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BRIEF ARTICLE

Syntactic fast mapping: The Korean Extrinsic Plural Marker

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ABSTRACT

This article shows that the Korean Extrinsic Plural Marker (EPM) may be acquired by children on the basis of very little evidence. The EPM marks distributivity, unlike the Instrinsic Plural Marker, which marks plurality. Thirty monolingual learners of Korean aged 5;03 to 6;09 (mean age 6;01) were tested using a series of Truth Value Judgment Tasks (Crain & Thornton 1998). The children were split into three groups: Experimental-1, Experimental-2, and Control. All children received a pretest, establishing that they are unaware of the properties of EPM. Children in the two experimental groups then received two interventions, each employing a single instance of a felicitous interaction between a child and a mother involving the EPM. One intervention presented positive evidence of the meaning of the EPM, and the other presented negative evidence. Each intervention was followed by an assessment of the effect of the intervention (using TVJT tests similar to the pretest). The experimental groups differed in the order of the interventions, and the control group received no interventions but otherwise received exactly the same regimen of tests as the experimental groups. The results show that fourteen of the twenty experimental children responded to the intervention that involved positive evidence; none responded to the intervention involving negative evidence; and none of the children in the control group acquired the meaning of the EPM. We conclude that inflectional patterns may be acquired on the basis of very little evidence, perhaps employing mechanisms of fast mapping akin to those found in the domain of the lexicon.

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1. Introduction

A key claim of contemporary cognitive science is that children's knowledge of language is out of proportion to their experience—a case of "rich languages from poor input," in the words of Piatelli-Palmarini & Berwick (2013). The most studied examples of this asymmetry involve the sorts of phenomena (binding, agreement, locality) that traditionally fall under the umbrella of Universal Grammar. However, another sort of phenomenon, far less studied, is also of potential interest—language-particular features of morphosyntax that must be learned from sparse input despite significant intricacy in their form and interpretation.

One such phenomenon involves the morpheme *-tul* in Korean, whose functions include the establishment of a distributive interpretation in patterns such as the following, based on an example from Song (1997).

(1)	Haksayng-tul-i	ai-eykey-**tul**	ton-ul	cwu-ess-ta.
	student-IPM-NOM	child-DAT-EPM	money-ACC	give-PST-DECL
	'Students each gave the children money.'			

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There are two instances of *-tul* in this sentence. The first, which occurs on the subject *hakysayng* 'student,' is the standard "intrinsic" plural marker (IPM); it occurs on the noun itself, inside the nominative marker *-i*, and signals plural reference for the NP. The second instance of *-tul*, which occurs on the entire dative phrase, outside the case marker *-eykey*, has a quite different function. Dubbed the "extrinsic" plural marker (EPM), it imposes a distributive interpretation in which each student gives money to a child, and each child receives money from a student. Without the EPM, the sentence allows both a collective interpretation and a distributive interpretation, as illustrated in (2). (For more detailed discussion, see Song 1975, Kang 1994, Kim 1994, Song 1997, Lardiere 2009, Kim, O'Grady & Deen 2014, among others).

(2) Haksayng-tul-i ai-eykey ton-ul cwu-ess-ta.
student-IPM-NOM child-DAT money -ACC give-PST-DC
'Students jointly gave the children money.'
'Students each gave the children money.'

Table 1 summarizes the contrast.

Using a truth-value judgment task, Kim, O'Grady & Deen (2014) confirmed the robustness of the contrast: A group of twenty adult native speakers of Korean accepted both interpretations for the non-EPM pattern (*c* and *d* in Table 1) at a rate of approximately 90%. However, they accepted the collective interpretation in the EPM pattern only 20% of the time, compared to 92% for the distributive interpretation (*a* versus *b* in Table 1).

Matters were very different for the twenty children (mean age 6;04) in Kim, O'Grady & Deen's study: They were completely insensitive to the function of the EPM, consistently accepting collective and distributive interpretations both with and without extrinsic *-tul*. This presumably reflects that fact that the EPM is not frequently used in Korean and that ditransitive patterns manifesting the contrast illustrated in (1) and (2) are vanishingly rare. In our search of the Sejong Corpus, which contains large samples of both speech (utterances totaling 800,000 words) and writing (58,000,000 words), we uncovered just 193 instances of the extrinsic plural marker—93 in speech and 100 in writing. There were no examples at all of the EPM pattern exemplified in (1).

