'è più	(no no more)	56.9
36.	milk	52.9	pantalone	diaper	56.9
37.	cat	52.7	*si	yes	56.9
38.	cracker	52.7	bavaglino	bib	56.4
39.	telephone	52.6	capelli	hair	56.4
40.	*yes	52.6	bocca	mouth	55.9
41.	cheerios	51.4	bicchiere	glass	54.9
42.	bird	50.4	uccellino	bird	54.4
43.	*pooey/pooh	50.4	passeggeri	stroller	54.4
44.	grandpa	50.1	*pronto	(hello on phone)	53.3
45.	wool	49.5	ciuccio	pacifier	53.7
46.	*DANCE	49.3	letto	bed	51.3
47.	baa-baa	49.0	televisione	television	50.3
48.	none	49.3	*no-no	no	49.2
49.	*LOOK	49.2	cucchiaio	spoon	49.2
50.	mouth	49.2	*PETTINARE	to comb	49.2
51.			*SALUTARE	to greet	49.2

- 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

---
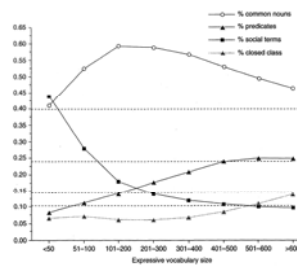
For young children (8-16 months)

- 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)
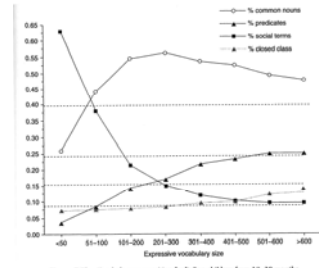   - Sound effects, names for people, routines

English-speaking children

- Preponderance of common nouns

- Slow growth of predicates

- Rarity of closed-class words
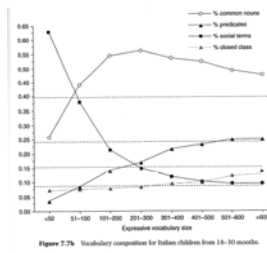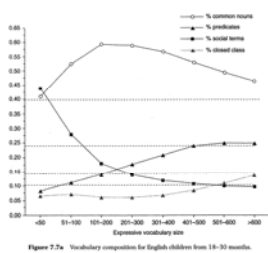
- Sharp, non-linear drop in social words

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

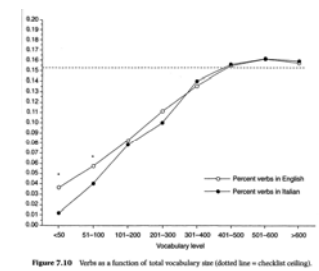- Italian-speaking children catch up, and even slightly overtake the English speakers

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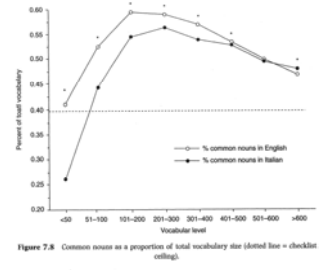
Predicates

- 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).
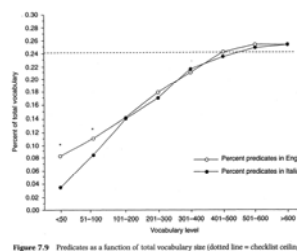
What about just verbs?

- 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
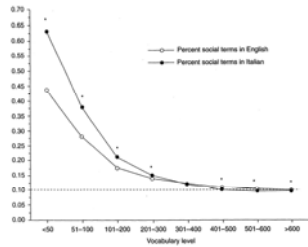   - More opportunities for routines

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

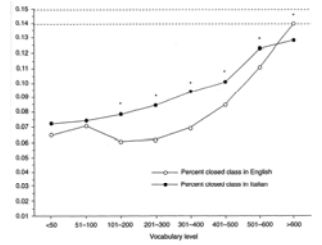- English-speaking children catch up at about 600 words

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