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The Parameter of Preposition Stranding: A View from Child English

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1. Introduction

In this squib, we investigate the time course of the acquisition of English to evaluate the basic insight of Kayne's (1981; 1984) parametric proposal that the availability of double object datives and the prepositional complementizer construction is tightly connected to the possibility of preposition stranding. We demonstrate that acquisitional evidence lends support to one component of Kayne's proposal, namely that UG contains a parameter that makes natural-language grammars permitting prepositional complementizers a proper subset of those permitting preposition stranding.

2. Kayne's (1981; 1984) Parameter of Preposition Stranding

Kayne (1981; 1984, Chapters 5 and 9) observes that English and French, despite their superficial similarity, show several interesting differences with respect to their syntactic properties. For example, while English allows preposition stranding (*P-stranding*) in *wh*-constructions, French does not allow it.[1,2]

(1) a. English: Which candidate have you voted for?
b. French: * Quel candidat as-tu voté pour?

In addition, while English allows an infinitival clause with a lexical subject that is (optionally) accompanied by a prepositional complementizer (*PC construction*), the corresponding sentences in French are ungrammatical.[3]

(2) a. English: John wants (for) Mary to leave.
b. French: * Jean veut (de) Marie partir.

Furthermore, a structure in which a single verb takes two accusative-marked objects (*double-accusative construction*) is possible in English but not in French.[4]

(3) a. English: John gave Mary a book.
b. French: * Jean a donné Marie un livre.

Icelandic is a language that has an intermediate status between English and French: It allows P-stranding in *wh*-questions as shown in (4), but does not have the PC construction or the double-accusative construction.

(4) Hann spurði hvern ég hefði talað við.
He asked whom$_{ACC}$ I had talked to
(Maling & Zaenen (1985, 151))

The observed cross-linguistic variation is summarized in Table 1.

Given these syntactic differences between English, French and Icelandic, Kayne (1981; 1984) proposed that UG contains a parameter that creates an implicational relationship between (i) the PC construction and double accusatives on one hand and (ii) P-stranding on the other. We do not go into the details of Kayne's particular implementation of this parameter here, since it is formulated within a pre-Minimalist framework and hence relies on theoretical concepts that are abandoned in the current syntactic theories. Yet, since the properties that Kayne tried to derive from a single parameter are extremely rare cross-linguistically, this is a domain in which acquisitional evidence can be especially valuable. Therefore, in the following sections we evaluate the validity of the basic insight of Kayne's P-stranding parameter, by examining the time course of the acquisition of English.[5]

3. Predictions for Acquisition

The fundamental idea in Kayne's (1981; 1984) proposal is that the parameter-settings required for P-stranding are a proper subset of the parameter-settings required for the PC construction and the double-accusative construction. If this is on the right track, then the following orders of acquisition are predicted.[6]

(5) Predictions for the Acquisition of English:

a. Children learning English should never acquire the double-accusative construction significantly earlier than P-stranding.

b. Children learning English should never acquire the PC construction significantly earlier than P-stranding.

4. Transcript Analysis

In order to test the acquisitional predictions in (5), we selected ten longitudinal corpora from the CHILDES database (MacWhinney (2000)), to obtain a total sample of more than 163,000 lines of child's speech.[7] The list of transcripts analyzed in our study is presented in Table 2.

4.1. P-stranding and the Double-Accusative Construction

For each child, we began by locating the first clear uses of (a) a direct-object *wh*-question, (b) a *wh*-question or a null-operator construction with P-stranding, and (c) a double-accusative construction. We reasoned that on Kayne's proposal, any child capable of producing both the double-accusative construction and a direct-object *wh*-question would necessarily be able to produce P-stranding with A'-movement. The CLAN program Combo, together with a complete file of English prepositions and a file of potentially dative verbs from Snyder and Stromswold (1997, 292), was used to identify potentially relevant child utterances, which were then searched by hand and checked against the original transcripts to exclude imitations, repetitions, and formulaic routines.

Results are summarized in Table 3. Nine of the ten children produced all three of direct-object *wh*-questions, the double-accusative construction, and P-stranding by the end of their corpora. Following Snyder and Stromswold (1997), the age at which a child produced his or her first clear example of a construction (followed soon after by regular use) was considered to be the age of acquisition for this construction. Mean age of acquisition for direct-object *wh*-questions was 2;3, with a range of 1;8 to 2;10.11 (years;months.days). Mean

age of acquisition for P-stranding was 2;7, with a range of 2;2 to 3;3.07. Yet, mean age of acquisition for double-accusative constructions was *earlier* than P-stranding, at 2;1 (range: 1;8 to 2;10.20).

