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# Hierarchies in the learnability of parts-of-speech The example of A-bar relative pronouns <sup>1</sup>

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## ***1. Introduction***

Parts of speech are prospective members of a UG set of categories. Nevertheless, each part of speech has an acquisition history of its own. The phonological forms of a category are language-specific and have to be acquired. The same holds for the various context restrictions, morphological and syntactic, that each category requires or allows in a language-specific grammar. Context restrictions on learnability may convincingly explain why grammatical categories, c.q. parts of speech, are as a matter of fact acquired in a predetermined hierarchy.

Section 2 below recaptures an acquisition procedure for the major categories V and N. The procedure begins with a radical, but predictable, reduction of the adult input into an intake of binary structures. The reductions soon allow a distinction between verbs and nouns. Verbs appear as denotational elements with a highly repetitive and language-specific marking  $I^{\circ}$ , where  $I^{\circ}$  stands for the beginning of the predicative paradigm. Nouns appear as denotational items with a highly repetitive and language specific marking  $D^{\circ}$ , where  $D^{\circ}$  stands for the beginning of the referential nominal paradigm. The productive acquisition of the verbal (predicative) and the nominal (referential) paradigm is reflected in acquisition graphs (Van Kampen 2004). These graphs reveal that both acquisition steps take a few months and several hundred thousand of learning experiences. More importantly for the present concern, the graphs reveal a paradoxical effect as well. The core elements of the verbal paradigm are less frequent, but they are acquired earlier than the nominal paradigm, that is more frequent in the input.

Sections 3 and 4 deal with the acquisition procedure for a minor category, the relative pronoun. Section 3 will analyze the Dutch paradigm for relative pronouns as mainly based on two competitive agreement systems. The subsequent section 4 will discuss the main circumstances around the acquisition of the Dutch relative pronoun. The acquisition of the Dutch relative paradigm is late but effective, although based on a remarkably small amount of input data. This will lead to a short consideration of two generative principles: Ross's *Penthouse Principle* (Ross 1973) and Lightfoot's *degree-0 learnability* (Lightfoot 1991).

Section 5 will contrast the acquisition of the Dutch verbal and nominal paradigm with the acquisition of the Dutch paradigm for relative pronouns. The acquisition of the highly frequent verbal and nominal paradigm is early, but it requires massive support from simplified intake. The acquisition of the Dutch relative paradigm is late, but it is based on a small amount of highly structured input. This contrast will be used to reconsider two dogmas of generative acquisition theories, (i) the poverty of the stimulus and (ii) innate grammar as a pre-existing set of UG distinctions.

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## **2. An acquisition context for major categories**

### **2.1 Thomas von Erfurt**

The elder grammarians made a distinction between nomina and verba. Nomina were denotational (content) words that had access to the (Latin) case system and verba were denotational words that had access to the (Latin) conjugation system. No distinction was made between the nomen adjectivum <A> and the nomen substantivum <N>, since in Latin both have access to the case system. Thomas von Erfurt (1300/1972) rightfully observed that certain nomina a) agree in case/number/gender (*homines pulchros*), b) may add markings for degree (*pulchriores*), c) allow adverbial variants (*pulchriter*). These combinatorial properties are inherent idiomatic properties of a set of denotational elements and they justify the word-class distinction “adjective”.

Thomas von Erfurt’s argument can be generalized in the following way. The grammatical category of a denotational lexical item is determined by a narrow set of grammatically fixed context properties. For Latin (and Thomas von Erfurt) the inflectional paradigm delivered the local context for the denotational categories V and N and, considering in addition some syntactic phrasal condition, for the category A as well. Languages with less or no inflectional morphology need not lack the categories V, N or A. The inflectional categories are in such languages expected to reappear as syntactic elements in local syntactic configurations. Prepositions, demonstratives, articles and classifiers may select the category N as well as the Latin case paradigm does. In the same vein, absence of the verbal paradigm does not prevent the identification of a category V by modal, negation and aspectual particles, or by the appearance of illocutive particles and complementizer elements. A significant generalization over the morphological and the syntactic contexts is possible. Grimshaw’s (1991) notion of *extended projection* allows us to define a category N, V, A by means of a restricted set of local grammatical context specifications. The acquisition of the syntactic category of a denotational item (V, N, A) now equals the acquisition of the local grammatical contexts it fits into, i.e. one should know its (language-specific) extended projection.

The present learnability view on UG categories is somewhat different from the innateness view. At least it leads to different questions. Like in the system of Jakobson (1942), there is a direct interest into the hierarchical order of acquisition steps due to the local context conditions. Certain categories are less likely to be acquired until others have been acquired earlier. The order of acquisition steps may reveal a natural hierarchy of acquisition steps.

### **2.2 A basic learnability paradox**

The notion “local context” hides a paradox as was pointed out by Pinker (1984). In order to find the category system due to its determination by context, the learner must have some syntactic orientation. Unfortunately, the learner has no syntactic orientation because, by assumption, he has no knowledge of the category system. This leads to the learnability paradox in (1).

- (1) *Learnability paradox*  
no formal context given  $\Leftrightarrow$  no formal category acquired

The paradox in (1) led Pinker (1984) to his bootstrapping proposal. The non-grammatical cognitive distinction thing/event would translate into the grammatical noun/verb distinction. Pinker (1987) grants that this “bootstrap” is not particularly reliable. The notions thing and

event have to be stretched up in dubious ways. To the extent that that is done, the distinctions  $\pm N \pm V$  become a freewheeling issue again.

An alternative to Pinker (Van Kampen 1997: chapt.2; 2005) is the analysis of language acquisition as a hierarchy of acquisition steps. In this view, child language starts with a category-neutral two-word syntax that is at first pragmatically defined. The initial two-word utterances consist of denotational words or semi-denotational deictic words that allow a pragmatic interpretation, see (2).

