

The Acquisition of Preposition Stranding and its Theoretical Implications*

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1. Introduction

An impressive number of language acquisition studies conducted within the Principles and Parameters approach to UG have made at least two major findings. One group of studies revealed that various principles of UG constrain the course of acquisition from virtually the very beginning of life (e.g. Otsu 1981, Crain and Thornton 1998), and a different group of studies demonstrated that even children's "errors" fall under the range of possible human languages determined by parameters (e.g. Hyams 1986, McDaniel et al. 1995, Thornton 2004). In making these findings, the contribution was mainly from theoretical studies to the study of child language, in that the role of the latter was limited to providing supporting evidence to the former. Yet, recent vast progress in both of these fields further tightened the connection between theoretical analyses and acquisition research, and enables us to make the opposite contribution. In this study, I will summarize some of my own works on the acquisition of preposition stranding and of pied-piping to illustrate how the investigations of child language can contribute to the study of syntax. More specifically, I will demonstrate that the time course of the acquisition of these properties has the potential to differentiate among the competing syntactic proposals concerning (i)

the nature of the preposition-stranding parameter and (ii) the derivation of *swiping* construction (Merchant 2002).

2. The Parameter of Preposition Stranding: A View from Child Language

From a cross-linguistic perspective, the possibility of preposition stranding illustrated in (1) is among the more exotic properties of English. The productive use of preposition/postposition stranding (hereafter, *P-stranding*) with A'-movement is attested only in some of the Germanic languages and in African languages of the Kru family, such as English, Danish, Icelandic, Norwegian, Swedish, and Gbadi (Maling 1977, van Riemsdijk 1978, Koopman 1984). In many other languages, obligatory pied-piping of prepositions is required, as illustrated by the French examples in (3).

(1) English: Which subject have you talked about *t* ?

(2) Gbadi (Koopman 1984:54):

táǫlĒ ₁	yI	wa	kÉ	-lÒ	lĪĒ	t ₁	klÚ	jIĪE
table	WH	they	FUT-A-FOC	food		on	put	

‘It is the table they will put the food on.’

(3) French:

a. * Quel sujet as-tu parlé de *t* ?
 which subject have-you talked about

‘Which subject have you talked about?’

b. De quel sujet as-tu parlé *t* ?
 about which subject have-you talked

In light of such cross-linguistic variation, many attempts have been made to determine what parameters are crucially relevant for the availability of this marked property (Abels 2003, Bošković 2001, Herslund 1984, Hornstein and Weinberg 1981, Kayne 1981, 1984, Law 1998, 2006, Maling 1977, van Riemsdijk 1978, Salles 1997, Stowell 1981, 1982, among many others). In this section, I will evaluate two of these approaches with the data from the acquisition of English and French. Evidence from child language lends support to Stowell's (1981, 1982) parametric proposal that the availability of P-stranding should be tightly connected to the availability of transitive verb-particle construction, and argues against the proposals by Law (1998, 2006) and Salles (1997) which relate the lack of P-stranding in Romance to the existence of suppletive forms of prepositions and determiners.¹

2.1 P-stranding and the Transitive Verb-Particle Construction²

In a pre-minimalist framework, Stowell (1981, 1982) proposed that preposition-stranding is possible only in languages that permit the V-Particle-NP construction (and postposition-stranding, only in languages with the NP-Particle-V construction). Stowell adopts the assumption from Hornstein and Weinberg (1981) that there is a UG constraint which dictates that Reanalysis must apply in the syntax in order for P-stranding to be possible. Reanalysis is an operation that creates a complex verb from a verb and a preposition. According to Stowell, the verb-particle combination provides a 'template' for the complex verb created by the Reanalysis operation. If a language has a transitive verb-particle construction with the order verb + particle as in (4a), then that combination provides a template to reanalyze the verb and the prepositional head of the following PP into a single complex verb. Similarly, if a language

contains a verb-particle construction with the order particle + verb as in (4b), then that combination provides a template to reanalyze the verb and the postpositional head of the preceding PP into a single complex verb.