For those nine children who acquired all three constructions before the end of the corpus, in order to evaluate the statistical significance of the observed age-differences between acquisition of P-stranding and acquisition of the double-accusative construction, we began at the first direct-object *wh*-question, and then counted the number of clear uses of the earlier construction (either P-stranding or the double-accusative construction) before the first clear use of the later construction. We next calculated the relative frequency of the two constructions in the child's own speech, starting with the transcript after the first use of the later construction, and continuing for a total of fifteen transcripts or through the end of the corpus (whichever came first). We then used a Binomial Test to obtain the probability of sampling the observed number of tokens of the earlier construction simply by chance, before the first use of the later construction, under the null hypothesis that both became available concurrently and had the same relative probability of use as in later transcripts (Stromswold (1996), Snyder and Stromswold (1997)).

The results of the statistical analysis are summarized in Table 4. Five of the nine children (April, Naomi, Peter, Sarah, Shem) actually acquired the double-accusative construction significantly earlier than P-stranding, by Binomial Test. One child (Adam) acquired double accusatives earlier than direct-object *wh*-questions and P-stranding, but the transcript containing his first clear use of a direct-object *wh*-question also contained his first clear use of P-stranding. For the remaining three children, the age-discrepancy did not reach significance ($p > .05$, by Binomial Test). But in absolute terms, all nine children acquired the double-object construction earlier than P-stranding (by about six months, on average).

In sum, the prediction in (5a) from Kayne's parameter was false. Five children in our study clearly exhibited grammars that permitted the double-accusative construction but did

not permit P-stranding. Our findings thus directly contradict Kayne's view that natural-language grammars permitting the double-accusative construction are a proper subset of those permitting P-stranding.[8]

4.2. P-stranding and the PC Construction

For each child, we took from the previous subsection the first clear uses of a *wh*-question or a null-operator construction with P-stranding, and then we located the first clear use of a PC construction with the verb *want*.[9] To count as a clear use, we required the PC construction to contain a bare infinitival verb and its overt NP subject in the complement of *want*, even though we permitted the omission of the INFL *to*. The CLAN program Combo was used to identify potentially relevant child utterances, which were then searched by hand and checked against the original transcripts to exclude imitations, repetitions, and formulaic routines.

Results are summarized in Table 5. Seven of the ten children produced P-stranding and the PC construction by the end of their corpora. Mean age of acquisition for P-stranding was 2;7, with a range of 2;2.0 to 3;3.07. Mean age of acquisition for the PC construction was 2;10, with a range of 2;8.12 to 3;3.13.[10] On average, children acquired P-stranding earlier than the PC construction by about three months.

We again evaluated the significance of the gap between these two constructions with a Binomial Test, based on the number of the earlier construction before the first use of the later construction, and based on the relative frequency of the two constructions in the next ten transcripts.

The results of the statistical analysis are summarized in Table 6. Three of the seven children (Adam, Nina, Shem) acquired P-stranding significantly earlier than the PC construction. One child (Peter) produced his first clear use of both constructions within the same transcript. The remaining three children (Abe, Naomi, Sarah) acquired P-stranding and

the PC construction at approximately the same age (no significant difference, $p > .05$, by Binomial Test). Crucially, no child in our study acquired the PC construction significantly earlier than P-stranding.[11] This result is especially striking because the two constructions had very similar age ranges for their acquisition. Moreover, an explanation simply in terms of relative frequency of usage of the two constructions is excluded, because the Binomial Test already takes relative frequency into account. Thus, our results have borne out the prediction in (5b).

One might argue, however, that if there is some performance factor that initially prevents children from producing any type of postverbal NP+Predicate constructions, then this factor would explain the observed ordering between P-stranding and the PC construction. In order to evaluate this possibility, we investigated the order of acquisition between P-stranding and the V-NP-VP constructions with verbs of causation and perception. The four verbs *hear*, *make*, *see*, and *watch*, were selected because of their high frequency of use in adult English (Snyder and Stromswold (1997, 296)). The CLAN program Combo, together with a file that contained any form of the four verbs, was used to identify potentially relevant child utterances, which were then searched by hand and checked against the original transcripts to exclude imitations, repetitions, and formulaic routines. In order for a construction to be counted, it had to contain a bare infinitival verb and an NP subject of the infinitival that was either in the accusative case or was not overtly Case-marked.

