Multilingual syntactico-semantic access during acquisition and in proficient language use

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A "mental lexicon"

We have words in the mind that we can pull out to express our thoughts, or to recognize thoughts that others express

- How are words learnt in a second language?
- Do speakers of more than one language use the mental lexicon of one language at a time, or more than one?

Concept → lexicon

Within a language, intended meaning activates more than one word: i.e. matching word *and* other related words.

Naming a picture of a dog activates ''dog,'' ''cat,'' ''bark,'' ...

A lexical selection mechanism decides which activated lexical item wins.

Two, three ... languages, one mind

- By the same logic, current models assume lexical nodes of both languages activated by semantic system

- But proficient bilinguals can select and produce words from only one of their lexicons, whether in L1 or L2, ...

- There must be mechanisms for bilinguals to restrict word access to one language: "inhibitory control"

Bilingual lexical access

- After the words of the "non-response language" are activated, they have to be inhibited.

- Amount of inhibition for a language depends on speaker's proficiency in that language.

- Speaking in L1: L2 is less dominant, so not much inhibition required (assume lower level of activation for L2 words)

- Speaking in L2: L1 dominant, its words must be strongly inhibited.

Language switching experiments

Task: name aloud numbers 1 to 9

- In L1 if the background colour is blue
- In L2 if the background colour is red
- Switching a language is costly, takes more time
- Switching L2 $\rightarrow$ L1 more costly than

$$L1 \rightarrow L2$$

because L1 is strongly inhibited.

Asymmetrical cost of switching disappears in proficient bilinguals

- If the difference in proficiency levels in the two languages is minimal, the amount of inhibition applied to both languages would be similar

Presupposition: fluent speech is monolingual

- lexical items from the "non-intended" language are an "intrusion" into bilingual speech
- On the contrary, intentional use of lexical resources from two or more languages in the "bilingual joke."

The bilingual joke

At its simplest, a cross-language pun:

- Q: What did the peas in the pod say to one another?

  A: mutter, mutter (Hindi)

Why did the Tamil cow eat the door?

It said 'pull' (grass).

Within word switching!

More complex 1:

stretch the pronunciation:

- Q: What did one brinjal say to another?

  A: Let baigaans be baigaans

More complex 2:

stretch the pronunciation **and** switch,

twice within a word! (Tamil-English)

Q: Give me a word with one 'g' and four 't's.

A: ori gi naali ty   ('originality')

Morpheme switching

Tamil –an (familiar 3rd person) av-an

  –ar (respectful 3rd person) av-ar

He's an engini-yan, not an engini-yer.

He's a ward-er, not a ward-en.

Panjabi-English

Customer: Sardarji, liptan di cha.

Shopkeeper: Badshao, tennu ɛ to

mennu bi ɛ

'Lipton' s tea'   'A wish to embrace'

'Madam, if you have it, so do I'

An article ʿa,ʾ a banana, a-lone

Q: What did one banana say to another?

A: A keela hû mɛ

ʿI am a keela (a banana)ʾ

ʿI am akeelaʾ (alone)

What is Bruce Liʾs finger called?

Ung li

Learning words in a 2nd language:
a noun advantage

- **When infants - 1 to 2 year olds – first begin to use words productively** (i.e. other than "formulas" for greeting, refusal, and other such functions), **these words are mostly nouns.**

- First documented for English, **noun dominance in early vocabularies** (up to 200 words) argued to hold even in "verb friendly" languages

- E.g. Korean, Mandarin and Navajo

(cf. Gentner and Boroditsky (Navajo) for discussion).

Cause: Cognition, or Language?

- Cognitive salience of objects in the environment

- Language represents nominal and verbal/ relational categories differently.

Gentner (1982): two interrelated hypotheses:

- the **natural partitions** hypothesis

- the **relational relativity** hypothesis

which address, respectively, cognitive and linguistic factors.