- (4) verb-particle Reanalysis
- a. [V V + Prt] : V [PP P NP] → [V V + P] NP
- b. [V Prt + V] : [PP NP P] V → NP [V P + V]

Since English permits the verb-particle construction with the order verb + particle, as shown in (5), this language is allowed to reanalyze the verb and the prepositional head of the following PP. Hence, ‘preposition-stranding’ is possible. In Dutch, the verb-particle construction has the order particle + verb as shown in (6), and thus Dutch allows the reanalysis of the verb and the head of the preceding postpositional phrase. Hence, ‘postposition-stranding’ is possible in Dutch as illustrated in (7b), even though its possibility is very limited, compared to English.

(5) John should pick up the book.

(6) ... omdat Jan mijn broer op belde
 because John my brother up called

(van Riemsdijk 1978: 91)

(7) a. Zij probeert [PP er in] te klimmen.
 she tries there in to climb

‘She is trying to climb into it.’

- b. Waar₁ probeert t₁ in te klimmen?
 where tries in to climb
 ‘Where is she trying to climb into?’ (Stowell 1982: 249)

As Baltin and Postal (1996) discuss in detail, Reanalysis operation faces a number of empirical problems. In addition, it is not clear whether such operation can be maintained in the current Minimalist framework (Chomsky 1995). However, the fundamental part of Stowell’s proposal seems to be on the right track. Our cross-linguistic survey suggests that P-stranding is in fact permitted only in those languages that allow transitive verb-particle construction.

(8) A Cross-linguistic survey:

	<u>P-stranding?</u>	<u>Transitive Verb-Particles?</u>
<i>(I-E) North Germanic:</i>		
Icelandic:	YES	YES
Norwegian:	YES	YES
Swedish:	YES	YES
Danish:	YES	YES
<i>(I-E) West Germanic:</i>		
English:	YES	YES
Dutch:	Limited	YES
Frisian:	Limited	YES
Afrikaans	Limited	YES
German	NO	YES
<i>Niger-Congo:</i>		
Bete-Gbadi:	YES	YES
Vata:	YES	YES
<i>Afro-Asiatic:</i>		
Hebrew:	NO	NO
<i>Altaic:</i>		
Turkish:	NO	NO

<i>Japanese-Korean:</i>		
Japanese:	NO	NO
<i>(I-E) Greek:</i>		
Greek:	NO	NO
<i>(I-E) Romance:</i>		
French:	NO	NO
Spanish:	NO	NO
Italian:	NO	NO
<i>(I-E) Slavic:</i>		
Bulgarian:	NO	NO
Russian:	NO	NO
Serbo-Croatian:	NO	NO
<i>Isolate:</i>		
Basque:	NO	NO

If Stowell's parametric proposal is correct in arguing that the transitive verb-particle construction constitutes one of the prerequisites for P-stranding, it is predicted that children learning English should never acquire P-stranding significantly earlier than the V-Particle-NP construction. In order to evaluate this prediction, Sugisaki and Snyder (2002) analyzed ten longitudinal corpora from the CHILDES database (MacWhinney 2000), which provided a total sample of more than 124,000 lines of child speech.

For each child we began by locating the first clear uses of (a) a V-Particle-NP construction, (b) a direct-object *wh*-question, (c) a *wh*-question or a null-operator construction with preposition-stranding. The CLAN program Combo, together with a complete file of English prepositions and of English particles, 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.

(9) Corpora analyzed:

<u>Child</u>	<u>Collected by</u>	<u>Age Span</u>	<u># Child Utterances</u>
Abe	Kuczaj (1976)	2;04 – 5;00	4,214
Adam	Brown (1973)	2;03 – 4;10	9,253
Allison	Bloom (1973)	1;04 – 2;10	2,192
April	Higginson (1985)	1;10 – 2;11	2,321
Eve	Brown (1973)	1;06 – 2;03	12,473
Naomi	Sachs (1973)	1;02 – 4;09	16,634
Nina	Suppes (1973)	1;11 – 3;03	22,957
Peter	Bloom (1970)	1;09 – 3;01	24,422
Sarah	Brown (1973)	2;03 – 5;01	20,787
Shem	Clark (1978)	2;02 – 3;02	9,178