The paucity of input relevant to the Korean EPM raises an intriguing research question: What is the lower bound on the input required to ensure the acquisition of morphosyntactic contrasts of this sort? We investigate this question in the next section with the help of a multipart experiment that explores whether a single exposure to the use (or misuse) of extrinsic *-tul* might trigger a breakthrough in children's understanding of the morpheme. Section 3 offers some general concluding remarks and suggestions for future research.

2. The experiment

2.1. *Participants*

Thirty monolingual learners of Korean aged 5;03 to 6;09 (mean age 6;01) participated in our study. All were born and raised in Korea and had received no prolonged exposure to any language other than Korean.

Table 1. The Effects of Extrinsic *-tul* in Combination with the Dative.

	With EPM	Without EPM
Distributive interpretation	(a) Yes	(c) Yes
Collective interpretation	(b) No	(d) Yes

2.2. *Materials and procedure*

We used a series of truth-value judgment tasks with a 2 x 2 design, varying *sentence type* (with EPM/without EPM) and *context* (distributive/collective), which resulted in a total of four conditions. Of these four conditions, the crucial one consists of sentences in which the EPM is used in a collective context—which should be judged false. All other patterns (non-EPM sentences in a collective or distributive context and EPM sentences in a distributive context) are acceptable to adult speakers of Korean.

We created sixteen test items (four tokens for each condition), from which we prepared four tests (i.e., a pretest, a first posttest, a second posttest, and a delayed posttest), each consisting of one item per condition. (Having more than one item per condition would expose children to additional felicitous uses of the EPM, creating the risk that the tests themselves might contribute to its acquisition.) The order of the four items within each test varied randomly across participants.

A sample item is presented in Figure 1. This item involves a collective context (the sample picture shows the final scene in which three monkeys jointly showed a table to three pigs), followed by a test sentence that includes an EPM.

Test sentence:

Wenswungi-tul-i	sey mali	twayci-eykey-**tul**	thakca-lul	poyecwu-ess-eyo.
Monkey-IPM-NOM	three CL	pig- DAT-EPM	table- ACC	show-PST-SE

'The monkeys show the three pigs-TUL a table.'

Figure 1. Test item and supporting picture for EPM sentence in collective context.

If children understand the (distributive) function of the EPM, they should reject the sentence as untrue, as the three monkeys jointly showed a single table to the pigs.

Based on Kim, O'Grady & Deen's (2014) finding that children are insensitive to the function of the EPM, we designed two interventions to provide children with input that would allow them the opportunity to acquire its relevant properties. One intervention involved negative evidence in the form of exposure to an incorrect use of the EPM in a collective context, accompanied by an admonition and a recast. The other involved positive evidence.

2.2.1. *Negative evidence scenario*

In the negative-evidence intervention, the children observed a conversation between a fictional mother and her daughter about a scene similar to the ones in our test items. As illustrated, the fictional child mistakenly attributes a collective interpretation to the EPM and is then corrected by her mother. The interventions were given only in Korean, but we present the English translations here. See Appendix B for the Korean transliterations and morphemic glosses.

English Translation of Negative Evidence Intervention: Dialogue between a Fictional Mother and Her Daughter

Mother: The monkeys pushed to three ducks-TUL a rock.
Is this sentence true?
Daughter: Yes.
Mother: No, mom did not say that 'the monkeys pushed to three ducks **(-Ø)** a rock.
Mom said 'the monkeys pushed to three ducks-**TUL** a rock.
Daughter: I see (literally: 'You are right.')

2.2.2. *Positive evidence scenario*

In the positive-evidence intervention, the participant children observed the correct use of the EPM in a context calling for a distributive interpretation—once again as part of a conversation between a fictional mother and her daughter.

English Translation of Positive Evidence Intervention: Dialogue between a Fictional Mother and Her Daughter

Mother: The monkeys pushed to three ducks-**TUL** a rock.
Is this sentence true?
Daughter: Yes.
Mother: You did a good job!

Our thirty participants were divided into three groups of ten each—a control group (group 1) that received no intervention, and two intervention groups (groups 2 and 3). On the first day, all three groups were given a pretest, which consisted of one item per condition (four

items total). One intervention group (group 2) was then exposed to the negative evidence scenario and the other intervention group (group 3) to the positive evidence scenario. Each group was immediately assessed by a posttest consisting of four novel test items (one per condition).