The natural partitions hypothesis

- "... concrete objects and entities are easier to individuate in the world (and therefore easier to label) than are the relational constellations that form the referents of verbs or prepositions"
- "Relations require the presence of the entities they link; ... entities are psychologically represented before the relations between them"

The relational relativity hypothesis

- verb meanings (relational terms, e.g. verbs, prepositions) – vary cross linguistically more than concrete nouns do.

"... the denotations of concrete nouns can be derived by linking a word with an existing concept. But the meanings of verbs and prepositions are not 'out there' in the same sense. . ."

- "... noun meanings are given to us by the world; verb meanings are more free to vary across languages." (Gentner 1981: 169)

Predictions from RR
for Second Language Acquisition

- There should also be a noun advantage in second-language learning
- As vocabulary size increases, there should be an increase in the proportion of relational terms.

Lila Gleitman: "syntactic bootstrapping"

- "different kinds of information must be brought to bear for solving the mapping problem" (between the world and language) for predicates than for nouns.
- The initial word-to-world pairing suffices "to identify a small set of concrete nominal terms," but later vocabulary building progresses "in tandem with the clause-level syntax."
- the latter kind of information processing is "structure-to-world pairing."

Snedeker and Gleitman (2004)

A noun advantage in English as a second language

- We document a noun advantage
- We show that verb acquisition goes hand in hand with acquisition of determiners, conjunctions, and prepositions ("closed class" or structural items).

  (Vijaya and Amritavalli 2008)

Speech elicitation: NBT India sequenced picture books

Familiar contexts   11 scenes, 4 books

- 1. The Train Journey (n.d.) "Train": A boy journeys with parents and grandparents: episodes (buying tickets, passing through a tunnel, ...)

- 2. Going to a Market (1986) "Market": A boy and a girl go to the market with their mother.

- 3. The Story of a Mango (1993) "Mango": A mango travels from a tree to a crow to a sleeping man's turban and finally, to the boy and the girl who first wanted it.

- 4. Flying Shoes (not dated) "Shoes": A girl finds flying shoes and goes places using them

- Study in Kendriya Vidyalaya (KV) Unnao, U.P. Pilot at KV Uppal, Hyderabad
- Each student narrated a story in English and Hindi
- No story repeated
- 30 students

Stories	English	Hindi
Mango	Gp 1: Students 1-8	Gp 2: Students 9-16
Shoe	Gp 2: Students 9-16	Gp 1: Students 1-8
Train	Gp 3: Students 17-24	Gp 4: Students 25-32
Market	Gp 4: Students 25-32	Gp 3: Students 17-24

Grade V: N, V token frequencies

- **Nouns**

Group range: 17-88

Anm, Vvy, Vib : 17-39
Anj, Shu, Anr: 19-39

Approx.noun-only stage
Verb-onset
Approx.verb dominance

- **Verbs**

Group range: 0-49

Anm, Vvy, Vib: 0-1
Anj, Shu, Anr: 20-46

verb-noun ratio < 0.33
0.33 - 0.66
>0.66

VVY 'Market' Noun-only
utterances 70 words 40

ma'am *ek laD|ki*   'one girl'

ma'am pineapple

banana

apple

mango

kavva   'crow'

ma'am *chiTThii*   'letter'

boy

girl

ek baar mother *aayII thI* ma'am
*to Inke yahAA saamAAn
leene aayee   thi*

'Once the mother had come (she) had come to his place to buy things.'

pineapple

father

ma'am girl

ma'am hen

ma'am mother

ma'am boy

ma'am bouquet

mother

girl

boy

An acquisitional path: noun only

- Students with very low verb counts use L1 to express *propositional meaning.* English words restricted to nouns.

- Given the instructional context, many use the *formulaic utterance "This is a…"* followed by a noun.

- A very few sentences in English interrupt strings of nouns in English.

