RECYCLING IN CATALAN CLITIC ACQUISITION: UNDERSPECIFICATION… AND FREQUENCY EFFECTS? *

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In this study, we consider the acquisition of oblique clitics in Catalan and investigate one specific aspect in their development: clitic replacements. While the acquisition of oblique clitics remains under-researched in Catalan, the development of accusative, partitive, and dative clitics has been extensively investigated (e.g., Gavarró, Mata & Ribera, 2006; Gavarró & Mosella, 2009; Gavarró et al., 2011; Varlokosta et al., 2016; Wexler, Gavarró & Torrens, 2004). From this research, we know that these object clitics are acquired by age 5, at least in children who are dominant in Catalan (Soto-Corominas, 2018).

Optional omission of the object or object clitic is a well-attested developmental stage cross-linguistically (for an overview, see Pérez-Leroux, Pirvulescu & Roberge, 2018). Unsurprisingly, developmental object omission has been reported in the acquisition of accusative, dative and partitive objects in Catalan (see studies above). On the other hand, clitic replacements are less frequently reported and discussed. Varlokosta et al. (2016), in studying the acquisition of third person accusative clitic pronouns in 5-year-olds in a variety of languages, note that children produced a small "amount of errors of gender, number and case", between 0 and 12%, in an oral production task (2016: 14). On the other hand, no replacements are noted in Gavarró et al.'s (2011) study of the acquisition of the partitive clitic.

The present study probes further into patterns of replacement of oblique clitics in Catalan by Catalan-speaking children, ages 4-8. Together with Spanish, Catalan is co-official in Catalunya, an autonomous region in north-east Spain. Catalunya presents a case of widespread, historical, language contact where 81.2% of inhabitants can speak both co-official languages (IDESCAT, 2019). To protect Catalan, the minority language, both Catalan and Spanish are taught in schools. Thus, no monolingual Catalan/Spanish children exist past the onset of obligatory schooling (6 years). The data presented in this study were collected in Central Catalunya (Manresa and surrounding area). According to IDESCAT (2013), 89.3% of Catalans living in Central Catalunya can speak both Catalan and Spanish. Catalan is spoken as an L1 by 49% of Catalans in this area, and Spanish by 37.1%.

1. Oblique clitics in Catalan

Oblique clitics replace oblique objects, which are prepositional phrases (PPs) that may or may not be required by the verb. Catalan has two oblique clitics: *en* and *hi*. *En* replaces a PP headed by preposition *de* 'of', (1), whereas *hi* replaces a PP headed by a preposition other than *de*, (2).

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(1) No presumeixo [de coses]$_i$. No *(en$_i$) presumeixo.
neg. boast.1SG of things neg. EN boast.1SG
'I don't boast about things. I don't boast about them.'

(2) No penso [en coses]$_i$. No *(hi$_i$) penso.
neg. think.1SG in things neg. HI think.1SG
'I don't think about things. I don't think about them.'

When these clitics replace an argument of the verb, they are obligatory in order to preserve the grammaticality of the sentence. In addition, replacing these clitics results in a semantic change or ungrammaticality, depending on the case. For example, the oblique object in sentence (3) is introduced by preposition *de*. The clitic to refer back to the PP *del Pere* "about Pere" would thus be *en*. Any other clitic, such as *hi*, would render the sentence unfelicitous, since that clitic could not be considered to refer back to *del Pere*, but it should be considered to replace another (implied) oblique object such as *amb el Pere* "with Pere".

(3) No parlo sempre [del Pere]$_i$. *(En$_i$/?Hi$_{*i/j}$) parlo algunes vegades.
neg. talk.1SG always of.the Pere EN HI talk.1SG some times
'I don't always talk about Pere. I talk about him/to him sometimes.'

The possible alternation shown in (3) is frequent in Catalan since it is rarely the case that a given predicate can only appear with one clitic. Many predicates, in fact, alternate between an accusative object (4a) and an oblique object (4b). Accusative objects are pronominalized with accusative *l* clitics (i.e., *l, la, ls, les*), which, as opposed to oblique *en/hi*, agree in gender and number with their accusative object.