The results were as follows. Among the ten children, eight of them acquired V-Particle-NP constructions, direct-object *wh*-questions, and P-stranding by the end of their corpora. Following Stromswold (1996) and Snyder (2007), the age at which a child produced his or her first clear example of a construction was considered to be the age of acquisition for this construction. Mean age of acquisition for V-Particle-NP construction was 2;03. Mean age of acquisition for P-stranding was 2;07. Thus, the mean age of acquisition for the V-Particle-NP construction was earlier than preposition-stranding by about 4 months. To evaluate the statistical significance of an observed age-difference between the acquisition of the V-Particle-NP construction and the acquisition of P-stranding, we began at the child's first direct-object *wh*-question. (We reasoned that it was appropriate to look for a *wh*-question with P-stranding only when the child was already using *wh*-movement in simple, direct-object questions.) We then counted the number of clear uses of the earlier construction (either V-Particle-NP or P-stranding) before the first clear use of the later construction. Next we 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 four transcripts or through the end of the corpus (whichever came first). Finally we used the 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 2007).

Results of the statistical analysis were as follows. Six of the eight children acquired the V-Particle-NP construction significantly earlier than P-stranding, by Binomial Test (Eve, Naomi, Nina, Peter, Sarah, Shem). The remaining two children acquired the V-Particle-NP construction and P-stranding at approximately the same age (no significant difference, by Binomial Test). Crucially, no child in our study acquired P-stranding significantly earlier than the V-Particle-NP construction. These findings from child English lend support to Stowell's parametric proposal that languages permitting P-stranding are a proper subset of those permitting transitive verb-particle construction: Since UG excludes the grammar that allows P-stranding but disallows verb-particles, English-learning children never exhibit an intermediate stage in which only P-stranding is permitted.

2.2. Obligatory Pied-piping and the Suppletive Forms of Prepositions and Determiners³

The parametric proposal by Stowell (1981, 1982) discussed in the previous section attempted to explain why P-stranding is permitted in English. In contrast, Law (1998, 2006) and Salles (1997) proposed an account for why prepositions

are obligatorily pied-piped in a number of languages. More specifically, they argue that the lack of P-stranding in French and other Romance languages can be attributed to an independent morphological property of these languages: A preposition sometimes coalesces with the following determiner into a suppletive form (henceforth, *P+D suppletive forms*). The relevant examples are given in (10) - (13).

(10) French (Law 1998:226):

Jean a parlé du sujet le plus difficile.
Jean have talked about-the subject the most difficult
'Jean talked about the most difficult subject.'

(11) Italian (Law 1998:227):

Gianni ha parlato del sogetto più difficile.
Gianni have talked about-the subject most difficult
'Gianni talked about the most difficult subject.'

(12) Portuguese (Salles 1997):

a volta ao Brasil
the return to-the Brasil

(13) German (Law 1998:227):

Hans war am Schalter.
Hans was by-the counter
'Hans was by the counter.'

Building on their cross-linguistic survey summarized in (14), Law and Salles postulate the generalization that if a language has P+D suppletive forms, then pied-piping of prepositions (*P-pied-piping*) is obligatory. In other words,

they propose that the existence of P+D suppletive forms in a given language constitutes a *sufficient* condition for obligatory P-pied-piping.

(14) Cross-linguistic survey:

	<u>P+D suppletive forms?</u>	Obligatory <u>P-pied-piping?</u>
<i>Romance:</i>		
French:	YES	YES
Italian:	YES	YES
Portuguese:	YES	YES
<i>Germanic:</i>		
German:	YES	YES
English	NO	NO
Scandinavian languages:	NO	NO

In order to account for this cross-linguistic generalization, Law (1998, 2006) postulates the parameter and the principle given in (15) and (16), respectively. Romance languages in general (and German) take the positive value of the parameter in (15), while English and Scandinavian languages take its negative setting. If the positive value is chosen, the head of DP in that language *always* incorporates into P, as shown in (17).

