

Cross-linguistic Differences in Children's Syntax for Locative Verbs

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Main points of this talk:

- a. To characterize 3-year olds' knowledge of locative verb syntax in English and Korean
- b. To demonstrate how syntax-semantics correspondences can assist learners despite cross-linguistic diversity

1. Learnability and Syntax-Semantics Correspondences

- **General Question:**

How do children learn a verb meaning and its associated syntactic structures?

- **Something that could help....**

Children can exploit universal regularities in syntax-semantics mappings (Gleitman 1990; Grimshaw 1981; Pinker 1989; Gropen et al. 1991a, b)

e.g. mental verbs take sentential complements : John thinks [that Mary is smart]
mental meanings sentential complements

Syntactic pattern of Locative verbs in English

- Non-Alternating Figure verbs in English
- | | | | |
|-----|------|-----------------------------------------------------|----------------|
| (1) | a. | John poured water (Figure) into the glass. (Ground) | Figure-frame |
| | b. * | John poured the glass (Ground) with water. (Figure) | * Ground-frame |

also, "dribble", "spill", "slop", or "ladle"
manner-of-motion non-Alternating Figure verbs

- Non-Alternating Ground verbs in English
- | | | | |
|-----|------|-----------------------------------------------------|---------------|
| (2) | a. * | John filled water into the glass. | *Figure-frame |
| | b. | John filled the glass (Ground) with water. (Figure) | Ground-frame |

also, "cover", "decorate", "soak", or "bandage"
change-of-state Ground verbs

- Figure-Alternating verbs in English
- | | | | |
|-----|----|----------------------------------|--------------|
| (3) | a. | John piled books (on the table). | Figure-frame |
| | b. | John piled the table with books. | Ground-frame |

also, "spray", "load", or "sow"

- Ground-Alternating verbs in English
- | | | | |
|-----|----|-----------------------------------------|--------------|
| (4) | a. | John stuffed feathers into the pillow | Figure-frame |
| | b. | John stuffed the pillow (with feathers) | Ground-frame |

also, "paint", "wrap", or "stuff"

• **But....**

The existence of cross-linguistic differences in the syntax of locative verbs undermines learning strategies based on universal mapping between syntax and semantics.

Syntactic pattern of "fill"-class verb in Korean: Alternators

(5)	a.	Yumi-ka	mul-ul	cep-e	chaywu-ess-ta	
		Nom	water-Acc	cup-Loc	fill-past-Decl	
		'*Yumi filled water into the container.'			Figure-frame	
	b.	Yumi-ka	cep-ul	mul-lo	chaywu-ess-ta	
		Nom	cup-Acc	water-with	fill-past-Decl	
		'Yumi filled the container with water.'			Ground-frame	

Syntactic pattern of "pile"-class verb in Korean: Figure verbs

(6)	a.	Yumi-ka	chaek-ul	chaeksang-ey	ssa-ass-ta	
		Nom	book-Acc	table-Loc	pile-past-Decl	
		'Yumi piled the books on the table.'			Figure-frame	
	b. *	Yumi-ka	chaeksang-ul	chaek-elo	ssa-ass-ta	
		Nom	table-Acc	book-with	pile-past-Decl	
		'Yumi piled the table with the books.'			*Ground-frame	

Syntactic pattern of "paint"-class verb in Korean: Alternators

(7)	a.	Yumi-ka	kirul-ul	pyek-e	chilha-ess-ta	
		Nom	oil-Acc	wall-Loc	paint-past-Decl	
		'Yumi painted the oil onto the wall.'			Figure-frame	
	b.	Yumi-ka	pyek-ul	kirul-elo	chilha-ess-ta	
		Nom	wall-Acc	oil-with	paint-past-Decl	
		'Yumi painted the wall with the oil.'			Ground-frame	

Syntactic pattern of "pour"-class verb in Korean: Figure verbs

(8)	a.	Yumi-ka	mul-ul	cup-e	pwu-ess-ta	
		Nom	water-Acc	glass-Loc	pour-past-Decl	
		'Yumi poured water into the glass.'			Figure-frame	
	b. *	Yumi-ka	cup-ul	mul-lo	pwu-ess-ta	
		Nom	glass-Acc	water-with	pour-past-Decl	
		'Yumi poured the glass with water.'			*Ground-frame	

Something else that could help....

- Children need to make constrained generalizations to learn idiosyncratic classes of syntactically similar verbs. (Pinker 1989)

e.g., the double object verb "send" "post", "mail"
 "email," "fax", NOT "deliver" or "dispatch"

John sent Mary the letter

John mailed Mary the package.
 John faxed his boss the report.
 *John delivered Mary flowers.

- **But....**

Children's overgeneralization of Figure-frames with Ground verbs suggests that they are not being conservative enough.

Figure-frame errors in spontaneous speech of English children (Bowerman 1982)

- (9) I didn't fill water up to drink it; I filled it up for the flowers to drink it.
Can I fill some salt in the bear? [= a bear-shaped salt shaker]
I'm going to cover a screen over me.
(see also experimental data in Gropen 1989; Gropen et al. 1991a, b)

Three suggestions for children's Figure-frame errors

- (i) Input Frequency Hypothesis (Bowerman 1982, 1990): based on suggestion that Figure frames might be more dominant than Ground frames in English (but cf. Gropen et al. 1991b)
- (ii) Perceptual bias Hypothesis
Moving object salience (Gentner 1978) can lead to;
 - a. the perceptual salience of moving objects over stationary ground objects leads children to encode the Figure object as the direct object (bias in semantics-syntax mappings)
 - b. the salience of figure object leads children to an incorrect semantic representation for a verb (Gropen et al. 1991a, b)
- (iii) Parameter mis-setting Hypothesis: if the Korean pattern is unmarked pattern, English-speaking children may be following this unmarked pattern.