(4) a. Crec [en moltes coses]$_i$. *(Hi $_i$) crec.
believe.1SG in many things HI believe.1SG
'I believe in many things. I believe in them.'

b. Crec [la teva resposta]$_i$. *(La $_i$) crec.
believe.1SG the your answer L.fem.sg believe.1SG
'I believe your answer. I believe it.'

One final note about oblique clitics *en* and *hi* is that they are homophonous with two other clitics, partitive *en* and locative *hi* respectively.[1] Partitive *en* pronominalizes non-definite direct objects, (5), and locative *hi* pronominalizes locative objects, as in (6), introduced by a preposition other than *de*:

(5) Tinc alguns [plans]$_i$. *(En) tinc alguns.

[1] Whether these are in fact different clitics or the same clitic with multiple functions is a matter of debate. See Soto-Corominas (2018:55-61) for a summary of the debate and the reasons to consider them different clitics.

have.1SG some plans EN have.1SG some
'I have plans. I have some.'

(6) Vaig [a casa]$_i$. *(Hi) vaig.
go.1SG to home HI go.1SG
'I have plans. I have some.'

1.2 Obliques in the input

Perpiñan (2017) was the first study to investigate the production of oblique and partitive *en*, as well as oblique and locative *hi* in adult Catalan-Spanish speakers. Perpiñan divided her participants into three groups according to their language dominance: Catalan-dominant (CDm), Balanced bilinguals (BB), and Spanish-dominant (SDm). The author elicited the four clitics using an oral production task (OPT). The results of this study are shown in Table 1.

Table 1
Perpiñan's (2017) results, in percentages, on the production, omission, and replacement of oblique and partitive en *and oblique and locative* hi

	Production			*Omission			*Replacement		
	CDm	BB	SDm	CDm	BB	SDm	CDm	BB	SDm
Oblique *en*	90.5	61.3	42.1	4.8	14.7	21.05	1.9	4	10
Partitive *en*[2]	96.2	72	69.5	0	14.7	20	0	0	0
Oblique *hi*	91.4	38.6	22.1	5.7	36	45.3	2.9	14.7	17.9
Locative *hi*	34.3	13.3	6.3	63.8	84	80	1.9	0	9.5

In terms of the differences between clitics, a few points stand out. All clitics, except for partitive *en,* are replaced to some extent, though the obliques appear to be replaced more often. Oblique *hi,* specifically, appears to be the clitic that is replaced the most frequently.[3] All clitics are omitted, but oblique and locative *hi* appear to be omitted more than others. Perpiñan (2017) reported that *en* was the clitic most commonly used to replace oblique *hi*, but did not provide further details regarding the patterns of replacements.

To the best of our knowledge, no study has investigated the frequency of these clitics in Catalan. In order to create a preliminary characterization of their distribution, we analyzed Bel's (1998) CHILDES corpus of Júlia, a child only exposed to Catalan in the home and, to some extent, to Spanish outside the home. The corpus has 17 files that span between ages 1;07 to 2;06. We measured the instances of *en* and *hi* in the input to the child (produced by Júlia's parents) and divided them into instances of oblique/partitive *en* and oblique/locative *hi*. We excluded from this count instances of *hi*

[2] Perpiñan (2017) elicited both partitive and quantitative *en*. The data shown here correspond to the results for the former.
[3] Note that neither Perpiñan (2017) nor Soto-Corominas (2018) considered cases of ablative *en*.

in the verb *haver-hi* (“there is”) and *ser-hi* (“to be”). Similarly, we excluded instances of *en* in *anar-se’n* (“to leave”) due to the fact that these clitics are arguably lexicalized in the given predicates/copulas. The remaining count is shown in Table 2.