On the second day, each intervention group received the other intervention (group 2 was exposed to the positive evidence scenario and group 3 to the negative evidence scenario). All groups, including the control group, were then immediately given a second posttest (this was the only input received by the control group on that day).

In order to determine the long-term effect, if any, of the interventions, a delayed posttest was administered to all three groups two weeks later.

2.3. *Results*

The EPM had no effect on the performance of group 1 (the control group). With or without the EPM, all test items were accepted as true in distributive and collective contexts in the pretest on Day 1, the posttest on Day 2, and the delayed posttest two weeks later.

Table 3 summarizes the results for the participants in group 2, who received the negative evidence intervention on Day 1. The numbers in the table indicate how many children rejected the test items as false. If the children were adultlike, all ten should reject the EPM in a collective context (column 1), and none should reject any of any other test items (the remaining three columns).

As Table 3 reveals, none of the children rejected any of the test items in the pretest, consistent with a general insensitivity to the EPM. Moreover, the initial intervention, involving exposure to the inappropriate use of *-tul* in a collective context (the negative evidence scenario), had no impact on the children's interpretation of that or any other pattern. However, the second intervention, which exemplified the appropriate use of the EPM in a distributive context (the positive evidence scenario), had a major effect: As can be seen by examining the first column, six of ten participants rejected the collective interpretation of the EPM sentence (column one). This judgment was maintained by all six participants in the delayed posttest conducted two weeks later. (We return in section 2.4 to the results reported in the fourth column.)

Now, let's consider the results for group 3 (see Table 4), who were exposed to the positive-evidence intervention first. Once again, we focus for now on the interpretation of EPM patterns in a collective context (column one).

Like their counterparts in groups 1 and 2, none of the participants in group 3 rejected any of the sentences in the pretest, regardless of whether an EPM was present or not. However, a dramatic change occurred after exposure to the positive evidence scenario in the first intervention: In posttest 1, eight of the ten participants correctly rejected the EPM sentence in the collective context (column one). Moreover, all eight maintained this interpretation in the second posttest and in the delayed posttest, administered two weeks later.

Table 2. Summary of the order of testing/interventions for each group.

Timeline	Group 1	Group 2	Group 3
Day 1	Pretest	Pretest	Pretest
	—	Negative evidence Intervention	Positive evidence Intervention
	—	Posttest 1	Posttest 1
Day 2	—	Positive evidence Intervention	Negative evidence Intervention
	Posttest	Posttest2	Posttest2
2 Weeks Later	Delayed posttest	Delayed posttest	Delayed posttest

2.4. *Discussion*

Our results appear to establish the existence of a type of fast mapping in morphosyntax: Six of ten participants in group 2 and eight of ten participants in group 3 learned the distributive function of the EPM after a single exposure to its use in an appropriate context.[1] The children in the control group, who received the same number of test items across exactly the same time course (but without the two intervention items) showed no learning whatsoever. This result reveals an ability to draw inferences from very minimal input, even in the case of a subtle semantic phenomenon.[2]

A second result also calls for attention: Most participants who came to realize that EPM patterns allow only a distributive interpretation ended up wrongly concluding that non-EPM patterns permit only the collective interpretation. As can be seen by examining the fourth column in Tables 3 and 4, all six successful participants in group 2 and six of the eight successful participants in group 3 rejected the distributive interpretation for the non-EPM pattern on the second posttest.[3] In fact, such patterns allow both a distributive and a collective interpretation in Korean, as noted in our earlier discussion of sentence (2).

This pattern of judgments, summarized in Table 5, is consistent with a preference for a one-to-one mapping between form and meaning (e.g., Brown 1973; Slobin 1985:1162; MacWhinney 1987:24; among others): The EPM is associated with the distributive interpretation and the distributive interpretation with the EPM. We return to this matter briefly in our concluding remarks.

Table 3. Number of Participants in Group 2 (n = 10) Responding False.

	With the EPM		Without the EPM	
	Collective	Distributive	Collective	Distributive
Target response	False	True	True	True
Pretest	0	0	0	0
→*Negative evidence*				
Posttest 1	0	0	0	0
→*Positive evidence*				
Posttest 2	6	0	0	**6**
Delayed posttest	6	**0**	**0**	6

Table 4. Number of Participants in Group 3 (n = 10) Responding False.