2. Experiment

Main Goals of this experiment:

- We examine how much children have learned about the syntax of locative verbs by age 3-4.
- We examine if we can find independent evidence for children's Figure-frame bias, the input matching effect, and parameter mis-setting, using an elicited production task of child and adult speakers of English and Korean.

Subjects

30 native speakers of English: 10 children aged 3;4 to 4;0;
10 undergraduate and graduate students at UD;
10 mothers of children aged 2;1 to 3:0.
30 native speakers of Korean: 10 children aged 3;2 to 4;0 who live in Korea;
10 graduate students at UD;
10 mothers of children aged 2;0 to 3;0 who live in Korea.

Procedures and Materials

28 scenes using 14 locative verbs:

- Group 1 ("pour"-class verb): Figure verbs both in English and Korean
(*pour, spill, hang, and stick*)
- Group 2 ("paint"-class verb): Alternator verbs both in English and Korean
(*paint, wrap, stuff, and spread*)
- Group 3 ("pile"-class verb): Alternator verbs in English but Figure verbs in Korean
(*spray, pile, and load*)
- Group 4 ("fill"-class verb): Ground verbs in English but Alternator verbs in Korean
(*fill, cover, and decorate*)

- Classes based on results of earlier grammaticality study (Kim & Landau 1997)
We examined the grammatical judgment of 20 locative verbs, which were based on Levin's (1993) list of locative verbs, by native speakers of English and Korean. Interestingly, Levin reports that verbs like "hang" and "stick" are Alternators in English, however, we found that those verbs were judged to be Figure verbs in English. in the contexts we used in our experiment.

Describing a videotaped scene:

Sample story for children

Locative verb "pour"	<p><i>Pragmatic Set-up</i> (children only)</p> <ul style="list-style-type: none"> • I have water and a bowl • I'm going to pour... I poured. • Did you see what I did? Let's watch the movie
	<p><i>Test Event on TV screen</i> (all subjects)</p> <ul style="list-style-type: none"> • She has different things. She has a glass and some sugar • She's going to pour... She poured. • Can you tell me what she did? • She poured _____ • Can you tell me what I did? I poured _____

Table 1: Contrastive events and Test events on TV screen

Verbs	Contrastive events	Events on a TV screen
Pile	bricks being piled on a box	cookies being piled on a plate
Load	cars being loaded on a trailer	apples being loaded on a truck
Paint	nail-polish being painted on a brick	watercolors being painted on a piece of paper
fill (1)	bowl being filled with water	glass being filled with juice
fill (2)	basket being filled with crayons	bowl being filled with toys
cover	table being covered with a table-cloth	doll being covered with a blanket
decorate	cup-cake being decorated with an icing	Christmas-tree being decorated with ornaments
spread	creamcheese being spread on a cracker	peanut-butter being spread on a slice of bread
pour	coke being poured into the cup	sugar being poured into a glass
spray	water being sprayed into a paper-towel	soap being sprayed on a sponge
wrap	scarf being wrapped around a puppet	bandage being wrapped around a hand
stuff	tissue being stuffed into a puppet's mouth	cotton being stuffed into a small bag
hang	keys being hung on some nails	caps being hung on a coat-rack
spill	water being spilled on a towel	juice being spilled on a piece of paper
stick	bear-stickers being stuck on a card	animal-stickers being stuck on a piece of paper