Results are summarized in Tables 7 and 8. Crucially, four children (Eve, Nina, Sarah, Shem) acquired causative/perceptual constructions significantly earlier than P-stranding. This finding speaks against an account of the P-Stranding/PC ordering in terms of general processing difficulty. Instead, the ordering appears to reflect the fine-grained grammatical knowledge required specifically for P-Stranding and for the PC construction.

5. Conclusions

In this study, we evaluated the basic insight of Kayne's (1981; 1984) parametric proposal by analyzing ten longitudinal corpora for English. Our results have shown that the time course of the acquisition of English directly contradicts Kayne's view that natural-language grammars permitting the double-accusative construction are a proper subset of those permitting P-stranding. At the same time, we have presented acquisitional evidence that lends support to one portion of Kayne's proposal, namely that natural-language grammars allowing the PC construction are a proper subset of those allowing P-stranding. This finding constitutes a new argument for the parameter-setting model of language acquisition proposed in Chomsky (1981), which in turn suggests that the time course of child language acquisition is a potentially rich source of evidence concerning the innate constraints on language variation (Snyder 2001, Snyder and Stromswold 1997, Sugisaki 2003).

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Table 1: Cross-linguistic Variation

	English	Icelandic	French
P-stranding	YES	YES	NO
PC construction	YES	NO	NO
double accusatives	YES	NO	NO

Table 2: Corpora Analyzed

Child	Corpus collected by	Ages	#Files analyzed	#Child utterances
Abe	Kuczaj (1976)	2;4.24 - 2;11.30	60	7,648
Adam	Brown (1973)	2;3.04 - 3;5.01	30	26,776
Allison	Bloom (1973)	1;4.21 - 2;10.0	6	2,192
April	Higginson (1985)	1;10 - 2;11	6	2,321
Eve	Brown (1973)	1;6 - 2;3	20	12,473
Naomi	Sachs (1983)	1;2.29 - 4;9.03	93	16,634
Nina	Suppes (1973)	1;11.16 - 3;2.04	50	28,179
Peter	Bloom (1970)	1;9.08 - 3;1.20	20	30,256
Sarah	Brown (1973)	2;3.05 - 3;8.27	75	20,787
Shem	Clark (1978)	2;2.16 - 3;0.20	43	16,282
Total				163,548

Table 3: Ages of Acquisition for Direct-Object *Wh*-question, Double Accusatives, and P-stranding

Child	direct-object *wh*-questions	double accusatives	P-stranding
Abe	2;5.0	2;6.14	2;7.07
Adam	2;5.12	2;3.04	2;5.12
Allison	2;10.0	1;10.0	-----
April	2;1	1;10	2;9
Eve	1;8	1;8	2;2
Naomi	1;11.30	2;0.05	2;8.23
Nina	2;2.12	1;11.29	2;9.13
Peter	2;1.18	2;1.0	2;8.12
Sarah	2;10.11	2;10.20	3;3.07
Shem	2;2.16	2;3.21	2;6.06
Mean	2;3	2;1	2;7

Table 4: Results of the Statistical Analysis

			Relative frequency		
Child	# of earlier construction		double accusatives	P-stranding	p =
Abe	1	(double accusatives)	.692	.308	$p > .10$
Adam	0		.602	.398	-----
April	4	(double accusatives)	.250	.750	$p < .01$
Eve	19	(double accusatives)	.889	.111	$p > .10$
Naomi	11	(double accusatives)	.692	.308	$p < .05$
Nina	16	(double accusatives)	.836	.164	$p > .05$
Peter	37	(double accusatives)	.919	.081	$p < .05$
Sarah	18	(double accusatives)	.837	.163	$p < .05$
Shem	5	(double accusatives)	.310	.690	$p < .01$

Table 5: Ages of Acquisition for P-stranding and the PC Construction

Child	P-stranding	PC construction
Abe	2;7.07	2;7.11
Adam	2;5.12	2;9.04
Allison	-----	2;10
April	2;9	-----
Eve	2;2	-----
Naomi	2;8.23	2;11.08
Nina	2;9.13	2;10.21
Peter	2;8.12	2;8.12
Sarah	3;3.07	3;3;13
Shem	2;6.06	2;11.10
Mean	2;7	2;10