- (2) a. bear sleep/nice [topic-name + comment]  
 b. that bear [operator + comment]  
 c. wanna eat [operator + comment]

The two-word binary utterances in (2) are not due to real (adult) syntax, but to a maximally simplified syntax of the child's intake. The acquisition procedure starts with a reduction of the adult input. All grammatical markings are automatically left out. The subsequent acquisition of grammatical markings introduces real syntax. The first grammatical markings that appear are the systematic marking of comments by  $I^0$ -elements (finiteness, i.e. grammatical marking of predication) and the systematic marking of the topic-names by  $D^0$ -elements (determiners, i.e. grammatical marking of reference). These are highly repetitive markings that appear added to comments or topics. They appear in a clear order. Systematic  $I^0$ -marking precedes systematic  $D^0$ -marking, if the acquisition points are well defined (Van Kampen 2004).<sup>2</sup> The acquisition order "verbal paradigm ( $I^0$ ) precedes nominal paradigm ( $D^0$ )" has been attested for, among others, Dutch, French, Italian and English. One may note that this acquisition order tallies well with the typological analysis in Hengeveld et al. (2004) where the category "head of a predicate phrase" is higher in the typological distribution than the category "head of a referential phrase".

The acquisition of  $I^0$ -markings as systematic companions of the comment in binary utterances opens the door to the method of Thomas von Erfurt: the definition of categories by the fixed local context known as extended projection, {utterance C-I-V}, {reference P- N- D}. Differences between the  $I^0$ -markings on comments highlight the cognitive distinction between, for example, aspectual "event" predicates (3)a and stative "property" predicates (3)b.

- (3) a. bear { gonna sleep  
           \* is  
 b. bear { \*gonna nice  
           is nice

The major effect is that denotational categories can be derived from the local grammatical context, see (4)

- (4)  $Y \rightarrow V / I^0 - \{ \text{verbal paradigm} \} \sim \text{predicate types}$   
 $X \rightarrow N / D^0 - \{ \text{nominal paradigm} \} \sim \text{reference types}$

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<sup>2</sup> For an attempt to derive the acquisition order of the basic paradigms see Evers and Van Kampen (to appear), where the notion "hierarchy of evidence frames" is introduced to describe the successive rise of elementary configurations in child language.

Languages with morphologically developed I<sup>0</sup>/finiteness and D<sup>0</sup>/case-marking allow the V/N distinction, but the same holds for systems that make use of syntactic devices such as aspect words, auxiliaries, the option of demonstratives, possessives and prepositions. The elementary configurations for predication and reference guarantee a learnability of the denotational categories. Although the V/N distinction is part of UG, it is now claimed that it is so due to the learnability from elementary, but highly repetitive and language-specific configurations. The acquisition results from an intake of primary input data and general cognitive distinctions, rather than from UG a priori as such.<sup>3</sup>

Category learnability from repetitive local contexts is supported by a property that minimalist-framed systems assume (and that has always been present in categorial grammars): *strict locality* and *inclusiveness*. That is, a parts-of-speech feature must be due to a highly frequent and highly locally identifiable structure. Once the lexicon has been acquired as a set of elements differentiated by a small number of syntactic categories, the child can acquire more articulate syntactic structures from that.

The learnability hierarchy as developed here allows a better view on the acquisition of grammatical categories that appear in complex structures. Grammatical categories that appear in subordinated structures (e.g. complementizers, relatives) are constructed from distinctions that were already acquired in earlier steps.<sup>4</sup> This is an acquisitional reinterpretation of Ross's *Penthouse Principle* (Ross 1973). The Penthouse Principle states (for grammatical theory) that subordinate clauses apply only grammatical distinctions present in root clauses. This may follow from a strong constraint on learnability, considered by Lightfoot (1991) as *degree-0 learnability*.<sup>5</sup> Category formation seems possible only in a non (CP) recursive context. This brings me to the developmental points formulated in (5).

- (5)
- a. Early child language develops in relative slow motion and builds up a category system, based on several hundred thousand of examples.
  - b. After the acquisition of the basic grammatical categories in the extended projections of root sentences (I<sup>0</sup>/C<sup>0</sup>-marking and D<sup>0</sup>-marking) the category system gets closed
  - c. Later child language develops the proverbial high speed in combinatorial complexities, each based on a few thousand of examples only.

The proposal to measure acquisition speeds in estimates of intake cases is due to Briscoe (2000).

I will exemplify in sections 3-4 the quite general points in (5) by looking at the learnability bootstraps for Dutch relative pronouns. Relative pronouns illustrate my point in a special way. They appear late in Dutch child language, say between the age of three and four. It turns out that they reapply categories that were already listed in the lexicon and that were in function for other constructions, namely the A-bar pronouns for root questions (*wat, wie, waar*) and the A-bar pronouns for root topicalizations (*dat, die*). As in Diessel & Tomasello (2000),

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<sup>3</sup> The learnability approach in (4) differs from Baker's typological approach (2003, to appear). Baker relates reference and theta-roles directly to N<sup>0</sup>, rather than to language-specific D<sup>0</sup>. In the same vein, Baker takes the subject configuration as directly defining V<sup>0</sup>, rather than turning to optional and language-specific I<sup>0</sup> devices. See Evers and Van Kampen (to appear).

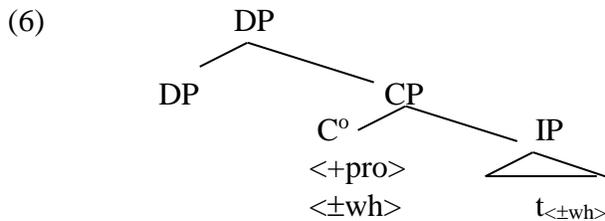
<sup>4</sup> The acquisitional aftereffect of simplex root CP structures is also noted in Evers-Vermeul (2005).