Table 2
Distribution of non-oblique and oblique uses of en *and* hi *in the input provided to Júlia (Bel, 1998)*

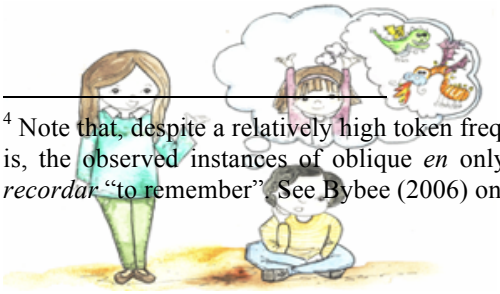
	En	*Hi*
Oblique	24[4]	0
Non-oblique (partitive / locative)	36	48

En was much more likely to appear as an oblique than *hi,* as shown by a Fisher’s exact test (p<.001). It is worth noting that both of Júlia’s parents are Catalan-dominant themselves and have university education in areas related to linguistics (Bel, p.c.). Therefore, while an analysis of oblique/non-oblique object omission or clitic replacement was not conducted on Júlia’s corpus, we can assume that the input she received was at least as normative as that of Perpiñan’s CDm participants’, and that the non-existence of oblique *hi* was not caused by ungrammatical omissions/replacements but, rather, by low frequency in the input.

1.3 Obliques in acquisition

The first study to investigate the acquisition of the oblique clitics in Catalan was Soto-Corominas (2018). In this study, 286 bilingual participants (ages 4-8) were divided into CDm, BB, and SDm according to different variables derived from a background questionnaire (e.g., ages of onset, input quantity in each language, and language preference). These are the data that are re-analyzed in the present study, so further details are provided here.

Bilingual children in Soto-Corominas (2018) were asked to complete an Oral Production Task (OPT) in which they were asked to correct statements (7) that, according to a visual representation (Fig. 1), were false.



(7) Tu no creus [en dracs]$_i$ però

[4] Note that, despite a relatively high token frequency for oblique *en*, its type frequency was rather low. That is, the observed instances of oblique *en* only appeared with a few predicates, the most common being *recordar* “to remember”. See Bybee (2006) on the effects of differential type/token frequency.

you neg. believe.2SG in dragons but

la teva germana sí..
the your sister yes
'You don't believe in dragons but...'

Figure 1. Stimulus from OPT

The predicates used to elicit oblique *en* were: *presumir* 'to brag about', *parlar* 'to talk about', *saber* 'to know about', and *dubtar* 'to doubt'. For *hi*, they were: *participar* 'to take part in', *pensar* 'to think about', *creure* 'to believe in', and *somiar* 'to dream about'.

Participants' responses to statements like (7) were coded as: target clitic (when the target clitic was produced, (7)a; *omission (when both the oblique clitic and object were absent, (7)b; ?overt PP (when the PP was unfelicitously repeated in the answer, (7)c; ?short (when a response without a predicate was produced, (7)d; other (when the response did not include the environment for the target clitic to surface, (7)e; *replacement (when a non-target clitic was produced, (7)f; and *reduplication/doubling (when both a clitic and a co-referential PP were produced, (7)g.

(7) a. que hi_i creu.
that HI believe.3SG
'...believes in them.'

b. *que creu.
that believe.3SG
'...believes in them.'

c. ?que creu en dracs.
that believe.3SG in dragons
'...believes in dragons.'

d. ?sí.
'...yes.'

e. ?és la nena.
be.3SG the girl
'It was the girl.'

f. *en_{*i} creu.
EN believe.3SG
'Believes (in them).'

g. *que hi_i creu [en dracs]$_i$.
that HI believe.3SG in dragons
'...that believes in them in dragons.'

Although results in Soto-Corominas (2018) were presented according to language dominance groups (CDm, BB, SDm), this division is not made in the present study, since no significant differences by group were found in terms of patterns of clitic replacements. Results for all participants combined, divided by age, are shown in Figures 2 (oblique *en*) and 3 (oblique *hi*).