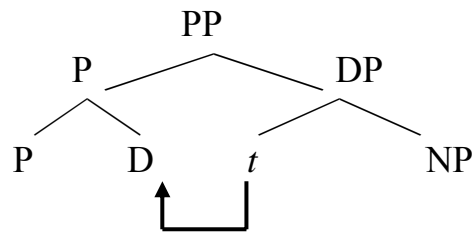
(15) Parameter of D-to-P incorporation:

A language {has, does not have} D-to-P incorporation.

(16) Syntactic constraint on suppletion (Law 1998:227):

Elements that undergo suppletive rules must form a syntactic unit X^0 .

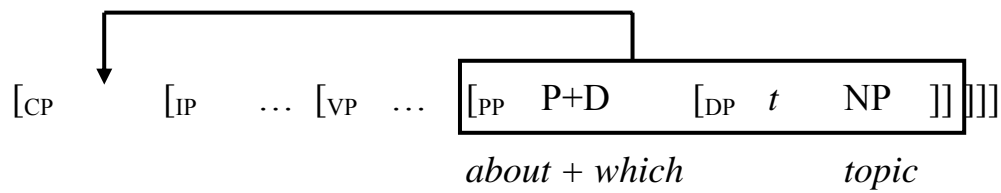
(17) D-to-P incorporation:



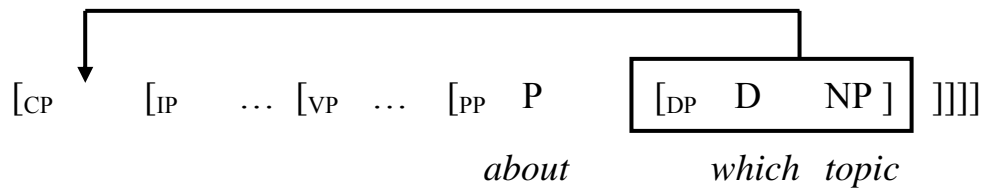
Given the constraint in (16), only those languages that have the positive setting of the relevant parameter are permitted to have P+D suppletive forms. Languages with the negative setting do not allow adjunction of the D head to P, and hence never satisfy the constraint on the application of suppletive rules stated in (16). In other words, the availability of P+D suppletive forms in a given language is an indication that the language has the setting which dictates that D must incorporate into P in the structure (17).

The obligatory P-pied-piping in Romance languages also follows from the positive setting of the parameter in (15). If we assume that *wh*-words are Ds, then languages with the positive value require that *wh*-words in the complement of P should undergo adjunction to P. Under this situation, the minimal phrasal category that contains the *wh*-word is PP, and hence the *wh*-movement to the specifier of CP results in P-pied-piping. On the other hand, in languages with the negative value, there is no incorporation of the *wh*-word to P, and thus the *wh*-word can move to the specifier of CP without pied-piping the prepositional head. The relevant derivations are schematically shown in (18) and (19).

(18) Languages with the positive setting:



(19) Languages with the negative setting:



In sum, under Law's parametric system, the existence of P+D suppletive forms in a given language is a reflection of the positive setting of the parameter in (15) that induces obligatory D-to-P incorporation, and this obligatory D-to-P incorporation is the trigger for obligatory pied-piping of prepositions with *wh*-movements.

The analyses by Law (1998, 2006) and Salles (1997) argue that, in every language that has such suppletive forms, D-incorporation to P is obligatory and hence pied-piping of prepositions is required. In acquisitional terms, their analyses suggest that the only language-particular knowledge that French-learning children need to acquire in order to induce obligatory P-pied-piping is (i) the knowledge about the availability of P+D suppletive forms and (ii) the knowledge about overt *wh*-movement. This should lead to the following prediction for acquisition: A French-learning child should exhibit P-pied-piping as soon as she acquires P+D suppletive forms and overt *wh*-movement.

In order to evaluate this prediction, Isobe and Sugisaki (2002) analyzed two longitudinal corpora for French in the CHILDES database (MacWhinney 2000).