<sup>5</sup> I am aware of the fact that degree-0 learnability implies many problems, but for the present I would like to maintain it as a productive challenge.

Brandt, S. (2004) and Diessel & Tomasello (2005) for the acquisition of relative clauses in English and German, there is an incremental development from simple non-embedded sentences to complex sentences. My focus adds to the discussion the gradual acquisition of A-bar pronouns.

### 3. Relative agreement

Besides adjectives, there are, in Dutch (and many other languages), CP structures that function as adjacent DP attributes as in (6).



The attributive CPs I have in mind are headed by a so-called relative pronoun. The relative pronouns are positioned in the C° of the attributive CP. I have labeled these pronouns, that are restricted to the C° or Spec,C position, as A-bar pronouns (Van Kampen 1997: chap. 4). The best examples of inherently A-bar pronouns are the <+wh> question pronouns in root questions. The V-second languages have in addition another A-bar pronoun, the *d*-pronoun also present in root clauses. It is <-wh> and derived from the demonstratives (Dutch) or the definite articles (German). A *d*-pronoun in root sentences is located in the Spec,C position.<sup>6</sup> It indicates that the focus of the preceding sentence is the topic of the new sentence, see (7).

- (7)
- a. er staat in de straat een huis te koop  
(there is in the street a house for sale)
  - b. dat wil ik wel kopen  
\*het  
(that/\*it I want to buy)
  - c. het heeft wel een kleine tuin  
\*dat  
(it/\*that has a little garden)

The *d*-pronoun in the Spec,C of (7)b is an A-bar topic pronoun.<sup>7</sup> It signals a topic change with respect to the preceding sentence and cannot be represented by a personal pronoun. The personal pronoun in (7)c, by contrast, signals a topic maintained as subject. The opposition in

<sup>6</sup> See Van Kampen (1997) for the observation that the *d*-pronoun in Dutch occurs predominantly in sentence-initial topic A-bar position. A German corpus study by Bosch, Katz & Umbach (to appear: figure 1) shows the same preference of the *d*-pronoun for the sentence-initial position.

<sup>7</sup> The *d*-pronoun has recently been discussed as ‘anaphoric demonstrative’ in Bosch, Katz and Umbach (to appear). Note, though, that the A-bar *d*-pronoun in German is taken from the article system and that the Dutch A-bar *d*-pronoun is not fully identical to the demonstrative. The A-bar topic *d*-pronoun in Dutch uses the unmarked distal variants only. It has no access to the opposition <±proximal>, unlike the demonstrative (*die/dat* <-proximal>, *deze/dit* <+proximal>). See also Van Kampen (1997: 96f), Rooryck (2003). Demonstratives are first in the acquisition hierarchy: demonstrative → topic *d*-pronoun → relative *d*-pronoun. The demonstrative is a situation-related deictic element, whereas the A-bar *d*-pronoun is a discourse-related deictic element. See van Kampen (2004).

the switched topic forms and running topic forms can be characterized as an explicit CP#IP clause structure (7)b, versus a CP=IP clause structure (7)c.

The A-bar pronoun can now be characterized by the features <+D, +C, +pro, ±wh>.<sup>8</sup> The Dutch A-bar pronoun appears in the <+wh> *w*-variants and in the <-wh> *d*-variants, see (8).

(8)	A-bar pronouns in Dutch	<+wh>	<-wh>
		wie	die
		wat	dat
		waar	daar

The A-bar pronouns *waar* ('where') and *daar* ('there') stand for locative/oblique. They do not express gender. The other pronouns stand for structural case. The *d*-pronouns *die*, *dat* ('that') reflect a gender difference <±neuter>. The <-neuter> (nouns with the article *de*) selects the relative *die* and the <+neuter> (nouns with the article *het*) selects the relative *dat*. The *w*-pronouns *wie* ('who'), *wat* ('what') reflect, like the question pronouns, a semantic difference <±human>, but not a gender difference.

The Dutch relatives are selected from the *d*-set and the *w*-set of the A-bar pronouns according to rules that must have been acquired.<sup>9</sup> In principle, the *d*-elements are obligatory if they can express the gender of the antecedent. In all other cases the *w*-set steps in.

If the relative carries structural case, the *d*-set can express the <±neuter> of the antecedent by *die/dat* and that excludes the *w*-set, see (9). The *d*-set fails to express gender opposition for the oblique case and the (bookish) genitive case, hence the *w*-set steps in, see (10).

- (9) Structural case: *die/dat*
- a. de jongen { die / \*wie } ik bewonder  
 <-neuter>
- (the boy that/\*who I admire)
- b. het huis { dat / ?wat } ik bewonder )  
 <+neuter>
- (the house that I admire)

<sup>8</sup> If one allows the category feature <+C> to appear in the lexicon as an option for certain D-elements, one gets for example: *wat* <+D, ±C, ±wh>. *Wat* <+D, -C, +wh> then may appear as indefinite pronoun in (<-C>) argument positions. As an indefinite argument *wat* cannot rise into the subject position, see (i).

- (i) a. als hem wat lukt. (if (to) him something 'occurs successfully')
- b. \* als wat hem lukt (if something (to) him 'occurs successfully')

Cf. the parallel observations in Cheng (2001), although Cheng does not give an analysis by means of these features.