	With the EPM		Without the EPM	
	Collective	Distributive	Collective	Distributive
Target response	False	True	True	True
Pretest	0	0	0	0
→*Positive evidence*				
Posttest 1	**8**	0	0	6
→*Negative evidence*				
Posttest 2	**8**	0	0	7
Delayed posttest	**8**	0	0	6

[1]The fact that not all children acquired the EPM after the positive intervention is not surprising, as learners can differ in their attentiveness and sensitivity to particular instances of input. For example, in Carey & Bartlett's (1978) study of the acquisition of *chromium* as a color term by English-speaking 3-year-olds, eight of nineteen participants failed to learn the word even after several exposures.

[2]An anonymous reviewer notes the likelihood that pragmatic reasoning underlies the quick advance in syntactic mapping: The appearance of an unfamiliar suffix leads to the inference that the speaker is using that form to draw attention to a salient feature of the sentence's meaning—such as the distributive relationships in the transfer event that it describes.

[3]One additional participant appears to reject the distributive reading without the EPM after the second intervention, but he is in fact an outlier who also accepted a collective interpretation for the EPM pattern.

Table 5. Common Error on the Part of Children Who Are Sensitive to the EPM

	Distributive interpretation	Collective interpretation
With *-tul*	Yes	No
Without *-tul*	No	Yes

3. Conclusion

Our results reveal an extraordinary sensitivity to the form-meaning mappings encountered in experience: Based on exposure to a single instance of the EPM, children are able to infer the essentials of its function.

On the face of it, this result may appear inconsistent with the finding that the EPM is acquired relatively late in development (Kim, O'Grady & Deen 2014). As an anonymous reviewer asks, why would the EPM be acquired late if it can acquired after a single exposure? The answer, we believe, lies in two related facts. First, as mentioned earlier, the EPM is extremely rare in spoken Korean, occurring in less than 0.02% of (adult-to-adult) utterances. So the opportunities to hear and learn from the EPM are limited to begin with. Second, there is no guarantee that any given example of the EPM will appear in the type of helpful context exhibited in our positive intervention.

Two of our findings shed additional light on the relationship between input and development in the case of the EPM. First, input involving positive evidence (exposure to the use of *-tul* in a distributive context) was superior to input consisting of negative evidence (information about the inappropriateness of the EPM in collective contexts). As revealed in the performance of groups 2 and 3, the intervention involving negative evidence had essentially no effect, whereas positive evidence led fourteen of the twenty participants to immediately assign a distributive interpretation to the EPM.

This contrast makes sense from an ecological perspective: Given that children do not in general have access to information about the unacceptability of particular form-meaning mappings (e.g., Snyder & Lillo-Martin 2011), the success of Korean learners should not be contingent on caregiver comments on a misused EPM. What our findings underline is that input of this sort is not only unnecessary but that it is actually less effective than simply hearing the EPM used, perhaps just a single time, in an appropriate context.

A second finding of potential interest has to do with the precise manner in which the information made available in our successful intervention contributes to development. A conservative response to an appropriate use of the EPM would be to conclude that extrinsic *-tul* is associated with a distributive interpretation—and no more. Two participants in group 3 did in fact draw this conclusion, which is correct. However, twelve participants (six in each group) went one step further, wrongly concluding not only that the EPM is associated with distributivity but that distributivity must be marked by the EPM—a one-to-one system of form-meaning mapping. This raises an obvious question about how an erroneous conclusion of this type is corrected. In the case at hand, the path seems straightforward: The mistaken conclusion that the distributive interpretation is only possible in the EPM patterns should be abandoned after exposure to (perhaps just) a single non-EPM pattern that allows a distributive interpretation. Exploration of this possibility is among the issues that call for attention in future work.

References

Brown, Roger. 1973. *A first language: The early stages*. Cambridge, MA: Harvard University Press.

Carey, Susan & Elsa Bartlett. 1978. Acquiring a single new word. *Proceedings of the Stanford Child Language Conference* 15. 17–29.

Crain, S. & R. Thornton. 1998. *Investigations in Universal Grammar: A Guide to Experiments on the Acquisition of Syntax and Semantics*. Cambridge, MA: MIT Press.

Kang, Beom-Mo. 1994. Plurality and other semantic aspects of common nouns in Korean. *Journal of East Asian Linguistics* 3. 1–24.

Kim, Chae-Eun, William O'Grady & Kamil Ud Deen. 2014. The extrinsic plural marker in Korean: Five studies. *Korean Linguistics* 16. 1–17.