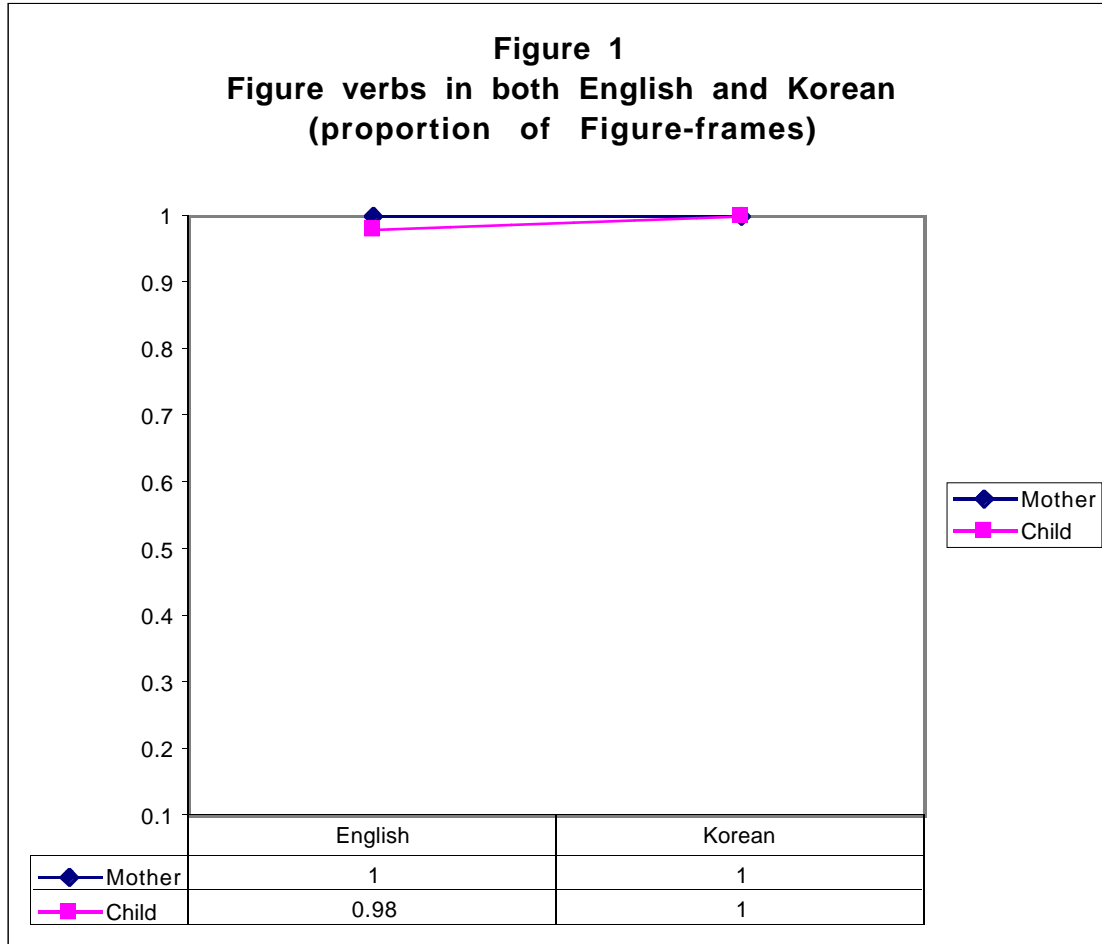
- Two different scenes for each of the verbs:
 - (i) one in which the ground object was completely filled or covered;
 - (ii) another in which it was only partially affected by the action.

We expected that the choice of syntactic frame might be affected by the presence of a "holistic interpretation" (see Anderson 1971), but no effect was found in any of these results.
- Two versions of the "filling" event:
 - (i) one involves pouring of juice; (ii) another involves loading of toys, specifically constructed to be unlike "pouring"
- No difference between mothers and adults was found across languages.

(No Significant Effect for "motherhood": $F(1,36)=2.56$, ns;
No Significant Interaction between "motherhood" and Language: $F(1,36)=1.59$, ns)

Results

- **Group 1 ("pour-class" verb)**
Figure verbs in both English and Korean ("pour", "spill", "stick", and "hang")