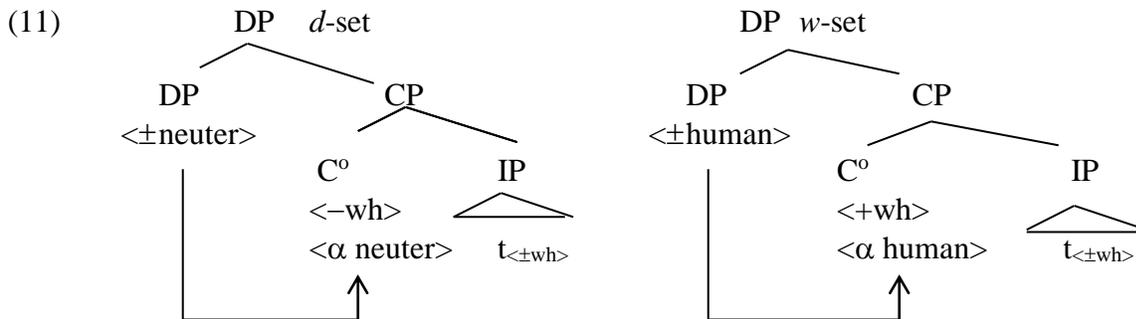
<sup>9</sup> Judgments for the correct use of relatives are often somewhat personal. Below, I simply follow the judgments of the ANS (Algemene Nederlandse Spraakkunst). The analysis of the data is my own. The ANS evades analyses as much as possible for an observational account by means of examples.

- (10) Oblique case: *wie/wat*
- a. de jongen  $\left\{ \begin{array}{l} *daar \\ waar \\ voor *die \\ voor wie \end{array} \right\}$  ik bewondering voor heb

- (the boy for whom I feel admiration)
- b. het huis  $\left\{ \begin{array}{l} *daar \\ waar \end{array} \right\}$  ik in woon

(the house in which I live)

In sum, there are two types of antecedent~relative agreement. The strictly grammatical gender  $\langle \pm \text{neuter} \rangle$  agreement blocks the semantic  $\langle \pm \text{human} \rangle$  agreement, see (11).



The  $\langle -\text{wh} \rangle$  configuration at the left blocks the  $\langle +\text{wh} \rangle$  configuration at the right.

Headless relatives in Dutch, as in (12), fit the pattern. They cannot express gender agreement with an antecedent and they employ the  $w$ -set.

- (12) a. *wie* ik bewonder is die jongen  
       \**die*  
       (who I admire is that boy)
- b. *wat* ik bewonder is het huis  
       \**dat*  
       (what I admire is that house)

The relevance of gender agreement tallies well with the relative paradigms in V-second German and Afrikaans and also with the relative paradigm in English. English and Afrikaans lack gender  $\langle \pm \text{neuter} \rangle$  and their relatives, in as far as they are present, are taken from the  $w$ -system.<sup>10</sup> German, by contrast, has a full-fledged gender system (See Duden 1997: 330, where the full paradigm is given for the four cases in three genders and the plural). The relatives in High German are basically  $d$ -variants only.<sup>11</sup> The  $w$ -system is blocked, as expected.

<sup>10</sup> I follow Bresnan (1970) and assume that the English element *that* in *the man that she looked at* is a  $\langle -\text{pro} \rangle$  (relative) complementizer  $C^\circ$  rather than a (relative) pronoun. It then follows that true English relative pronouns are  $w$ -elements. This fits my general view on the matter.

<sup>11</sup> The A-bar  $d$ -pronouns in German are (mostly) taken from the definite article, unlike the Dutch ones that reapply the distal demonstratives. Historically speaking, all topic/relative  $d$ -pronouns in German were ‘short’



- c. er is weinig *dat/wat* we nog niet hebben  
           little  $\emptyset$     that/what
- d. ik heb bezwaar tegen alles *dat/wat* lang duurt.  
   everything  $\emptyset$  that/what
- e. gooi iets *dat/wat* je nog gebruiken kunt, nooit weg!  
           something  $\emptyset$  that/what

The ANS values the *dat/wat* switch in (14)b as standard spoken (not written) Dutch. The examples are again with an antecedent where the noun is empty ( $\emptyset$ ), see (16).

- (16) a. het kleinste *dat/wat* daar hangt (bijv. een portret)  
           the smallest  $\emptyset$     that/what
- b. het eerste, *dat/wat* er gehavend uitzag, kostte veel  
           the first  $\emptyset$  that/what

The ANS values also as a spoken variant (14)c, a system where all <+neuter> antecedents allow the *dat/wat* relative switch as an option, especially for speakers in the North of the Netherlands. For those speakers the *wat* as a relative does no longer imply anything about < $\pm$ human>. It implies <+neuter> antecedent whether <-human> or <+human>.

- (17) a. het was een land<+neuter> *dat/wat* wachtte op de revolutie  
           a land                            what/that
- b. ze gaf de hond het eten *dat/wat* de kinderen toekwam  
           the food that/what
- c. het jongetje *dat/wat* ik leuk vind  
           the little boy    that/what

One may wonder where the tendency in spoken Dutch to *w*-variants for <+neuter> relatives comes from. An option may be that the acquisition device may draw different conclusions from the set in (15). The context N  $\emptyset$  does not fit the system that well. The relevant feature should derive from the DP head *het/D*<sup>o</sup>. If the D<sup>o</sup> in (15) allows the *dat/wat* switch, this may hold (from an acquisitional point of view) for the D<sup>o</sup><+neuter> in general. Only a highly conservative learner can be willing to pay attention to the N  $\emptyset$  in (15).

In sum, the *die/dat* set of relative pronouns realizes a < $\pm$ neuter> agreement with the antecedent. The <-neuter> selects the relative *die* and the <+neuter> selects the relative *dat*. If the < $\pm$ neuter> agreement cannot be applied, there is a switch to the *wie/wat* set of relatives. The moves for relatives can now be captured by two guidelines. The first one is given in (18) and holds independently of the antecedent.