(20) Corpora analyzed:

<u>Child</u>	<u>Collected by</u>	<u>Age Span</u>	<u># Child Utterances</u>
Grégoire	Champaud	1;09 – 2;05	3,237
Philippe	Suppes et al. (1974)	2;01 – 3;03	13,739

For each child, we began by locating the first clear uses of (a) an overt *wh*-movement of *que* ‘what’ or *qui* ‘who’ from a complement position, (b) a *wh*-question with pied-piping, and (c) a P+D suppletive form. To count as a clear use, we required the P+D suppletive form to appear after verbs, nouns, or adjectives that take a PP complement, thereby eliminating the possibility that the child is using the relevant form as a pure determiner. The age of acquisition was taken as the first clear use, followed soon after by additional uses (Stromswold 1996, Snyder 2007). The CLAN program Combo, together with complete files of *wh*-words and P+D suppletive forms in French, was used to identify potentially relevant utterances, which were then searched by hand and checked against the original transcripts to exclude imitations, repetitions, and formulaic routines.

The results were as follows. One child (Philippe) acquired direct-object *wh*-questions, *wh*-questions with pied-piping, and P+D suppletive forms by the end of his corpus. He acquired direct-object *wh*-questions at the age of 2;2, P+D suppletive forms at the age of 2;2, *wh*-questions with pied-piping at the age of 2;6. To evaluate the statistical significance of observed age-differences between acquisition of P-pied-piping and acquisition of P+D suppletive forms in Philippe, we began at the first overt *wh*-movement, and then counted the number of clear uses of the earlier construction before the first clear use of a 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 through the end of the corpus. We then used a Binomial Test to obtain the probability of sampling the observed number of token of the earlier construction simply by chance, before the first clear 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 2007).

The results of the statistical analysis revealed that the age-discrepancy between the P+D suppletive form and P-pied-piping was statistically *significant* ($p < .05$, by Binomial Test). This indicates that Philippe acquired P-pied-piping significantly *later* than overt *wh*-movement and P+D suppletion, contrary to the prediction from the parametric proposal by Law (1998, 2006) and Salles (1997). Our findings from the acquisition of French directly contradict Law-Salles's view that the existence of P+D suppletive forms in a given language constitutes a *sufficient* condition for the obligatory pied-piping of prepositions. One child in our study clearly exhibited a grammar that permitted both overt *wh*-movement and P+D suppletion but did not permit P-pied-piping. Our results are compatible only with an analysis in which the availability of P+D suppletive forms is a *necessary* condition for pied-piping. Yet, such an analysis would be far from appealing, given that it permits adult grammars that have P+D suppletive forms but still permit P-stranding. Hence, evidence from child French argues against the view that the parameter of P-stranding should relate the lack of preposition stranding to the existence of suppletive forms of prepositions and determiners.⁴

2.3 Interim Summary

In this section, we have shown that the time course of acquisition is consistent with Stowell's (1981, 1982) parametric proposal that the parameter of

P-stranding should create an implicational relationship between P-stranding and transitive verb-particle construction, but is inconsistent with the parametric view by Law (1998, 2006) and Salles (1997) that the lack of preposition stranding should be connected to the existence of suppletive forms of prepositions and determiners. Even though a minimalist reformulation of the P-stranding parameter that can capture these observations is a remaining issue, these findings severely restrict the range of possible parametric analyses, and hence demonstrate that the time course of acquisition is potentially an important ground to evaluate parametric proposals.

3. The Syntax of Swiping: A View from Child Language⁵

In this section, we shift our focus to a different construction in English, which has surface similarity to P-stranding. It has been observed at least since Ross (1969) and Rosen (1976) that English allows a peculiar type of elliptical *wh*-questions that can be found only under sluicing, in which the *wh*-object of the preposition appears not after the preposition but before it, as illustrated in (21). Merchant (2002) calls this construction *Swiping* (sluiced *wh*-word inversion with prepositions in Northern Germanic).

- (21) a. John fixed it, but I don't remember what with.
b. John was talking, but I don't remember who to.

Since the recent minimalist analysis by Merchant (2002), this phenomenon has gained much attention, and two major types of analysis have been proposed in the syntactic literature. One approach (Merchant 2002; see also van Craenenbroeck 2004) argues that swiping crucially involves pied-piping of

prepositions in its derivation, while the other approach (Hasegawa 2006, Kim 1997, Nakao and Yoshida 2006; see also Richards 2001) claims that swiping is derived through P-stranding. In this section, I will summarize the findings of Sugisaki (2008) to demonstrate that the time course of the acquisition has the potential to differentiate between these two competing approaches.