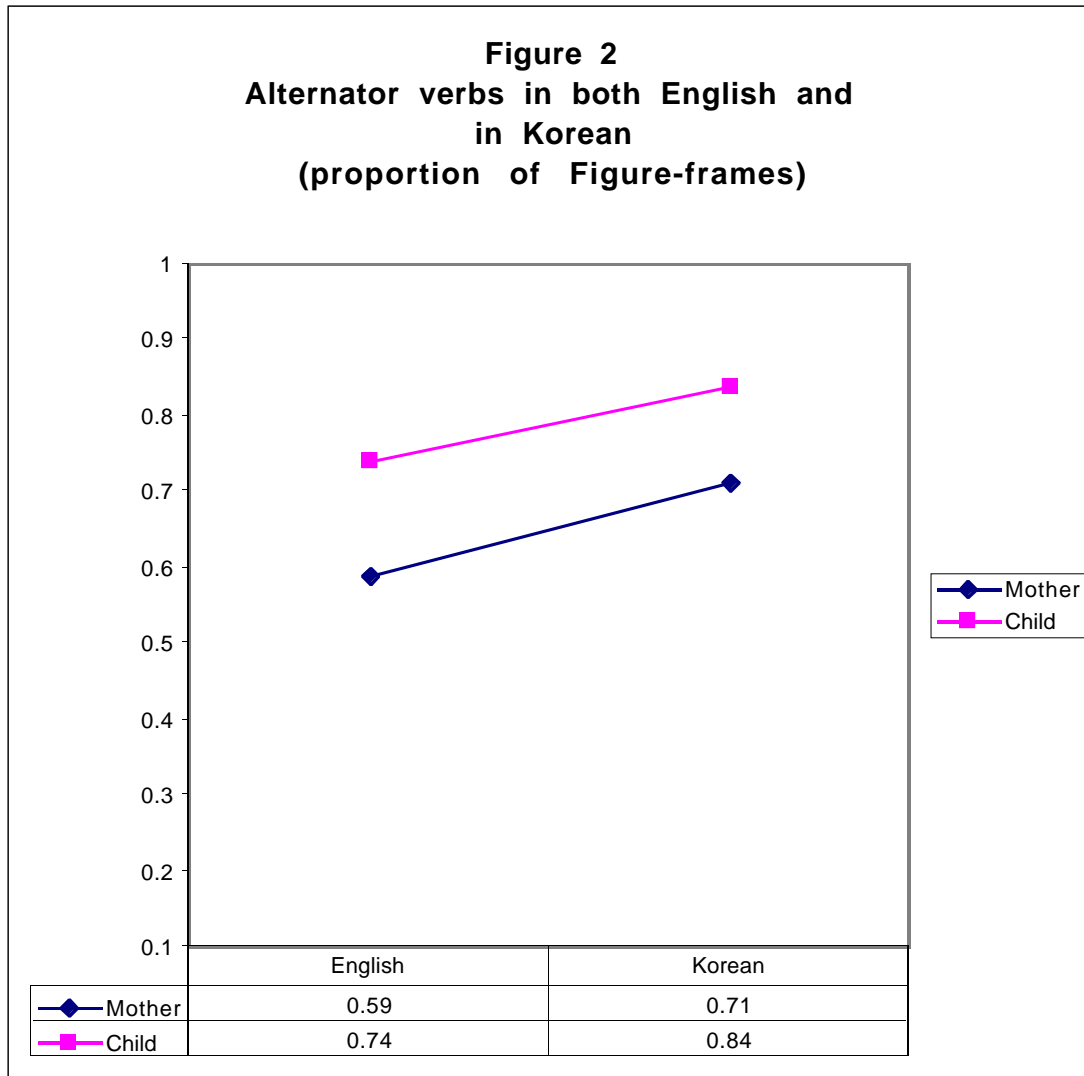


No Significant Effect for Age and Language: $F(1,36)=2.25, ns$
 No Significant Interaction between Age and Language: $F(1,36)=2.25, ns$
 *Significance level at .05

Result 1: All subjects do exactly what their language requires with Figure only verbs

- | | | | |
|------|--------------------------------------|---------|---------|
| | | English | Korean |
| (10) | a. John poured water into the glass. | Figure | Figure |
| | b. John poured the glass with water | *Ground | *Ground |

- **Group 2 ("paint"-class verb)**
Alternator verbs in both English and Korean ("paint", "wrap", "stuff", "spread")



Significant Effect for Age: $F(1,36)=11.11, p<.01$

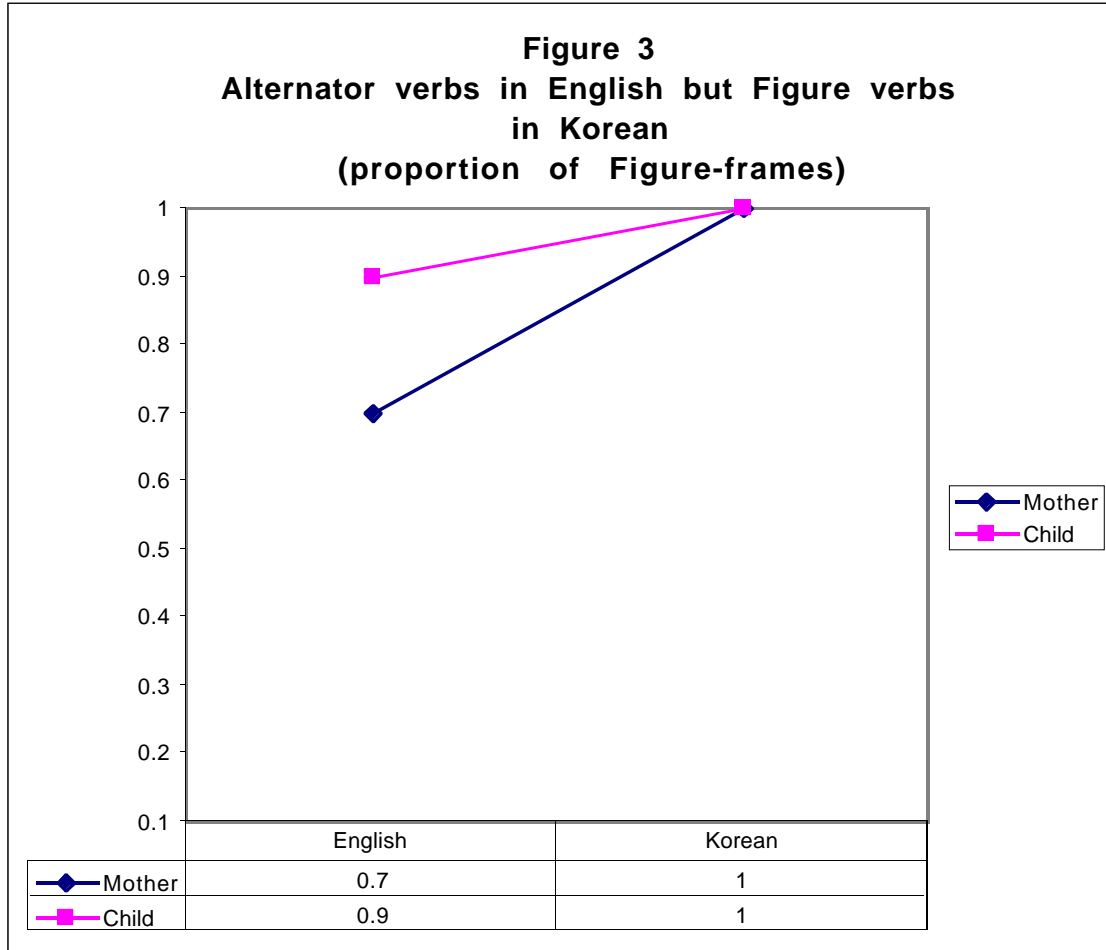
Significant Effect for Language: $F(1,36)=7.44, p<.01$

No Significant Interaction between Age and Language: $F(1,36)=.09, ns$

Result 2: When both syntactic frames are available in both English and Korean, children show a small Figure-frame bias in both languages

- | | | |
|---------|------------------------------------|--------|
| | English | Korean |
| (11) a. | John spread butter on the bread. | Figure |
| b. | John spread the bread with butter. | Ground |

- **Group 3 ('pile'-class verb)**
Alternators in English but Figure verbs in Korean ("pile", "spray", and "load")