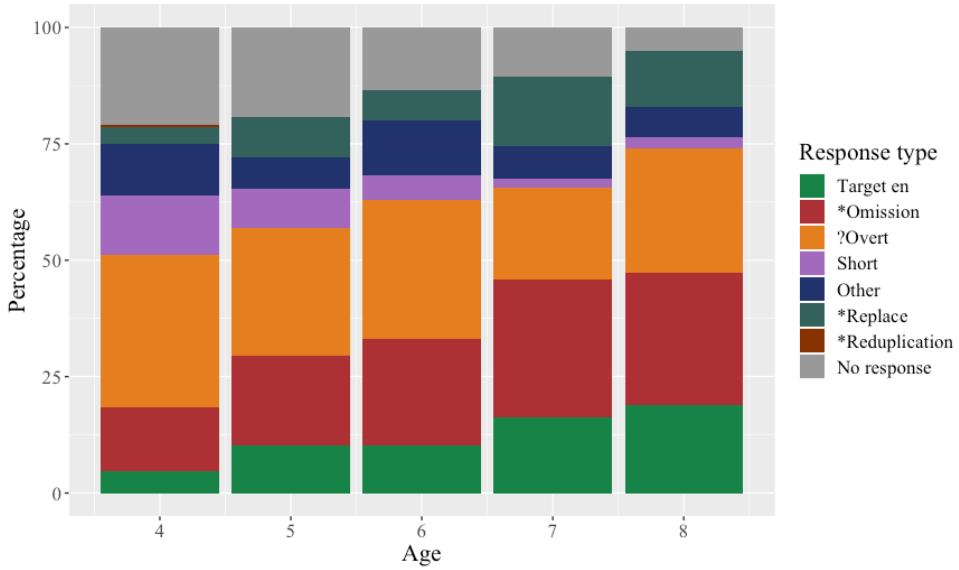


Figure 2. Responses, in percentages, for target oblique *en* in Soto-Corominas (2018)

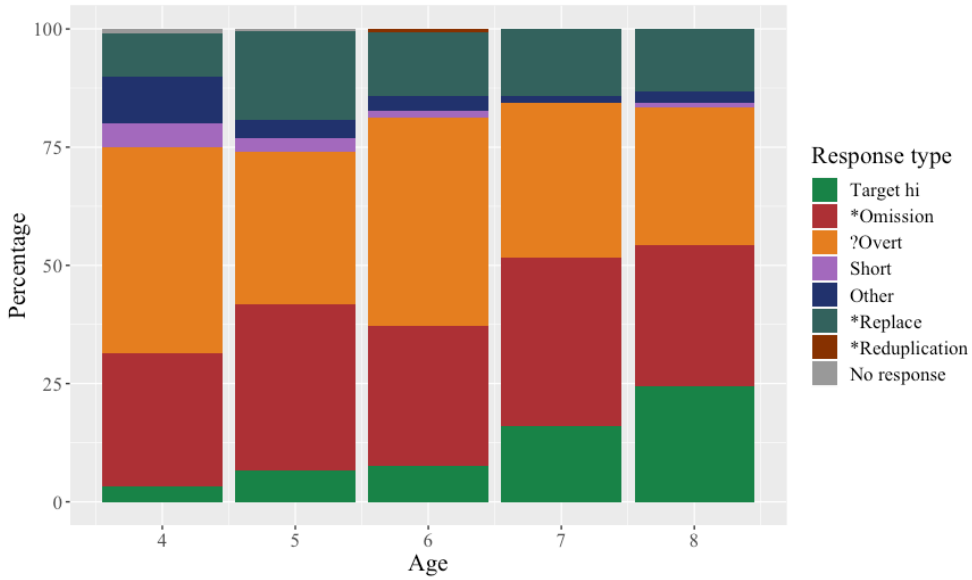


Figure 3. Responses, in percentages, for target oblique *hi* in Soto-Corominas (2018)

As observed from Figures 2 and 3, target productions of the clitics remain limited (under 20-25%, at most), always outnumbered by ungrammatical responses. Therefore, even by age 8, oblique *en* and *hi* cannot be said to have been acquired by Catalan-Spanish bilingual children. Importantly, replacements accounted for a sizeable proportion of participant productions across these ages. In Tables 3 and 4, only target responses and replacements are shown as percentages. In turn, the ungrammatical replacements are divided by the clitic that was used in place of the target oblique.