- (18) Switch to the *w*-set in case gender agreement cannot be expressed by the *d*-set. This covers
       a. genitive relatives
       b. oblique relatives
       c. headless relatives

The second guideline covers three idiolects in a cumulative fashion, (19)a < (19)b < (19)c.<sup>12</sup>

- (19) Switch optionally to *wat* for <+neuter> antecedents in one of the following contexts
- a. with empty N  $\emptyset$ , when the <+neuter> antecedent is a quantifier or refers to “things in general” (standard Dutch)
  - b. with empty N  $\emptyset$  with all <+neuter> antecedents (spoken Dutch)
  - c. for all <+neuter> antecedents (spoken Dutch)

The next sections will deal with the learnability of the Dutch relative pronouns. Section 4.1 shows that A-bar root pronouns are acquired before relative A-bar pronouns. A subsequent learnability account should then pay attention to the following points for Dutch relatives.

(20)

a. *Hierarchy in acquisition steps*

The order of acquisition steps is beyond doubt. The two types of A-bar pronouns that play a part in the relative paradigm have clearly been acquired before from simple root CP structures. Does that order represent an acquisition hierarchy, i.e. an order that follows from a learnability principle? In the next section, I will argue for an affirmative answer (cf. Lightfoot 1991).

b. *Category status*

Dutch relative pronouns are selected from two sets of A-bar pronouns. The acquisition step concerns that selection rather than the A-bar elements as such. Are relatives as such a part of speech? In the conclusion, I will argue for an affirmative answer derived from the idea that categories stand for bundles of features (cf. Marantz 1997).

#### ***4. The learnability of relative pronouns in Dutch***

##### ***4.1 The child data***

A factually attested order of acquisition steps represents an acquisition hierarchy when earlier steps are reconstructed as clear entrance conditions for the later steps. The present case shows that the relative paradigm makes a selection from two types of A-bar pronouns. These have been acquired earlier in simplex root clauses. One might imagine A-bar pronouns exclusively designed for relative CPs, but reapplying the available A-bar pronouns is the more economic way out. The learnability hierarchy in (20)b follows from a natural acquisition economy, rather than requiring the postulation of an innate grammar-specific UG.

The claims made in the present paper have been validated by the acquisition of relative pronouns for three children in the CHILDES database (McWhinney 2006): Sarah and Laura (Van Kampen corpus), and Abel (Groningen corpus). The corpora of the other Dutch children in CHILDES do not contain enough relevant data. This paper will exemplify the acquisition steps that lead to the relative pronoun selection for Sarah.

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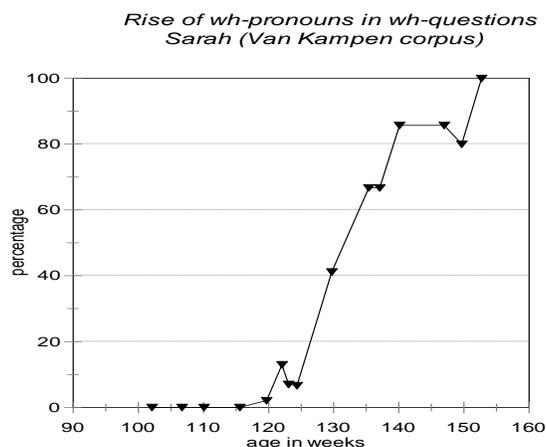
<sup>12</sup> These two guidelines for switching to the *w*-system do not (yet) reach a highly informal variant of Dutch discussed in Bennis (2001): “Switch for relatives to the *w*-system of A-bar pronouns”. Bennis (2001) believes, for unmentioned reasons, that the *w*-system will be a winner in the long run.

Sarah's first relative clause with a relative pronoun appears in file 31, when she is 3 years and 19 days old, see (21). This is a couple of months after her full acquisition of A-bar pronouns for root clauses.

- (21) a. (mother: vertel nog eens wat leuks tegen mamma.  
 (mother: tell mummy something nice)  
 ja, *wat* ik (g)edaan heb. (S. 3;0.19)  
 yes, what I have done)
- b. (mother: welke kussens?) *die* van Nienke is (S. 3;2,13)  
 (mother: which pillows?) (that from Nienke is)

The longitudinal acquisition graphs of *wh*-questions and discourse-related pronouns in my previous work (Van Kampen 1997, 2004) show that Sarah's speech abounds in A-bar topic *d*-pronouns and A-bar question *w*-pronouns before the age she starts producing relatives. See the graph in (22) that measures the rise of *w*-pronouns in root content questions in the speech of Sarah.

(22)



At week 140 (2;8.6) Sarah uses *w*-pronouns productively in content questions. Before the age of three, Sarah used 131 root questions with a *w*-pronoun in the files. Most of the *wh*-questions are copula constructions and partly stereotypes. When these are excluded from the count, the files still delivered 34 cases of overt non-cliticized A-bar *w*-pronouns (*wat*, *waar* and *wie*) in the speech of Sarah before 3;0.19. See some examples in (23).

- (23) a. *wat* is dr gebeurd? (S. 2;7.16)  
 what is there happened?  
 (what has happened)
- b. *wat* heb ik (g)edaan? (S. 2;8.19)  
 what have I done?
- c. *waar* hoort ie ? (S. 2;7.16)  
 where belongs he?  
 (where does he belong?)
- d. *waar* is tie alleen? (S. 2;9.7)  
 where is he alone?

- e. wie doet dat ? (S. 2;11.3)  
 who does that?

At 2;8.6, Sarah also starts using topic *d*-pronouns referring to a previously introduced antecedent. In the files before the age of three, I counted 135 topic A-bar *d*-pronouns (*dat*, *die* and *daar*). Again, copula constructions were excluded from the count.<sup>13</sup> Of these A-bar *d*-pronouns, 33 referred to a discourse antecedent, previously mentioned in a preceding sentence. Some of Sarah's examples of the period before 3;0,19 are given in (24).<sup>14</sup>

- (24) a. *die* is voor papa, *die* hondje (S. 2;6.28)  
 (that is for daddy, that doggie)  
 b. (mother: een kippetje). *dat* heb ik goed ingedaan (S. 2;10.18)  
 (mother: a little chicken). that have I well indone  
 ((mother: a little chicken). I have rightly put it in there)  
 c. (mother: een bot). *dat* vinden wij niet lekker (S. 2;11.3)  
 . ((mother: a bone). that find we not tasty  
 ((mother: a bone). we don't like that)  
 d. (mother: maar de kleine baby van Berry). ja, *die* kan lope(n). (S. 2;10.18)  
 (mother: but the little baby of Berry). yes, that can walk  
 ((mother: but Berry's little baby). yes, he can walk)

In later files, Sarah realizes an antecedent and a topic A-bar pronoun pair in her own (complex) discourse.