Significant Effect for Age: $F(1,36)=7.35, p<.01$

Significant Effect for Language: $F(1,36)=18.15, p<.01$

Significant Interaction between Age and Language: $F(1,36)=7.35, p<.01$

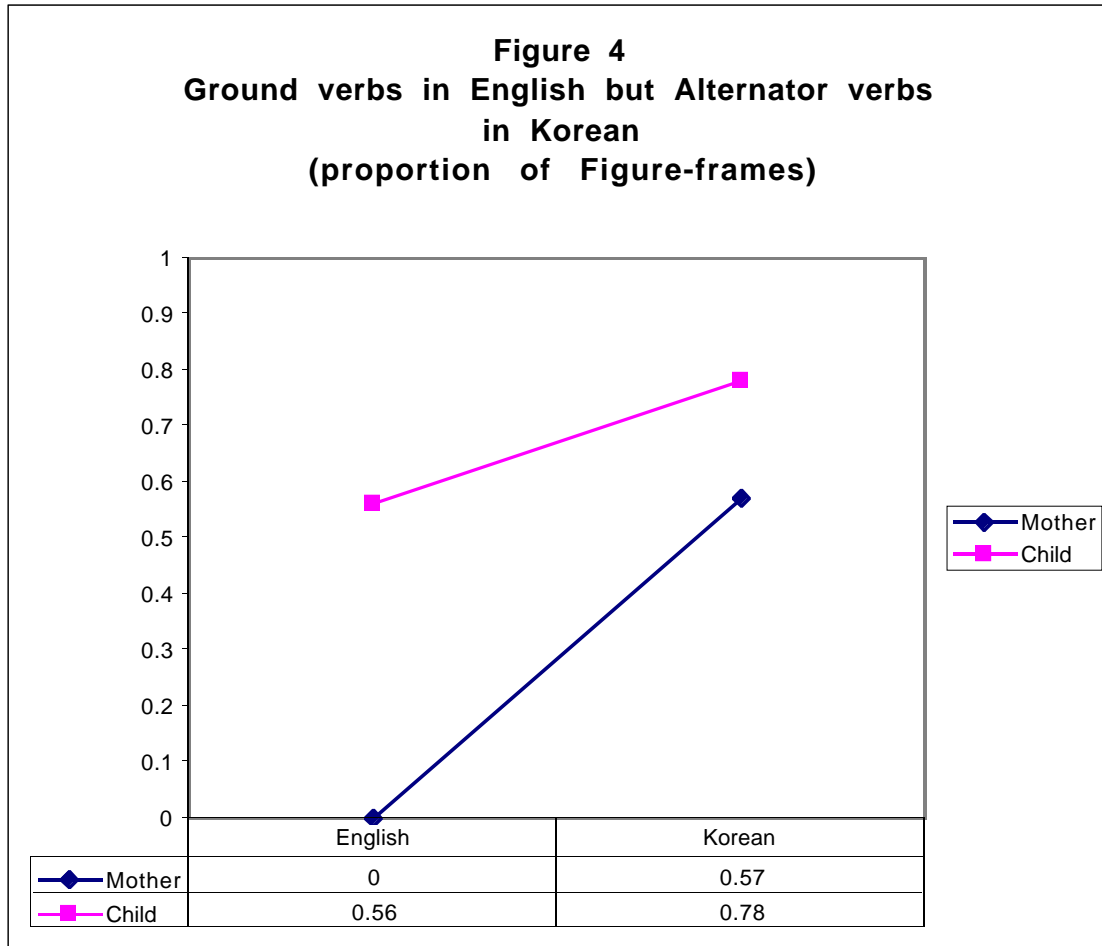
Result 3:

- **Korean: All Figure frames, as Korean grammar requires [exactly like result 1]**
- **English: Both frames are available, children show a small Figure-frame bias [exactly like result 2].**

- | | | | |
|------|--------------------------------------|---------|---------|
| | | English | Korean |
| (12) | a. John sprayed water on the wall. | Figure | Figure |
| | b. John sprayed the wall with water. | Ground | *Ground |

- Not surprisingly, there is an increase in Figure-frames in the Figure-Alternating class (Group 3) relative to the Ground-Alternating class (Group 2) in English, because the verbs in Group 3 are Figure verbs with a secondary change-of-state meaning component, whereas the verbs in Group 2 are Ground verbs with a secondary manner-of-motion meaning component (see Pinker 1989): Significant effect of age [$F(1,18) = 17.93, p < 0.001$], a significant effect of verb-type [$F(1,18) = 8.64, p < 0.01$], and no interaction.

- **Group 4 ("fill"-verb class)**
Ground verbs in English but Alternator verbs in Korean ("fill", "cover", and "decorate")