Hem 'Train' Noun-only utterances 109 words 74

this is a man
this is a boy
this is a coolie
this is a grandfather
this is a grandmother
this is a mother
this is
ma'am

dekh   raahae   '(He) is watching.'
bhojan kar raahae   '(He) is having food.'

ANV 'Train'
utterances 36 words 204

there was a man and a child and a child was
the old man was the old man was
the old man was
old woman was
and a woman sitting in the seat
there was a man and children
and a and a woman
and the other people was sit to the train
a man was bring the
a man was bring the potatoes

Acquired language vs. taught lg.

- Many utterances in even the 'better' transcripts ungrammatical or incoherent.
- Errors a natural characteristic of developing language systems
- Capture language development reflected in spontaneous, unrehearsed speech: not 'tutored,' 'rehearsed,' 'taught' language
- Contrast the answers written in notebooks

SHU 'Shoe' Verb-dominance
utterances 20 words 103

a girl was going in his school

he saw birds are flying

he was going to school

he saw flying shoes

he wear the flying shoes

the girl fly in the air

the birds was sawing, saw the girl,
        saw in air

the farmers are saw

the girls fly to his parent

the parent saw

the girls the girl is flying with dog
        rushed to her

the girl aunt and he, he saw and
        said bye bye

the girl was flying

his friends sawing saw

he give his shoes to the friends

the boy

his friends fighting

he break his shoes

the girl was crying

now they are friends

Verb Onset: L1- L2 comparison

- Resembles the two-word stage in L1 (Brown 1973)
- two-word utterances: meaning relations
- *entity-location* spoon table   tree mango
                                    up mango

- *agent-action* daddy kick boy run dog see
                                    squirrel mango

- *agent-affected* me ball   woman fruits

Emergence of predicative categories (group means)

	Det	Prep	Conj	Adv/ Adj
N-only	0.6	0	0	0
Approx. N-only	10.1	3.3	1.1	0
Vb-onset	27.8	3.5	8.1	2
Approx. vb dom	35.2	8.6	8.8	6
Vb dom	23.3	2.3	4	1

Lexico/syntactic structure

Verbs/ predicates have argument structure
(intransitive: 1 argument, transitive: 2 arguments)
John ran (*the road); John killed *(the goat).
assign thematic roles (agent, experiencer, patient).
A mapping from lexical structure to syntactic
structure:

The ice melts/ the rope drops/ the door opens.

John melts the ice/ drops the rope/ opens the door.
"The Uniformity of Theta Assignment" (Baker 1988)
"The structured lexicon:" Hale and Keyser (1993, 2002)
a.o.

"First phase syntax"

Ramchand 2008: *Verb meaning and the lexicon*

Event predicates are syntactically represented with three sub event components:

An initiating projection (causing projection)

A process projection

A result projection

Assume a lexical entry*:*

push [init, proc] (lexico-encyclopaedic content)

push: A first phase

initP

  3

(John)   3

      init   procP

      push   3

          (the table)   3

                proc   XP

                <*push*>   away

Reference: out there?

Chomsky: "Symbols appear to relate to physically identifiable external or internal states: motion of leaves elicits a warning cry (maybe an eagle is coming); "I'm hungry"; etc. Nothing remotely like that is true for even the simplest elements of human language: *cow, river, person, tree*, pick any one you want."

- *river* (Heraclitus: you do not step in the same river twice)
- *person* (a person I know, on his person)

Language Development Symposium: Language & other cognitive systems. What is special about Language?

There is no direct link between the elementary elements of language and thought and some mind-independent external entity. ... the internal syllable [ta] yields a physical event, but no one seeks some category of physical events associated with [ta]. Similarly some (by no means all) uses of the word *river* relate to physically identifiable entities ... In David Hume's phrase, the "identity, which we ascribe" to vegetables, animal bodies, artifacts, persons and their minds, and so on ... is only a "fictitious one," established by our "cognoscitive powers," as they were termed by his 17th century predecessors.