- (25) a. daar zaten ook tijgers in. *die* gingen opeten (S. 3;2,13)  
 there were also tigers in. those went up-eat  
 (there were also tigers in. they were eating)  
 b. daar zijn de kinderen weg. *die* wonen bij Utrecht. (S. 3;2,13)  
 there are the children away. those live in Utrecht  
 (there, the children are gone. they live in Utrecht)  
 c. kan ik Argos aaïen, want *die* bijt niet (S. 3;2,13)  
 can I Argos caress, for that bites not  
 (then) I can caress Argos, for he doesn't bite  
 d. ja maar, *dat* hoort bij de maan, dat dingetje (S. 3;4.13)  
 yes but, that belongs to the moon, that little thing  
 e. het kleine handje, *dat* hoort er niet bij, he. (S. 4;1.11)  
 the small hand, that belongs there not with, uh?  
 (small hand, that doesn't belong there, isn't it?)

<sup>13</sup> In copula constructions, *d*-pronouns are demonstratives that point to a referent in the situation. This use is not restricted to V-second languages.

<sup>14</sup> Brandt (2004) refers to the first type as "V2-relatives". A grammatical analysis, though, would have shown that the simple sentences crucially differ from both relative and from V2-relative clauses. First, the pronoun in V2-relatives is a demonstrative, not a relative pronoun. For instance, relative *w*-pronouns are not permitted. That is, they are like the sentence-initial *d*-pronouns in main clauses in the examples (24)-(25). Moreover, V2-relatives have a specific semantics, see Gärtner 2001 for German V2-relatives and Zwart 2005 for Dutch V2-relatives. That semantic use is beyond the scope of small children. It seems to me that all examples given by the authors are examples of topic *d*-pronouns in main clauses that refer to a previously introduced antecedent. The term V2-relative is misleading.

In most of the cases, the <±neuter> opposition is reflected in Sarah’s use of *die* versus *dat*, see the examples in (24) and (25) above. Like in spoken Dutch, Sarah sometimes overgeneralizes the A-bar topic *d*-pronoun to *die* when referring to <+neuter> antecedents, especially when the antecedent is <+human> or a diminutive, see (26).

- (26) Topic *d*-pronoun *die* instead of *dat* (also informal Dutch)
- a. dit is een andere boekje<+neuter>. *die* lees ik nooit (S. 3;5.30)  
 this is another booklet that read I never  
 (this is another booklet. I never read it)
  - b. ‘t Beest<+neuter> is er niet bij. *die* woont in het kasteel (S. 4;0.11)  
 the Beast is not there. that lives in the castle  
 (the beast is not there, he lives in the castle)
  - c. dat meisje<+neuter> *die* geeft de baby water (S. 4;9.13)  
 that girl that gives the baby water  
 (that girl, she gives the baby water)

The general conclusion is that the use of {*wie*, *wat*, *waar*} as A-bar *w*-pronouns in root questions and the use of {*die*, *dat*} as A-bar topic *d*-pronouns is present and established in the speech of Sarah before she reached the age of three.

Relative clauses appear somewhat later. There are 2 relative constructions before the age of three, but each one appears without relative pronoun.

- (27) a. dat zijn twee kinder(tje)s, Ø in de water speelt. (S. 2;8.19)  
 there are two little children (that) in the water play(s)
- b. die andere, Ø sgistere had (S. 2;11.3)  
 that other, (that) (I) yesterday had

When Sarah starts using relative pronouns, it is only in remnant clauses. Her mother delivers the main clause, see (28).

- (28) (mother: welke kussens?) *die* van Nienke is (S. 3;2.13)  
 (mother: which pillows?) (that of Nienke is = that belongs to Nienke)

Between 3-4 years there are some relatives “with antecedent included” (29)a,b. In (29)a, Sarah uses correctly *wat*, in (29)b she uses correctly the oblique *waar*. In (29)c and (29)d the relative pronoun *die* appears which asks for an antecedent. However, from the context it appears that the antecedent is present in the situation. Sarah points at the pieces of a jigsaw puzzle she and her mother are working on.

- (29) a. (mother: vertel nog eens *wat* leuks tegen mamma.  
 (mother: tell mummy something nice)  
 ja, *wat* ik (g)edaan heb. (S. 3;0.19)  
 yes, what I have done)
- b. ze mogen soms ook naar *waar* de andere dieren zitten (S. 3;10.7)  
 they may sometime to where the other animals seat  
 (they are sometimes allowed to go where the other animals are housed)

- c. is voor ons *die* daar ligge(n) . (S. 3;0.19)  
 is for us, that there lie
- d. *die* we allemaal niet nodig hebben, moeten we hier neerleggen (S. 3;11.4)  
 (which we all not need, must we here down-put)  
 (those which we don't need all, we must put them here)

The first relative pronouns with a discourse antecedent are found in file 40, when Sarah is 4;1.11 year old, see (30).<sup>15</sup> They have the correct *die* relative for <-neuter> antecedents.