3.1. Two Approaches to Swiping

One of the fundamental characteristics of swiping is that, at least in English, only a limited variety of *wh*-expressions can occur in this construction. Based on his classification of *wh*-elements in swiping sentences given in (22), Merchant (2002) proposes the generalization in (24) that the *wh*-element must be a head, not a phrase.⁶

(22) Possible and impossible *wh*-elements in swiping:

- a. Swiping possible: who, what, when, where
- b. Swiping impossible: which, which one, whose, how rich,
 what kind, what time, what town, etc.

(23) a. * She bought a robe for one of her nephews, but God knows which
 (one) for.

- b. * They were riding in somebody's car, but I don't know whose in.

(24) The Minimality Condition:

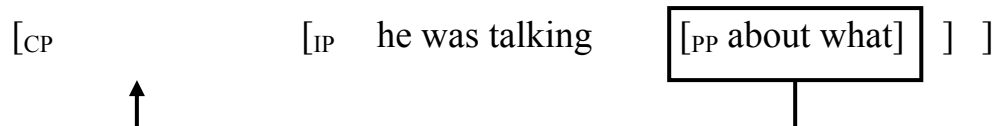
Only 'minimal' (i.e. X^0) *wh*-operators occur in swiping.

In order to account for this fundamental property of swiping, Merchant (2002) proposed an analysis in which swiping sentences are derived through *wh*-movement involving pied-piping of a preposition, followed by head

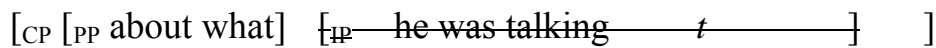
movement of the *wh*-word to the selecting preposition in the PF component. A sample derivation under this analysis is shown in (25).

(25) (John was talking, but I don't remember ...)

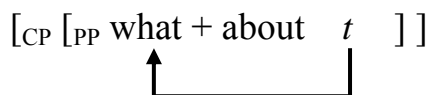
a. *wh*-movement + P-pied-piping:



b. sluicing (IP-deletion) in PF:



c. head movement in PF:



This “P-pied-piping + PF head-movement” analysis provides a straightforward account for the Minimality Condition: In order to adjoin to the preposition, which is a head, the *wh*-element must also be a head, due to Structure Preservation. In other words, by using head movement to derive the observed inversion, this analysis correctly rules out the possibility that phrasal *wh*-operators participate in swiping.

Even though the analysis by Merchant (2002) captures the Minimality Condition (24) in a straightforward way, it offers no account of the cross-linguistic distribution of swiping that Merchant himself notes: The languages that allow swiping are limited to those that permit P-stranding. English, Danish, and some varieties of Norwegian allow swiping, and these languages also permit P-stranding, as illustrated in (26) and (27).

(26) Danish:

- a. Per er gået i biografen, men jeg ved ikke
Per is gone to cinema but I know not
hven med.
who with

‘Per went to the movies but I don’t know who with.’

- b. Hvem har Peter snakket med?
who has Peter talked with

‘Who was Peter talking with?’

(27) Norwegian:

- a.% Per gikk på kino, men jeg veit ikke hvem med.
Per went to cinema but I know not who with

‘Per went to the movies but I don’t know who with.’

- b. Hvem har Per snakket med?
who has Per talked with

‘Who was Per talking with?’

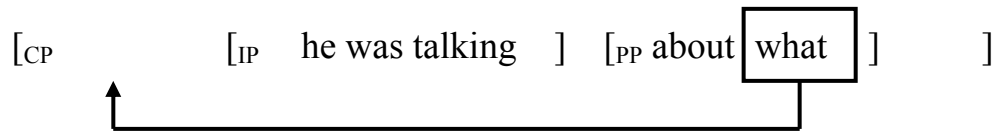
An alternative approach proposed by Hasegawa (2006), Kim (1997), and Nakao and Yoshida (2006) is better suited to explain this cross-linguistic generalization. These studies argue that the swiping construction is derived through the combination of P-stranding and a rightward movement of PP. A sample derivation under Kim’s (1997) analysis is shown in (28).