Table 6: Results of the Statistical Analysis

			Relative frequency		
Child	# of earlier construction		P-stranding	PC construction	p =
Abe	1	(P-stranding)	.458	.542	$p > .10$
Adam	16	(P-stranding)	.174	.826	$p < .01$
Naomi	2	(P-stranding)	.500	.500	$p > .10$
Nina	11	(P-stranding)	.571	.429	$p < .01$
Sarah	1	(P-stranding)	.412	.588	$p > .10$
Shem	22	(P-stranding)	.429	.571	$p < .01$

Table 7: Ages of Acquisition for P-stranding and Causative/Perceptual Constructions

Child	P-stranding	Causative/Perceptual
Abe	2;7.07	2;7.07
Adam	2;5.12	2;8.01
Allison	-----	2;4
April	2;9	2;1
Eve	2;2	1;11
Naomi	2;8.23	3;3.27
Nina	2;9.13	2;0.24
Peter	2;8.12	2;4.15
Sarah	3;3.07	2;10.05
Shem	2;6.06	2;2.16
Mean	2;7	2;5

Table 8: Results of the Statistical Analysis

			Relative frequency		
Child	# of earlier construction		P-stranding	Causative/Perceptual	p =
Adam	13	(P-stranding)	.655	.345	$p < .01$
April	2	(Causative/Perceptual)	.750	.250	$p > .05$
Eve	12	(Causative/Perceptual)	.500	.500	$p < .01$
Naomi	4	(P-stranding)	.655	.455	$p > .05$
Nina	10	(Causative/Perceptual)	.403	.597	$p < .01$
Peter	4	(Causative/Perceptual)	.200	.800	$p > .10$
Sarah	5	(Causative/Perceptual)	.538	.462	$p < .05$
Shem	10	(Causative/Perceptual)	.643	.357	$p < .01$

Appendix: Children's First Clear Use

Abe:

a.	*ABE:	what you doing ?	(Abe002: line 119)
b.	*ABE:	no you show Mike this picture for Mike […]	(Abe017:37)
c.	*ABE:	Mom # I blowed you in the fingers Mom # what's that for ?	(Abe021:274)
d.	*ABE:	because I [/] I want it to snow and I sled.	(Abe030:24)
e.	*ABE:	# Georgie and Porgie # pudding and pie # make those girls # make them cry .	(Abe002:55)

Adam:

a.	*ADA:	what shell doing ?	(Adam05:24)
b.	*ADA:	gi(ve) me screwdriver .	(Adam01:810)
c.	*ADA:	where dat come from ?	(Adam05:9)
d.	*ADA:	want car to <go> [/] go dat way?	(Adam15:313)
e.	*ADA:	see me put de boot on ?	(Adam11:834)

Allison:

a.	*ALI:	what does the pig say .	(Allison6:411)
b.	*ALI:	get Mommy cookie .	(Allison4:123)
c.	*ALI:	want her to put her feet down.	(Allison6:573)
d.	*ALI:	make him run run .	(Allison5:1384)

April:

a.	*APR:	what goat say ?	(April02:854)
b.	*APR:	give Roy it .	(April01:597)
c.	*APR:	owl to play with .	(April04:419)
d.	*APR:	make me laugh .	(April03:2547)

Eve:

a.	*EVE:	what doing # Mommy ?	(Eve05:69)
b.	*EVE:	Fraser read Eve Lassie .	(Eve05:29)
c.	*EVE:	it's a bathtub for a boy get in .	(Eve18:1980)
d.	*EVE:	see me hammer .	(Eve12:3287)

Naomi:

a.	*NAO:	what-'is Mommy doing ?	(N34:78)
b.	*NAO:	can make it horse ?	(N37:136)
c.	*NAO:	what-'is this go in ?	(N70:105)
d.	*NAO:	I want you to read this.	(N79:228)
e.	*NAO:	see George do it ?	(N46:177)

Nina:

a.	*NIN:	what is daddy holding ?	(Nina14:1119)
b.	*NIN:	Frank sent Nina book .	(Nina03:1173)
c.	*NIN:	who's that you talking to # Momma .	(Nina32:1429)
d.	*NIN:	she # she wants me to carry her.	(Nina37:600)
e.	*NIN:	make it stand up .	(Nina07:1446)