- (30) a. ik wil niet kinderen *die* huilen in mijn klas hebben (S. 4;1.11)  
 I want not children<+plural> that cry in my class have  
 (I don't want to have children in my class that cry)
- b. we doen grote cracker *die* net omgevallen heb (S. 4;1.11)  
 we do big cracker that just fallen over has  
 (we take the big cracker that just has fallen over)
- c. dat was de nummer van de man *die* in het bos woonde . (S. 4;9.13)  
 that was the number of the man that lived in the wood

The interesting acquisition hurdle is the switch towards the *w*-pronouns. In section 3 we have seen that there is a switch to the *wie/wat* set of relatives if the < $\pm$ neuter> agreement cannot be expressed. The  $d_{\text{system-to-}w\text{-system}}$  for relative switches were captured by two guidelines, one independent of the antecedent and one dependent on a <+neuter> antecedent. The first guideline, obligatory in Dutch seems to be correctly applied by Sarah, within the limited set of examples. There were 2 correct examples of headless relatives and 1 example of an oblique relative, see for instance (31).

- (31) en ik heb gedaan *wat* ze allemaal aan 't doen zijn (S. 4;11.15)  
 and I have done what they all at do(ing) were

The relative clauses with a <+neuter> antecedent that allows an optional *dat/wat* switch (the guideline in (19)) appear as well. Sarah used *wat* for all <+neuter> nouns, following option c of the guideline in (19). See (32) and (33).

- (32) *wat* with a quantifier antecedent (as in standard Dutch)
- a. ik doe alles dr uit *wat* er niet in hoort (S. 4;5.29)  
 I take everything  $\emptyset$  out what there not in belongs  
 (I take everything out that doesn't belong in there)
- b. dit moet allemaal hier, *wat* je vindt (S. 4;5.29)  
 this must all  $\emptyset$  here what you find
- c. ik mag alles weten *wat* we gaan doen (S. 4;9.13)  
 I may everything  $\emptyset$  know what we will do

<sup>15</sup> These findings from the files are supported by diary notes Sarah's mother took of her daughter's language development. The first relatives without antecedent were recorded at the age of three and the first relatives with antecedent follow a few months later.

- (33) *wat* with a <+neuter> antecedent (as in spoken Dutch)
- a. motiefjasje<+neuter> *wat* je aan hebt, dat motiefjasje (S. 4;6.11)  
 design-jacket what you wear, that design-jacket  
 (design-jacket which you wear, that design-jacket)
- b. ik wil dat toastje<+neuter> *wat* wij gekocht hebben (S. 4;8.21)  
 I want that cracker what we bought have  
 (I want that cracker which we have bought)

There were no *dat* relatives at all in the files. So, Sarah disregards the *dat/wat* switch for a consistent *wat*. I wonder whether this is a strategy to avoid uncertainty when possible. It has been argued before that the development in child language reflects at first the grammatical force towards more uniform grammar (Van Kampen and Corver 2006). The actual adult spoken language reflects the diverse outcome that results from social forces, and so does input from Sarah's mother in the CHILDES files. See (34) some of the mother's diversity in relative clauses, taken from the (19)b,c set. For the sake of exposition, only antecedent and relative pronoun are listed, with the file number.

- (34) <+neuter> noun
- a. een boek *wat* (a book what) (mother S., file 4, 42)
- b. een spelletje *wat* (a small game what) (mother S., file 12, 17)
- c. dat andere stukje *wat* (that other piece Ø what) (mother S., file 38)
- d. het plakband *dat* (the tape that) (mother S., file 29)
- e. het jongetje *dat* (the little boy that) (mother S., file 5, 30, 45)
- f. het stukje *dat* (the piece Ø that) (mother S., file 39)
- g. het verhaaltje *dat* (the story that) (mother S., file 44)

The acquisition data in (30) and (33) above showed Sarah's attempts to streamline the slightly chaotic input by a uniform *die/wat* opposition.

Finally, it has to be noted that, the Sarah files, still one of the more extensive data sets of Dutch child language, yield no more than 21 relative clauses over some two years (between the age of three and five). The recordings of Sarah during this period contained 7.050 utterances. The percentage of relative clauses amounts then to 0.3%. This number may be not very high, but it nicely reflects the number of relative clauses in the adult input. The mother produced 57 relative clauses (in all files) out of 23.331 utterances. This also amounts to less than 0.3%. The quantitative force of the input will be reconsidered in section 4.2.

#### 4.2 Hierarchy of acquisition steps

Obviously, the relative paradigm is acquired, although the amount of primary data from the parental input is remarkable low. The nearly 24.000 utterances of the mother recorded over a period of four years the Sarah files, contain no more than 55 examples of relative clauses with an antecedent and 10 "with antecedent included". This amounts to less than 0.3% of all the CPs. If we assume that the daily amount of sentences processed by Sarah was around 5.000 sentences, she got less than 20 examples of relative clauses each day. These examples divided over the five main types (*die*, *dat*, *wat*, *wie*, *waar*). The opportunity to get the whole paradigm of Dutch relatives seems slender, see (35).

## (35) Relative pronouns in the speech of the mother (Sarah files, Van Kampen corpus)

<i>d</i> -pronoun	with antecedent	<i>w</i> -pronoun	with antecedent	antecedent included
<i>die</i>	29 0.12%	<i>wie</i>	---	1
<i>dat</i>	17 0.07%	<i>wat</i>	6 0.02%	8 0.03%
		<i>waar</i>	3 0.01%	2 0.01%