Kim, Yookyung. 1994. A non-spurious account of "spurious" Korean plurals. In Young-Key Kim-Renaud (ed.), *Theoretical issues in Korean linguistics*, 303–323. Stanford, CA: Center for the Study of Language and Information.

Lardiere, Donna. 2009. Some thoughts on the contrastive analysis of features in second language acquisition. *Second Language Research* 25. 173–227.

MacWhinney, B. (Ed.). 1987. *Mechanisms of language acquisition*. Hillsdale, NJ: Lawrence Erlbaum.

Piatelli-Parlmarini, Massimo & Robert Berwick. 2013. *Rich languages from poor inputs*. Oxford: Oxford University Press.

Slobin, Dan. 1985. Crosslinguistic evidence for the language-making capacity. In D. Slobin (ed.), *The crosslinguisic study of language acquisition. Volume 2: Theoretical issues*, 1157–1256. Mahwah, NJ: Lawrence Erlbaum.

Snyder, William & Diane Lillo-Martin. 2011. Principles and parameters theory and language acquisition. In Patrick Colm Hogan (ed.), *The Cambridge encyclopedia of language sciences*, 670–673. Cambridge: Cambridge University Press.

Song, Jae-Jung. 1997. The so-called plural copy in Korean as a marker of distribution and focus. *Journal of Pragmatics* 27. 203–224.

Song, Seok-Choong. 1975. Rare plural marking and ubiquitous plural marker in Korean. *Proceedings of the Annual Meeting of the Chicago Linguistics Society* 11. 536–546.

Appendix A

Participants' Background

No	Group	Age	Sex
1	1	5;07	M
2	1	5;09	F
3	1	6;09	F
4	1	6;01	M
5	1	6;03	M
6	1	5;09	M
7	1	5;08	M
8	1	5;08	F
9	1	6;05	F
10	1	6;07	F
11	2	6;01	F
12	2	5;08	M
13	2	6;00	F
14	2	6;01	F
15	2	5;03	F
16	2	6;02	M
17	2	6;04	M
18	2	6;06	M
19	2	6;08	F
20	2	6;09	F
21	3	6;06	M
22	3	6;07	F
23	3	5;04	F
24	3	5;08	F
25	3	6;01	M
26	3	6;03	F
27	3	5;09	M
28	3	5;07	M
29	3	6;06	F
30	3	6;08	F
		Mean = 6;01	

Appendix B

Korean transliterations and glosses of interventions

Negative evidence intervention

Dialogue between a fictional mother and her daughter

Mom:
Wenswungi-tul-i sey mali oli-eykey-**tul** tol-ul mil-ess-eyo.
Monkey-IPM-NOM three-CL duck-DAT-**EPM** rock-ACC push-PST-SE
The monkeys pushed to three ducks-TUL a rock.

I mwuncang-i mac-ni?
This sentence-NOM correct-Q
'Is this sentence true?'

Daughter: Ney!
'Yes'
Mom:
Ani, emma-nun "wenswungi-tul-i sey mali oli-eykey tol-ul mil-ess-eyo" lako
No, mom-TOP monkey-IPM-NOM three-CL duck-DAT rock-ACC push-PST-SE COMP
malha-ci anh-ass-e.
say-COMP NEG-PST-SE
'No, mom did not say that 'the monkeys pushed to three ducks a rock.'

Emma-nun, "wenswungi-tul-i sey mali oli-eykey-**tul** tol-ul mil-ess-eyo" lako
Mom-TOP monkey-IPM-NOM three-CL duck-DAT-**EPM** rock-ACC push-PST-SE" COMP
malhay-ss-e.
say-PST-SE
'Mom said 'the monkeys pushed to three ducks-TUL a rock.'

Daughter: Maca-yo!
Correct-SE
'You are right.'

Positive evidence intervention

Dialogue between fictional mother and daughter:

Mom:
Wenswungi-tul-i sey mali oli-eykey-**tul** tol-ul mil-ess-eyo.
monkey-IPM-NOM three-CL duck-DAT-**EPM** r ock-ACC push-PST-SE
The monkeys pushed to the ducks-TUL a rock.

I mwuncang-i mac-ni?
this sentence-NOM correct-Q
'Is this sentence true?'
Daughter:
Ney!
'Yes.'

Mom:
Cham cal hay-ss-eyo!
Very good do-PST-SE
'You did a good job!'