Table 3
Participants' responses, in percentages, for target oblique en*: only target and replacements*

Age	Target *en*	**hi*	**ho*	**l*
4	4.63	0.00	1.06	2.77
5	10.19	0.00	6.72	1.96
6	10.18	1.92	4.59	0.00
7	16.31	4.77	8.09	1.82
8	18.94	5.75	5.84	0.46

Table 4
Participants' responses, in percentages, for target oblique hi*: only target and replacements*

Age	Target *hi*	**en*	**ho*	**l*
4	3.19	1.34	4.36	3.54
5	6.68	2.38	12.33	3.22
6	7.49	3.27	9.80	0.38
7	15.95	5.03	7.78	1.00
8	24.49	4.02	8.76	0.49

Note that *ho* and *l* are both accusative clitics. Though it is a possibility that, during acquisition, children treat the predicates as transitive and thus requiring a direct object rather than an oblique object, this may not be necessarily the case. To the prompt *jo no sé de cuina però el pare sí…* 'I don't know much about cooking but dad…', where *de cuina* is a PP which includes the feminine noun *cuina* 'kitchen/cooking', children often used the [-masculine, -feminine] accusative clitic *ho* or [+masculine] *l* in their responses, therefore not encoding the feminine gender of what could have plausibly been considered the accusative object.

In total, oblique *en* was replaced in 9.18% of the responses and oblique *hi,* in 13.81%. These patterns of replacements stand in stark contrast to their non-oblique counterparts. In the same OPT, participants did not replace partitive *en* at all and replaced locative *hi* in only 0.96% of their responses (see Soto-Corominas, 2018: 104-140 for further details).

2. Present study

The goal of the present study is to investigate the patterns of replacements of Catalan-speaking children who are acquiring the oblique clitics, regardless of language dominance (since the replacement patterns do not vary significantly by dominance groupings; Soto-Corominas, 2018). Specifically, the questions that we seek to answer were:

(8) a. Why are the oblique clitics (*en, hi*) replaced more frequently than their non-oblique counterparts?
b. How can these replacements be accounted for?

2.1. Morphological Underspecification and Feature Geometry

In her study of acquisition errors in the interlanguage grammar of L2 Spanish learners, McCarthy proposes the following:

(9) Morphological Underspecifciation Hypothesis "L2 errors are the result of underspecification rather than feature clash." (McCarthy 2004: 6)

We propose that this same prediction should apply to some L1 acquisition (substitution) errors as well, as in the present study. McCarthy's (2004) examples are all rather "simple" cases of default substitutions i.e. singular for plural, masculine for feminine, present for other tenses. For more complex cases like Catalan clitics, we need a more articulated theory of relative internal structures of the morphemes involved, i.e. which clitic is underspecified with respect to which other clitics. As Longa, Lorenzo, and Rigau (1998) state with their "recycling" principle, clitics are not (usually) substituted by random unattested forms, but rather by some existing form from elsewhere in the same paradigm. This observation in turn reflects what some have called "Bonet's generalization" about opaque surface
sequences more generally:

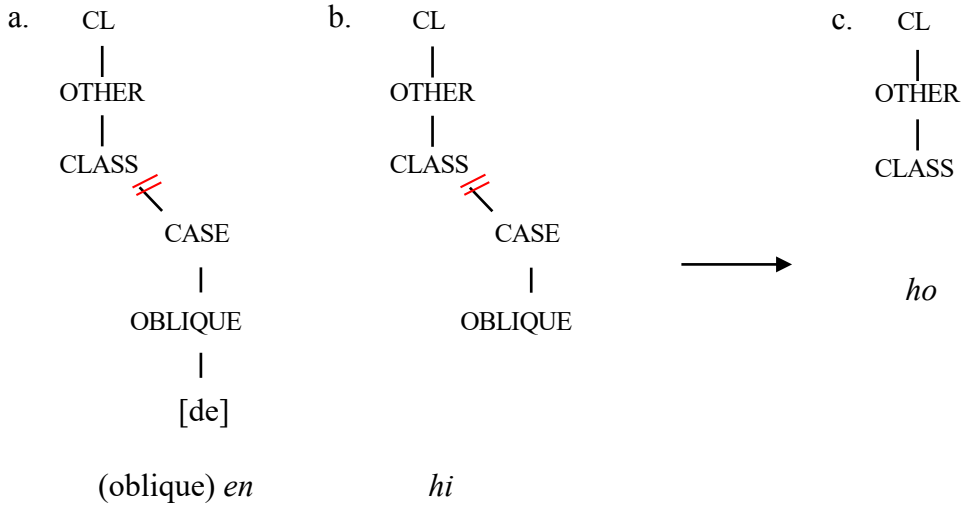
(10) "nontransparent output forms will have the same surface form as other clitics of the language instead of becoming an arbitrary phonological sequence." (Bonet 1991: 2-3).