(28) (John was talking, but I don't remember ...)

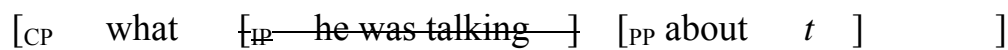
a. rightward movement of PP:



b. *wh*-movement + P-stranding:



c. sluicing (IP-deletion) in PF:



Such a “P-stranding + PP movement” analysis is quite appealing in that it opens up a way to capture the cross-linguistic generalization that swiping is restricted to P-stranding languages. On the other hand, this approach has difficulty in offering a satisfactory account of the Minimality Condition: There is no reason not to expect both phrasal and minimal *wh*-expressions to appear in the swiping construction, given that both of them can undergo P-stranding.

(29) a. What was John talking about?

b. Which (book) was John talking about?

Then, since both the “P-pied-piping + PF head-movement” analysis and the “P-stranding + PP movement” analysis have their own strengths and weaknesses, the evaluation of these two approaches awaits evidence from a different source. In light of this situation, we now turn to a novel source of evidence: the time course of child language acquisition.

3.2. Transcript Analysis

The “P-pied-piping + PF head-movement” approach and the “P-stranding + PP movement” make different predictions for the acquisition of English. The former approach gives *wh*-movement involving P-pied-piping a central role in the derivation of swiping. Under this analysis, the syntactic knowledge required for P-pied-piping constitutes a proper subset of the syntactic knowledge required for swiping. Then, we expect that English-learning children should never acquire swiping significantly earlier than pied-piping with *wh*-movement. In other words, the P-pied-piping approach predicts that (30) should hold in the acquisition of English. In contrast, under the P-stranding approach, *wh*-movement involving P-stranding constitutes a crucial step in deriving swiping sentences, and the syntactic knowledge required for P-stranding constitutes a proper subset of the syntactic knowledge required for swiping. Then, we predict that English-learning children should never acquire swiping significantly earlier than P-stranding with *wh*-movement, as stated in (31).

(30) *Prediction from the P-pied-piping Approach:*

English-learning children should acquire P-pied-piping with *wh*-movement significantly earlier than or at around the same time as swiping.

(31) *Prediction from the P-stranding Approach:*

English-learning children should acquire P-stranding with *wh*-movement significantly earlier than or at around the same time as swiping.

In order to determine which of the two acquisitional predictions is correct, Sugisaki (2008) analyzed 20 longitudinal corpora for English from the CHILDES database (MacWhinney 2000), which provided a total sample of

more than 434,000 lines of child speech. For each child, we located the first clear uses of (i) swiping, (ii) *wh*-movement involving P-pied-piping, and (iii) *wh*-movement involving P-stranding. The corpora analyzed in this study are listed in (32). The CLAN program Combo was used, together with complete files of prepositions and *wh*-words in English, to identify potentially relevant child utterances. These were then searched by hand and checked against the original transcripts to exclude imitations, repetitions, and formulaic routines. The age of acquisition was taken as the first clear use, followed soon after by repeated use (Stromswold 1996, Snyder 2007).

The results were as follows. Two children (Abe and Aran) showed frequent use of swiping, while other children did not produce any swiping sentences. One of these two children (Abe), however, uttered only a single type of swiping: *What for?* This limitation leaves the possibility that this expression is a formulaic routine for this child. Hence, we should focus on the analysis of the remaining single child, Aran.

Aran exhibited the first clear use of swiping at the age of 2;07. His swiping sentences exhibited two kinds of *wh*-expressions (*who* and *what*) and various different prepositions. This variety suggests that Aran had already acquired adult-like knowledge of swiping. Some actual utterances are listed in (33).