Peter:

a.	*PET:	Mommy # what you doing .	(Peter08:528)
b.	*PET:	<oh my pen # gonna get Mama pen> [<] .	(Peter07:3594)
c.	*PET:	what this come from ?	(Peter13:2043)
d.	*PET:	want em to fall down.	(Peter17:2068)
e.	*PET:	watch me do the blocks .	(Peter12:1316)

Sarah:

a.	*SAR:	what my doing ?	(Sarah033:522)
b.	*SAR:	give me some more .	(Sarah034:79)
c.	*SAR:	whe(r)e you at .	(Sarah052:332)
d.	*SAR:	I wan(t) Daddy to help me.	(Sarah053:556)
e.	*SAR:	make it stand up ?	(Sarah032:1365)

Shem:

a.	*SHE:	what is mommy doing ?	(Shem01:539)
b.	*SHE:	(I)-'m draw you uh baby fast .	(Shem05:291)
c.	*SHE:	i(t)'s step for sitting on .	(Shem15:801)
d.	*SHE:	i wan(t) uh porcupine to be duh boy.	(Shem21B:108)
e.	*SHE:	make it go in the [/] there .	(Shem01:478)

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[1] For a detailed typology of P-stranding with *wh*-movement, see Sugisaki and Snyder (2002). That study provides an acquisitional argument for Stowell's (1981) proposal that P-stranding is restricted to those languages that have the verb-particle construction.

[2] P-stranding with NP-movement as in (i) is observed only in a proper subset of languages that allow P-stranding with *wh*-movement. See Maling and Zaenen (1985) for disucussion.

(i) This problem was already accounted for.

[3] See Lasnik and Saito (1991, 337) for data suggesting that in sentences like (2a), when *for* is not overtly present the infinitival subject is assigned Case not by the matrix verb, but by a null prepositional complementizer. Following Lasnik and Saito, we also treat ECM with

believe-class verbs as fully distinct from the PC construction. In this respect we diverge from the details of Kayne's original proposals.

[4] The term double-accusative construction is based on the fact that both of the two NPs that follow the verb in the English example (3a) bear morphological accusative case. We can observe this in the following example, in which both of the objects are pronouns:

(i) I showed him her.

Yet, it might be the case that one of the two objects bears dative Case, and that the loss of the morphological distinction between accusative and dative in English masks this fact. In the analysis by Kayne (1984), it is crucially assumed that both of the NPs in fact bear accusative Case.

[5] For proposals about the P-stranding parameter, see also Abels (2003), Bošković (2004), Hornstein and Weinberg (1981), Law (1998), Maling (1977), van Riemsdijk (1978), Salles (1997), and Stowell (1981), among many others.

[6] Stromswold (1988) conducted an earlier investigation of acquisitional orderings between these constructions in order to test the validity of Kayne's parametric system. She claimed that her findings, obtained by analysis of the five longitudinal corpora then available for English in CHILDES (MacWhinney 2000), did not support Kayne's parameter at all. In our view, however, Stromswold's study contains several problems. The most serious one is that Stromswold tested the prediction that all three constructions would appear in the child's speech simultaneously, which is unnecessarily strong. Since P-stranding, double accusatives and the PC construction differ in the combination of parametric values on which they depend, the prediction Stromswold tested would not be the correct one. The correct prediction from Kayne's parameter is about *order* of acquisition, as stated in (5). See Sugisaki (2003) for a more detailed discussion.

[7] See Stromswold (1996) for inherent advantages and limitations of a spontaneous speech

study.

[8] Our results are consistent with Zhang's (1990) cross-linguistic evidence against Kayne's proposal, which suggests that Chinese allows the double-accusative construction but still prohibits P-stranding.

[9] The PC constructions with other verbs (e.g. *prefer*) were extremely rare in the child speech, and hence we focused on *want* in this study.

[10] In an earlier version of this paper we reported slightly different ages for Peter and Shem. Here we more strictly follow the criterion of 'first clear use, *followed soon after by regular use*.' This change has little effect on the overall results, however.

[11] Allison poses a potential problem for this conclusion, because she showed clear uses of the PC construction, but not P-stranding, by the end of her corpus. Yet, closer examination of her data reveals that the difference in age of acquisition between the PC construction and P-stranding did not reach statistical significance. Her first clear use of the PC construction appeared in the last transcript, and she produced only three clear uses of that construction before the end of her corpus. Consequently, if we run a binomial test using the average relative frequency (.576) from the six children in Table 6, the result does not reach significance ($p > .10$).

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