So the question then becomes: which clitic form(s) can be substituted for which other clitics, and why?

2.2 Feature Geometry and Underspecification

In order to answer this question, we use a pronominal Feature Geometry (Harley & Ritter, 2002), a theory under which features are organized hierarchically according to their featural makeup. Broadly speaking, more marked clitics have more internal structure (more features, arranged hierarchically) while less marked clitics have fewer features and less structure. Underspecification errors of the type predicted by McCarthy's hypothesis in (9) thus entail more marked (more specified) forms being replaced by less marked (less specified) forms. Since oblique clitics have more internal structure than other clitics (Soto-Corominas, 2018; based on Bonet, 1991; Heap, 2005), the replacement of *en* or *hi* by *ho* is predicted by underspecification, as in Figure 4. Importantly, this replacement is the one most frequently observed (see Tables 3 and 4).

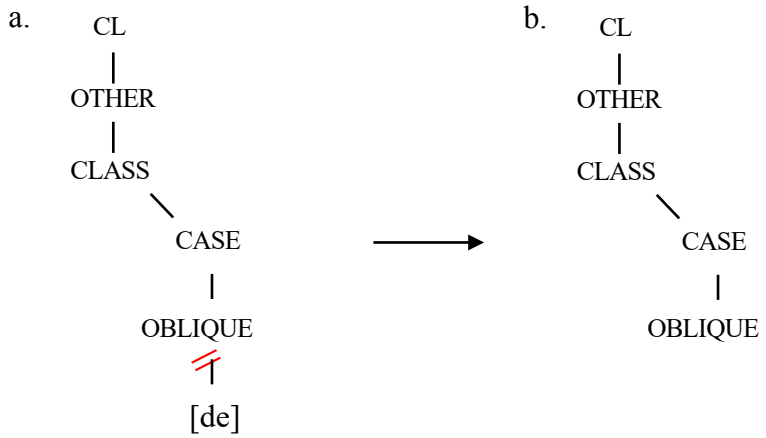
Figure 4. Proposed feature geometries for oblique clitics *en* and *hi*, and the accusative 'neuter' [-masculine, -feminine] clitic *ho* (Soto-Corominas, 2018: 233-234; based on Bonet, 1992), together with delinking rule.



By default, acquirers "delink" (or have not yet fully acquired) all the structure below CLASS in Figure (4). This means that the more marked (oblique) targets *hi* in 4a. and *en* in 4b. can both surface as default *ho*, 4c., the least specified OTHER clitic.

Similarly, the substitution of target *en* by *hi* is also predicted by underspecification, as shown in Figure 5. Here again, acquirers are "building up contrasts" and have not yet (fully) acquired the addition of the final contrasting node [de]: when this final specification is delinked (or not realized), target *en* in 5a. is realized as the next most specified OBLIQUE clitic, *hi,* in 5b:

Figure 5. Feature geometries for oblique *en* and *hi*, together with delinking rule (Soto-Corominas, 2018: 233-234)



Thus an underspecification approach that uses a hierarchical Feature Geometry for the internal morphological structure of clitics allows us to successfully model three of the oblique clitic substitutions attested in Tables 3 and 4 (we do not model the less frequent substitution by accusative *l* clitics here, but they could also involve underspecification). These is however one substitution in our results which defies modeling under this analysis.