(32) Corpora Analyzed:

Child	Collected by	Age Span	# Child Utterances
Abe	Kuczaj (1976)	2;04 – 5;00	22,633
Adam	Brown (1973)	2;03 – 4;10	45,555
Anne	Theakston et al. (2001)	1;10 – 2;09	19,902
Aran	Theakston et al. (2001)	1;11 – 2;10	17,193
Becky	Theakston et al. (2001)	2;00 – 2;11	23,339
Carl	Theakston et al. (2001)	1;08 – 2;08	25,084
Dominic	Theakston et al. (2001)	1;10 – 2;10	21,180
Eve	Brown (1973)	1;06 – 2;03	11,563
Gail	Theakston et al. (2001)	1;11 – 2;11	16,973
Joel	Theakston et al. (2001)	1;11 – 2;10	17,916
John	Theakston et al. (2001)	1;11 – 2;10	13,390
Liz	Theakston et al. (2001)	1;11 – 2;10	16,569
Naomi	Sachs (1973)	1;02 – 4;09	15,960
Nicole	Theakston et al. (2001)	2;00 – 3;00	16,950
Nina	Suppes (1973)	1;11 – 3;03	31,505
Peter	Bloom (1970)	1;09 – 3;01	26,891
Ruth	Theakston et al. (2001)	1;11 – 2;11	20,419
Sarah	Brown (1973)	2;03 – 5;01	37,012
Shem	Clark (1978)	2;02 – 3;02	17,507
Warren	Theakston et al. (2001)	1;10 – 2;09	16,651

- (33) a. *CHI: what in ? (Aran26a.cha)
b. *CHI: who for ? (Aran27a.cha)
c. *CHI: who from ? (Aran28b.cha)
d. *CHI: what with ? (Aran33a.cha)

Despite such productive use of swiping, Aran showed not a single use of P-pied-piping with *wh*-movement. This complete absence of P-pied-piping in the spontaneous speech makes it difficult to statistically evaluate the prediction from the P-pied-piping approach in (30). Yet, the lack of P-pied-piping in child

English despite the presence of swiping casts serious doubt on any analysis in which swiping is derived through *wh*-movement involving P-pied-piping.

In contrast, P-stranding under *wh*-movement was frequently observed in Aran's speech. The first clear use of P-stranding appeared at the age of 2;05, two months earlier than the first clear use of swiping. We evaluated the statistical significance of the observed age-differences between acquisition of P-stranding and acquisition of swiping by using the same method as the one described in section 2. This statistical analysis revealed that Aran acquired P-stranding significantly earlier than swiping ($p < .0001$, by Binomial Test), along the lines of the prediction in (31). This finding, combined with the complete lack of P-pied-piping, lends support to the P-stranding approach to swiping, and puts further explanatory burden on the P-pied-piping analysis.

4. Conclusion

In this study, I summarized some of my own works on the acquisition of preposition stranding and of pied-piping to illustrate how the investigations of child language can contribute to the study of syntax. I argued that evidence from child language sharply restricts the range of possible analyses concerning (i) the parameter of P-stranding, and (ii) the derivation of swiping construction. I sincerely hope that this study successfully demonstrated that the time course of child language acquisition is potentially an important ground to differentiate among competing syntactic analyses, and hence is able to make significant contributions to the theoretical studies of syntax.

Notes

* I would like to thank Seiki Ayano, Yukio Otsu, Kensuke Takita, Akira Watanabe, and especially Cedric Boeckx for valuable comments. I am also grateful to the audience at TCP 2008 for comments and discussion. The usual disclaimers apply. This research was supported in part by a Grant-in-Aid for Scientific Research (B) from the Japan Society for the Promotion of Science (#17320062, Project Leader: Seiki Ayano).

1. See Sugisaki (2003) and Sugisaki and Snyder (2005/2006) for an acquisitional evaluation of Kayne's (1981, 1984) parametric proposal.
2. This section is based on Sugisaki and Snyder (2002).
3. This section is based on Isobe and Sugisaki (2002).
4. See Isobe (2005) for evidence from an elicited-production experiment.
5. This section is based on Sugisaki (2008).
6. The *wh*-expressions *which* and *whose* are monomorphemic, as well as those in (22a). Yet, Merchant (2002) argues that *which* must select a complement (which may be null due to NP-ellipsis), and *whose* can be analyzed as *who* in the specifier of DP headed by the genitive 's. These properties distinguish them from the other simple *wh*-expressions listed in (22a).

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