Nevertheless, the system reproduces its relative pronouns over the centuries in a fairly stable way. Obviously, such a small amount of primary data is sufficient. Since the paradigm is highly language-specific, one may wonder where this effectiveness derives from. A decisive point must be that the acquisition procedure confronts the relative pronouns in subordinates, when it is highly informed about the relevant categorial factors and the relevant configurations. Due to preceding acquisition steps, it knows about the same A-bar pronouns in non-relative root constructions. As my acquisition graphs showed (Van Kampen 1997, 2004), the topic *d*-system and the question *w*-system have been acquired well before the third birthday. This includes the function of the C<sup>o</sup> as a clause classifying position, the grammatical <±neuter> and the semantic <±human> features, both for the antecedent DP and for the A-bar pronoun. Previous knowledge also includes the binding of an empty argument position by the A-bar pronoun. See Van Kampen (1997) for the case of Sarah. The grammatical system will also contain a procedure to distinguish a CP complement and a CP adjunct, where the complement subcategorizes a denotational item and appears in a lexical sub-categorization frame, whereas an adjunct CP like the relative clause does not. This is sure, since the subcategorization is part and parcel of the lexicon acquisition from the beginning on. The previous acquisition of all this grammatical knowledge as a fully automatic type of perception creates the primary data for relative clause formation. Before that, the relative clauses cannot be noticed in the mass of maternal input CPs. The first relative pronouns in the Sarah files are of the *die* type. The novelty in that construction are A-bar *d*-pronouns that introduce a subordinate clause. The agreement pattern of the topic *d*-pronouns and the relatives is identical. The curious *wat* switch that distinguishes the relatives from the other *d/w* A-bar pronouns follows later and basically still escapes an explanation.

The most important point is that language acquisition goes together with a natural ordering of its material, and the acquisition of the relative clause is no exception. Primary input data for the child is not a bulk of possible grammatical observations as they appear to a linguist. Primary input data are a more transitory kind of thing. A construction enters the primary data when it is analyzed and known but for a single categorial feature in its configuration (Berwick 1985, Clark 1992, Evers and Van Kampen to appear). Before that point, such a construction cannot be noticed and acquired and after that point it has been acquired and is no longer active as a point of specific attention. It will rather enable the acquisition procedure to notice more advanced constructions and these will now enter the primary input data. Whereas one may say that the full unordered set of observational statements would constitute a completely confused and weak stimulus, this is no longer true for primary data seen as a naturally ordered hierarchy of learning steps. The new data for an acquisition step get a special focus of attention. May be they are heard with a clarity that we experience when hearing a single grammatical mistake in a stream of well-formed utterances. They differ from the data that are processed automatically, because those have already been acquired. They differ as well from the data that contain several grammatical properties that have not yet been acquired, because

such data are simply discarded as incomprehensible parts of language stream. The new data selection is rather a shifty small set of identical configurations that is in focus during a couple of months.

## 5. Conclusion

The acquisition of the Dutch relative paradigm is different from the acquisition of the Dutch verbal or nominal paradigm on the following points.

(i) The identification of lexical items as V versus N takes place fairly early; (ii) the identification is (at least partly) due to binary constructions based on highly frequent and adjacent grammatical markings for predication ( $I^0$ ) and reference ( $D^0$ ); and (iii) each of these acquisition steps (for V and N) takes several months and involves by consequence several hundred thousands of learning experiences.

By contrast, the acquisition of relative pronouns (i) belongs to later child language (say around the fourth birthday), (ii) it is supported by syntactically analyzed constructions that have a considerable grammatical sophistication due to previous acquisition steps, and (iii) the input for the relative pronouns is not repetitive and certainly an order of magnitude smaller (a few thousand examples at most).

One might argue that relative pronouns do not represent the acquisition of a new part of speech (see also Nolda 2004), or even that relative pronouns are rather a choice made out of pre-existing A-bar pronouns. Yet, that choice itself represents an acquisition step. Moreover, it is not improbable that “parts of speech” (just like for instance the phonemes) are in the first place intuitive units. They adapt to context in such a way that their status in grammar is better accounted for by a bundle of features that is only partly stable (see also Marantz 1997 *Distributed Morphology*, Chomsky 2000).

The differences between the acquisition of the relative paradigm as compared to the verbal or nominal paradigm seem quite instructive. The acquisition stimulus of the relative paradigm must be sufficiently effective to offer the relatives a survival based on a fraction (less than 0.3%) of the clausal (CP) input. Plausibly, the stimulus for the relative pronoun can be quantitatively low, because it is qualitatively rich. Qualitatively rich may be circumscribed as contextually precise and complex. Trivially, those qualities are due to the pre-existing structure that has been acquired before. The previous acquisition steps include the two types of A-bar pronouns related to the  $C^0$  position with argument gap, the CP nominal adjuncts, and local agreement in phi-features. Like the later steps in making a jigsaw puzzle the solutions are easier to find because they have more structural support. The conclusion seems to be that primary input data become stronger stimuli for language acquisition to the extent that they embody more pre-existing structure. The other conclusion could be that lack of preciseness in the stimulus can be made up for by taking more time and quantity as in the case of N and V. This undermines two dogmas in generative theory. (i) the language acquisition procedure must confront “the poverty of the stimulus” and (ii) it succeeds due to grammatical structure that pre-exist as a “genetic endowment” of the human species.

The acquisition procedure as considered here is clever in a more simple way. It reduces the input to an intake of binary structures. A few elementary categories are derived from maximally reduced local configurations. This takes a period of some two years, say between the first and third birthday. It is only thereafter that the acquisition procedure can be supported by pre-existing structure of a language-specific type and typology. Subsequently, the procedure speeds up.

Pre-existing grammatical structure as a genetic endowment can be given up. This is not so far from present day (Chomskyan) theorizing as one might imagine. Chomsky (2005) singles out three factors for the acquisition of grammar (i) primary input data; (ii) UG properties; (iii) general cognitive abilities. He underlines that the better and the more “perfect” the system of language is, the less separate genetic substance the UG factor should have. From there we get a short track towards the position of the present paper. Let language be “perfect”, since evolution is without mercy for the imperfect. Hence, substantive innate UG support is better evaded and, contrary to previous assumptions, the stimulus by the primary input data is somehow sufficiently effective, rather than poor. Consequently, an acquisitional account in terms of a cumulative procedure fits in.

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