Acquiring the Korean Causatives

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The Korean Causative Alternation

- **Korean has two causative constructions**, synthetic **-히(*-hi*)** which applies to a fixed set of about 40 verbs and periphrastic **게 (*ke*)** which applies to an open class [5]
- ***-hi*** has phonologically conditioned allomorphs
- The causative alternation differentiates unaccusative verbs from corresponding transitives (e.g., ***The ice melted*** vs. ***The sun melted the ice***)
- ***Ke*** can also make any intransitive verb into a transitive

Intransitive	Transitive
살다 *sal-da* 'live'	살리다 *sal-li-da* 'save'
앉다 *anj-da* 'sit'	앉히다 *anj-hi-da* 'make sit'
먹다 *meok-da* 'eat'	먹게하다 *meok ke-ha-da* 'make eat'

Acquiring the Causative Alternation

- **English learners are characterized by the over-application of the alternation** (e.g., *"Adam fall toy"* (Adam)) [1]
- **A single paper on the acquisition of Korean has identified three facts [2]**
  1. Under-application of ***-hi***
  2. Only ***ke*** is productive
  3. ***Ke*** is acquired later than ***-hi***

e.g., Under-Application of *-hi* (Yun):

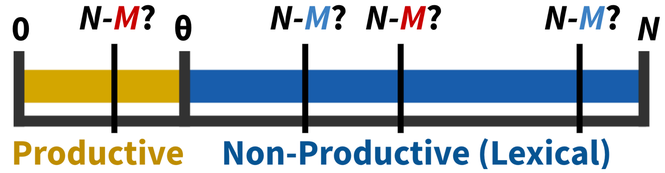
초식공룡이 죽으니까 그 육식공룡이
'The carnivore dies the herbivore'
Attested: 죽으니까 ***juk-eu-nikka*** **'die'**
Expected: 죽이니까 ***juk-i-nikka*** **'kill'**

The Sufficiency Principle Model

How much evidence does a child need to learn a pattern? [4]

- A generalization is productive if the number of **attested instances (types) *M*** is great enough that **those not (yet) attested *N-M*** does not exceed **the sufficiency threshold θ** for number of **linguistic items (types) *N*** that the generalization pertains potentially to
- **If non-productive, learn attested *M* examples lexically**
- As learners mature, *N* and *M* increase and productivity may change

Calculating productivity with the Sufficiency Principle



The sufficiency threshold θ:

N = number of (alternator/stative/ non-alternator) verbs learned so far

θ = *N* / ln *N*

Learn productive *ke* if:
enough ***M*** verbs have been observed in an alternation with ***ke*** *so that*
***N* - *M* < θ**

Learn productive *-hi* if:
enough ***M*** verbs have been observed in an alternation with ***-hi*** *so that*
***N* - *M* < θ**

Data Set

- **Yun's child-directed (CDS) and child-produced (CPS) speech in CHILDES [3]**
- All unaccusative (alternator) verbs were extracted by a native speaker
- Child-produced causative utterances were catalogued
- CPS divided into "correct" and "error" productions
- Adult causative productions were extracted for the SP calculation
- All CDS verbs were sorted into alternator/non/stative and available causative formations were identified

Korean Error (Yun)	Count	English Error (Ross)	Count
-hi over-application	1	Alternation over-app	10
-hi under-application	6	Alternation under-app	0
ke over-application	2		
ke under-application	0		
Total CDS utterances	81,577	**Total CDS utterances**	82,466
Total CPS utterances	38,356	**Total CPS utterances**	35,912

Results

Modeling an early learner's productivity judgments

- Calculating the SP over only the ***M -hi*** and ***M ke*** forms attested in Yun's CDS

In Yun CDS	*M -hi*	*M ke*	*N*	θ	*-hi* Prod?	*ke* Prod?
Alternators	12	4	25	7.6	*N-M*=13, no	*N-M*=21, no
Non-alternators	12	3	129	26.5	*N-M*=117, no	*N-M*=126, no
Statives	1	6	74	17.2	*N-M*=73, no	*N-M*=68, no

- For an early learner whose vocabulary is approximated by Yun's CDS, **neither construction is productive – they are both lexical**
- **We expect under-application** since there is no way to extend either construction to verbs not yet learned
- More ***-hi*** verbs are attested than ***ke*** verbs
- Merging Statives into other classes does not change the result

Modeling an adult's productivity judgments

- Calculating the SP over the ***M -hi*** and ***M ke*** forms determined by adult grammaticality

Adult Judgments	*M -hi*	*M ke*	*N*	θ	*-hi* Prod?	*ke* Prod?
Alternators	16	25	25	7.6	*N-M*=9, no	*N-M*=0, **yes**
Non-alternators	11	128	129	26.5	*N-M*=118, no	*N-M*=1, **yes**
Statives	3	66	74	17.2	*N-M*=71, no	*N-M*=8, **yes**

- For an adult, ***-hi*** **is not productive for any class - it is still lexical**
- But ***ke*** is productive for all verbs
- At some point during development, learners must hear enough verb types with ***ke*** causatives for it to become productive

Discussion

Accounting for acquisition observations

1. **Under-application of *-hi* –** SP defines it as non-productive (lexical-only) for young learners and adults
2. **Only *ke* is productive** – SP consistent with this
3. ***Ke*** **is acquired later than *-hi*** – for early learners, both are unproductive, but more types are attested with ***-hi***. Since both are learned word-by-word, children may use more ***-hi*** than ***ke***, giving the appearance of later acquisition

The same acquisition model (SP) applied to English [x] and Korean accounts for differing development trajectories in those languages

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Selected References

[1] M. Bowerman and W. Croft. 2008. The acquisition of the English causative alternation. **[2]** J.-H. Choi. 1999. Sayektongsa suptuk-e kwanhan yenkwu (On the acquisition of causative verbs). **[3]** J.-Y. Ryu. Ryu corpus: `http://childes.talkbank.org/access/eastasian/korean/ryu.html` **[4]** C. Yang. 2016. *The price of productivity: How children learn to break the rules of language*. **[5]** J.-H. Yeon. 1991. The Korean causative-passive correlation revisited.

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