Significant Effect for Age: $F(1,36)=38.43, p<.01$

Significant Effect for Language: $F(1,36)=41.89, p<.01$

Significant Interaction between Age and Language: $F(1,36)=7.8, p<.01$

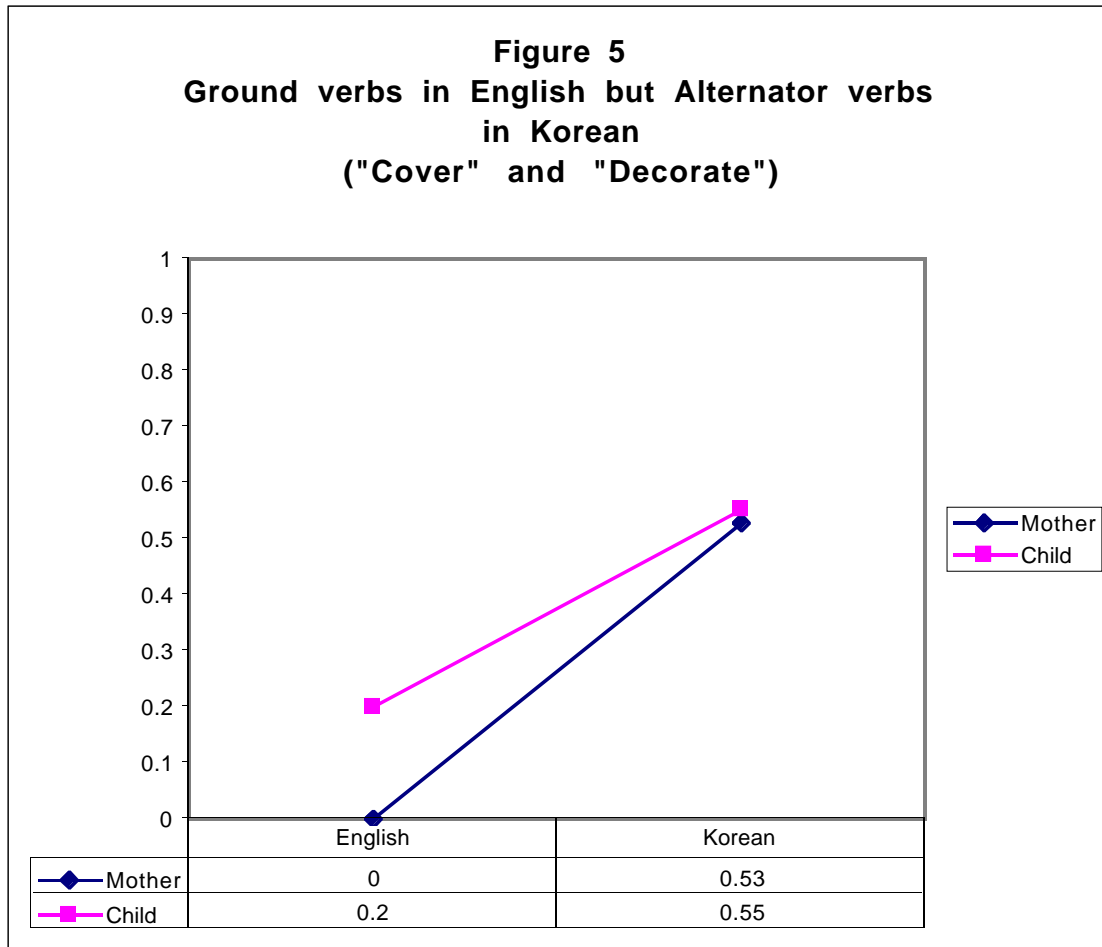
Result 4:

- a. Korean: language allows both frames, children show a small Figure-bias [exactly like result 2]**
b. English: language only allows Ground-frames, children show massive use of Figure frames relative to mothers

- | | | |
|---------|-----------------------------------|----------------|
| | English | Korean |
| (13) a. | John filled water into the glass. | *Figure Figure |
| b. | John filled the glass with water. | Ground Ground |

However,

- When "fill" is excluded from other Ground verbs:

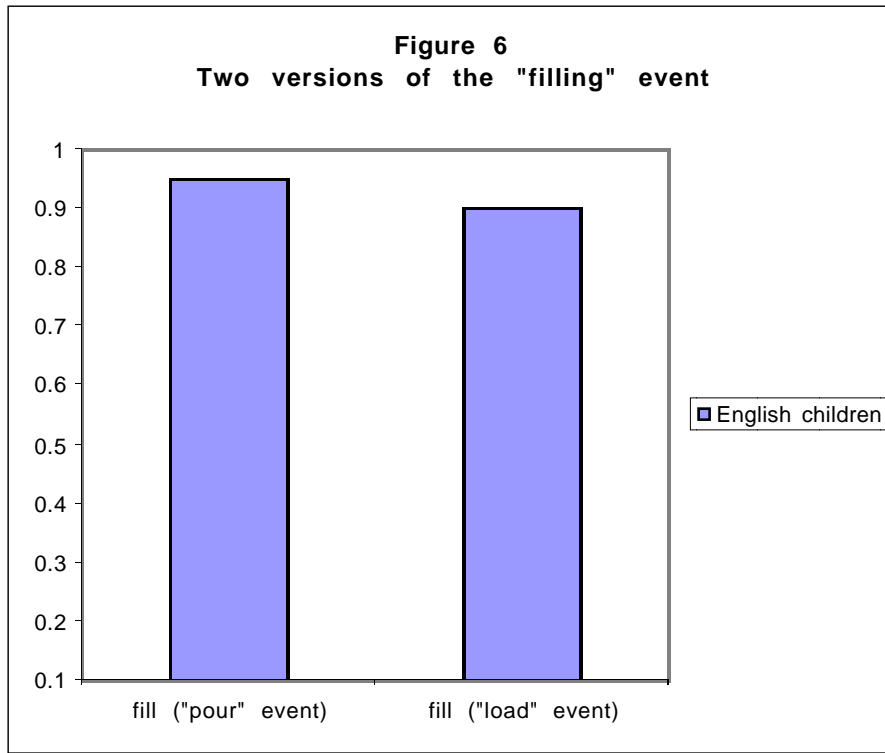


Result 5:

English: Without "fill", English children show a small Figure-frame bias [similar to result 2]

- Note the loss of Figure bias in Korean: the Figure-frame effect goes away, because "fill" is 100% Figure for children vs. 65% for mothers.