2.3. Beyond Underspecification and Feature Geometry: Complexity and Frequency

The substitution of *hi* by *en* is not predicted by the underspecification approach since oblique *en* (5a.) is more specified than oblique *hi* (5b.). However, this puzzling result does not seem random either: as shown in Table 4, acquirers substitute other less specified clitics in some of these cases (e.g. accusative *l* clitics, occasionally, and especially the 'neuter' *ho*, as modeled in (4)c. above), but also produce another, more specified form from the under the OBLIQUE node, *en*. In other words, this substitution

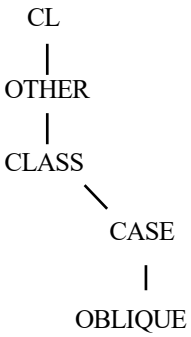
follows Bonet's generalization in (10) because the substitute is drawn from elsewhere in the clitic paradigm, but not McCarthy's Morphological Underspecifciation Hypothesis in (9), since the substitute is more rather than less specified.

It does not appear to be coincidental that this unexpected substitution occurs just at this point in the Feature Geometry. It seems that grammars may have limits to the level of complexity (the number of contrasts) they can support in inventories, and these become apparent when these contrasts are represented in Feature Geometric terms. Rice and Avery (1993) show that "Structural Complexity Constraints" apply to segmental inventories, such that the maximum number of contrasts can be reached on one branch of a Geometry or another, but not both simultaneously. This idea is extended with Morphological Complexity Constraints by Béjar (1999, 2000) to cover the notion that there are limits to how much featural contrast a morphological paradigm can support. Heap (2005) in turn adapts the idea of Morphological Complexity Constraints to Romance pronominal inventories. Though parts of their initial clitic inventories are very similar or identical, some Catalan acquirers seem to be at the farthest branches of morphological Feature Geometries at this point (when acquiring the two different oblique clitics). Not all acquirers reach this level of morphological complexity in their clitic inventories at the same time. At this outer limit where developing specifications meet the Morphological Complexity Constraint, uncertainty may lead to production of a more specified clitic item, rather than a less specified one, possibly under the influence of other factors, such as frequency.

Evidence from the field of psycholinguistics shows that higher frequency is often related to earlier acquisition (Wulff & Ellis, 2018). As shown in Table 2 above, *en* is overall more frequent in the input than *hi*. In terms of their oblique vs. non-oblique uses, oblique *en* is significantly more frequent in the input than oblique *hi* (at least the in the CDm input directed towards Júlia; see Table 2, again).

Our proposal, then, is that by virtue of being significantly more present in the input, the form for oblique *en* may be initially acquired without the [de] node being fully specified. We propose that initially, oblique *en* can variably assume the geometry in Figure (6), which corresponds to oblique *hi* in adult grammars. According to this hypothesis, the child could produce *en* to refer to a PP introduced by any preposition, and this form could potentially be in free variation with oblique *hi.*

Figure 6. Child feature geometry for oblique *en* during development.



(oblique) *en*

3. Conclusions

Our account based on underspecification (McCarthy 2004), clitic 'recycling' (Longa et al. 1998) and Feature Geometry (following Bonet, 1984; Heap, 2005; Soto-Corominas, 2018) accounts for most of the substitutions of oblique clitics amongst all groups of acquirers, regardless of language dominance. It would appear therefore that McCarthy's Morphological Underspecification Hypothesis (2004:6) applies not only to L2 learners but also to L1 acquirers, and also in cases like oblique clitics, which are considerably more complex (i.e. involve more features), than the 'simple' default cases examined by McCarthy.

When the limits of complexity are reached (as is the case with oblique clitics in Catalan), a Morphological Complexity Constraint may come into play, such that acquirers hesitate with respect to which specifications apply, and their outputs may vary in ways which are not determined by underspecification, as in the case of *en* for *hi*. In such cases, frequency effects become crucial. Forms that are more readily available in the input may be reinforced and despite their overspecification, may be selected to fill in the clitic position.

We leave for future research questions about the relationship between oblique clitics like *hi* and *en* and their homophones, locative *hi* and partitive *en*, and why for example the latter are acquired earlier and apparently without substitution. What seems clear at this point is that, far from being random, clitic substitutions are highly structured, although variable.

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