When we used two versions of the "filling" event:

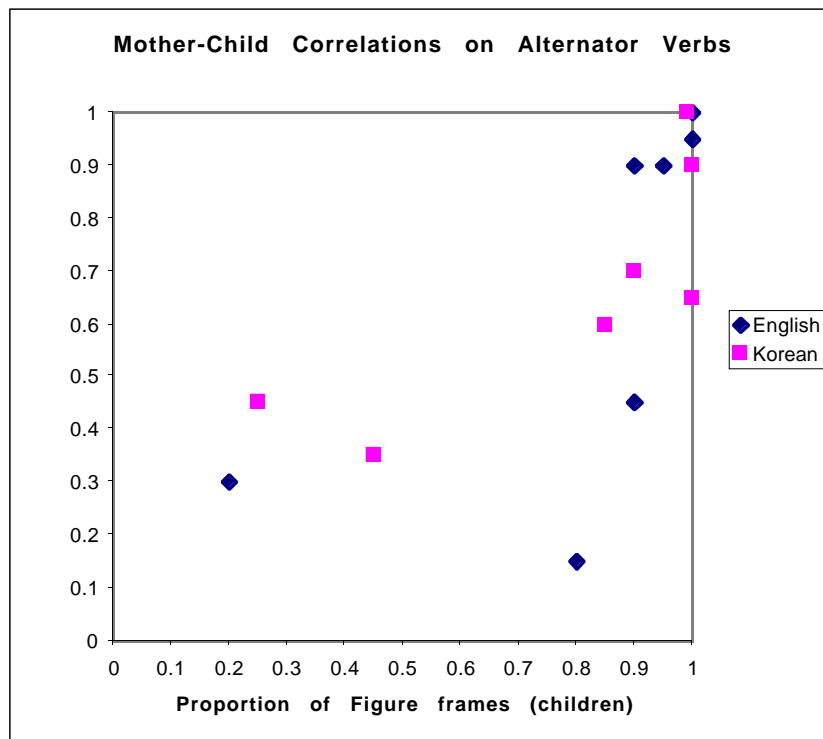


Result 6:

**Massive use of Figure-frames in both versions of the "filling" events.
No difference was found in the Figure-frame errors with the two
versions of the "filling" event**

Summary of findings

- We found that neither English-speaking children nor Korean-speaking children make errors with Figure verbs like "pour", but English-speaking children make errors with Ground verbs like "fill", as reported by a number of the literature (Bowerman 1982; Gropen et al. 1991a, b).
- In both languages, across all verb groups, there is a consistent but small Figure-frame bias in the speech of children.
- In both languages, there is a specific frequency matching effect in mother's speech and children's, even on individual verbs. Therefore, it does not seem that their high percentage of errors with "fill" can be explained by the global frequency matching.



$R^2 = 0.47$
 $F(1,12) = 10.52; p < 0.01$

- It does not seem that English-speaking children have Korean-style systems for locative verbs, in that the children in both languages overwhelmingly conform to what the grammar of their native language allows.
- Children's well-known Figure-frame errors are overwhelmingly due to the single verb "fill". Therefore, any account of children's "fill" errors needs to be one which does not automatically generalize to all other Ground verbs in English, such as "cover" and "decorate".

3. Learnability and Cross-linguistic Diversity

- How do children succeed in learning the syntax of locative verbs, especially given the potential problems raised by cross-linguistic differences?
- We find that much of cross-linguistic variation in the syntax of locative verbs is restricted, dividing languages into two basic classes:
 - (i) Korean-type languages - which includes Korean, Japanese, Chinese, Thai, and Turkish – always allow Figure-frames with *all* locative verbs.
 - (ii) English-type languages - which includes English, French, Spanish, Singapore Malay, and Classical Arabic - have both Figure and Ground non-Alternating verb classes, plus one or more classes of Alternating verbs.

English-type languages:

- (14) a. Marie a decoré l'arbre avec des lumieres colorées.
 Marie decorated the tree with colored lights
 'Mary decorated the tree with colored lights.'
- b. * Marie a decoré les lumieres colorées sur l'arbre
 Mary decorated colored lights onto the tree
 'Mary decorated colored lights onto the tree.' (French)
- (15) a. Juan llenó el vaso con agua
 John filled the glass with water
 'John filled the glass with water.'
- b. * Juan llenó agua en el vaso
 John filled water into the glass
 'John filled water into the glass.' (Spanish)
- (16) a. Saya hias bilik ini dengan bunga
 I decorate room this with flowers
 'I decorated the room with flowers.'
- b. * Saya hias bunga dalam bilik ini
 I decorate flowers inside room this
 'I decorated flowers inside the room.' (Singapore Malay)
- (17) a. gattayat al tawalah bi al gittah
 covered the baby with the the table-cloth
 'I covered the table with the table-cloth.'
- b. * gattayat al gittah ala al tawaleh
 covered the table-cloth on the table
 'I covered the table-cloth on the table.' (Classical Arabic)

Korean-type languages:

- (18) a. Taro-ga baketu-o mizu-de mitasi-da
 Nom bucket-Acc water-with fill-past
 'Taro filled a bucket with water'
- a. Taro-ga mizu-o baketu-ni mitasi-da
 Nom water-Acc bucket-Loc fill-past
 '*Taro filled water into a bucket.' (Japanese)
- (19) a.? Zhang San young tanzi gai le chuang
 Zhang San use blanket cover-Asp bed
 'Zhang San covered the bed with a blanket.'
- b. Zhang San wang chuang shang gai le tanzi
 Zhang San to bed on cover-Asp blanket
 '*Zhang San covered the blanket onto the bed.' (Chinese)

- (20) a. Chan toktang hong duay dokmai
 I decorate room with flower
 'I decorated the room with flowers.'
- b. Chan toktang dokmai nai hong
 I decorate flower into room
 '*I decorated flowers into the room.' (Thai)
- (21) a. P-in-nalamudi-an ni-Juan ang puno ng ilao
 Past-decorate-Loc Obl-John Top tree with lights
 'The tree was decorated with lights by John.'
- b. I-b-in-nalamud ni-Juan ang ilao sa puno
 Top-Past-decorate Obl-John Top light onto tree
 '*The lights were decorated onto the tree by John.' (Tagalog)
- (22) a. John bardagi suyla doldurdu
 John glass-Acc water-with filled
 'John filled the glass with water.'
- b. John bardaga suyu doldurdu
 John glass-Dat water-Acc filled
 '*John filled water into the glass.' (Turkish)

Universal Syntax-Semantics Correspondence

- Syntax-Semantics Correspondence consistent across languages
 manner of motion Figure frame

Group-specific Syntax-Semantics Correspondences

- In English-type languages (French, Spanish, Singapore Malay, and Classical Arabic)
 change-of-state Ground frame
- In Korean-type languages (Japanese, Chinese, Thai, and Turkish)
all locative verbs Figure frame
 never allow non-Alternating Ground verbs.
- The cross-linguistic differences in locative verb syntax appear to correlate reliably with properties of the language which are quite easily observable.

Table 2: Locative verb syntax and Serial verb constructions

	Syntax of Ground verbs	Serial verbs	Overt Causatives ¹	Lexical parameter (Talmy 1991)	Word-order	Pro-drop
English	Ground-frame	NO	NO	Satellite-framed	SVO	NO
French	Ground-frame	NO	NO	Verb-framed	SVO	NO
Spanish	Ground-frame	NO	NO	Verb-framed	SVO	YES
Singapore Malay	Ground-frame	NO	YES ²	Satellite-framed	SVO	?
Classical Arabic	Ground-frame	NO	YES	?	VSO	YES
Korean	Ground and Figure	YES	YES	Verb-framed	SOV	YES
Japanese	Ground and Figure	YES	YES	Verb-framed	SOV	YES
Chinese	Ground and Figure	YES	YES	Satellite-framed	SVO	YES
Thai	Ground and Figure	YES	YES	?	SVO	YES
Turkish	Ground and Figure	YES	YES	Verb-framed	SOV	YES

1. Juffs (1996) claims that there is a connection between the syntax of locative verbs and overt causative morphemes across languages.

2. Note that in Singapore Malay, the causative morpheme "-kan" is often referred to as a transitive morpheme.

- Striking connection between the syntax of Ground verbs and complex predicates often known as V-V Compounds, or Serial Verb constructions, and the availability of a kind of complex predicate formation.
- English-type languages which have the same locative verb syntactic pattern as English, such as French, Spanish, Classical Arabic, and Singapore Malay do not allow Serial verb constructions (V-V compounds).

In contrast, Korean-type languages which have the same locative verb syntactic pattern as Korean, such as Japanese, Chinese, Thai, and Turkish, *do* allow Serial verb constructions.

- (23)
- | | | | | | |
|----|-------------------------------------|---------------|-------------------|-------|--------------------|
| a. | John-i | ttangkhong-ul | sa-mek-ess-ta | | |
| | Nom | peanuts-Acc | buy-eat-Past-Decl | | |
| | 'John bought peanuts and ate them.' | | | | (Korean: Lee 1992) |
| b. | John-ga | niwatori-o | naguri-korosi-ta | | |
| | Nom | chicken-Acc | beat-kill-Past | | |
| | 'John beat and killed a chicken.' | | | | (Japanese) |
| c. | Baoyu | song-gei | Daiyu | yiben | shu |
| | | send-give | | one | book |
| | 'Baoyu sent Daiyu a book.' | | | | (Chinese: Li 1990) |
| d. | Chan | pat | kai | kin | |
| | I | fry | chicken | kit | |
| | 'I fried chicken and ate it.' | | | | (Thai) |
| e. | John | tavugu | pisit-ip | yedi | |
| | | chicken | cook-eat-past | | |
| | 'John cooked chicken and ate it.' | | | | (Turkish) |

- **Why should verb compounding/serialization correlate with locative verb syntax?**

Basic idea: the semantic packaging of predicate meanings required to use Ground verbs in Figure-frames involves the same kind of process seen overtly in Serial verb constructions.

Generalization: in serializing languages, all Ground verbs also allow Figure-frames.

Suggestion: creating a Figure frame based on a Ground verb depends on a property of verb serializing systems, such as (i) indirect causation, (ii) argument sharing.

Possibility I: formation of Figure frame from Ground verb has the semantics of complex verb formation: the predicates (X affects Y) and (Y affects Z) are combined, and an argument is shared between the predicates, as is characteristic of verb serialization:

e.g. *John decorated the lights on the tree."
 = [John affects the lights] + [the lights decorated the tree]

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