Acquisition of the German plural markings

A case study in natural and cognitive morphology

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1. Objectives

Natural morphology (Dressler et al. 1987; Mayerthaler 1981; Wurzel 1984) and cognitive morphology, here represented by the schema concept (Bybee 1985, 1988; Köpcke 1993), make the assumption that competing morphological forms are subjected by the speaker to a qualitative evaluation with respect to their symbolizing capacity. Speakers assess which of the available symbolizations "best" represent the grammatical content to be encoded. The evaluation of the forms follows different criteria. The criteria established by natural morphology are associated on the one hand with the semiotic quality of the morphological symbolization (principle of "uniformity and transparency", principle of "constructional iconicism", Mayerthaler 1981) and on the other hand with the structural and typological uniformity of the affixes used in the inflectional system, that is, the systemic appropriateness of the means of symbolization (Wurzel 1984). Cognitive morphology stresses the signalling capacity of the symbolization, as determined by the perceptual criteria salience, type/token frequency, cue validity, and iconicity. This essentially is in agreement with the assumptions of natural morphology. The primary difference between the two approaches is that natural morphology takes the perspective of production, and thus of the speaker, tracing the effects of the principles assumed upon the organization of the grammar and the course of language change. Cognitive morphology, in contrast, takes the perspective of perception, that is, the perspective of the hearer, investigating the decodability of the given formal schemata.

In the following, we will discuss the acquisition of plural forms in German from the unified perspective of the two, in our opinion compatible, approaches, on the basis of a longitudinal data sample of eight children.[1] There are at least six recordings of each child. Together, the data cover the acquisition period

[1] The data used were gathered in 1990 as part of the DFG project "Lexlern" under the direction of Harald Clahsen. We thank Harald Clahsen and his assistants for giving us the oppor-

from 1;11 to 2;10. One may thus anticipate that the data sample under investigation reflects the transition from purely lexical memorization to the acquisition of regularities or patterns. In the naturalness-theoretic, constructivist approach to language acquisition of Dressler 1995 and Dressler and Karpf 1995, this corresponds to the transition from the premorphological to the protomorphological acquisition phase. The premorphological phase is defined as

> the phase where morphological operations occur - both extragrammatical (or "expressive") ones and precursors of later grammatical rules. The precursors consist of rote-learned forms whose selection is based on principles of naturalness and constructivism. In the pre-morphological phase, no system of grammatical morphology has yet become dissociated from a general cognitive system that handles, inter alia, words of whatever form (including morphological forms), i.e. pre- and at least early protomorphology are part of the lexicon.

The protomorphological phase is defined as

> the period when the system of morphological grammar and of its subsystems start to develop without having reached the status of modules and submodules. In this phase children start to construct creatively morphological patterns or rules, many of them overgeneralised, i.e. with unrestricted productivity. (Dressler 1997:10f.)[2]

We will begin with a brief description of plural formation in the target grammar. Then we will show which processes mark the transition between the two phases in German and how these can be explained from a naturalness-theoretic and cognitive perspective.

2. Plural formation in German

For the formation of noun plurals German has seven native affixes or affix combinations: *-(e)n*, *-e*, *-er*, *-s*, and umlaut, plus the combinations of *-e* and *-er* with umlaut. In addition, a subset of nouns - masc. (msc.) and neuters (ntr.) those ending in /en/, /el/, or /er/ - receive no marking in the plural. In the target system, the assignment of the plural markers is largely bound to certain lexical, phonological, and (sometimes) semantic characteristics of the nouns (cf. D. Bittner 1993, 1994; Köpcke 1993; Wurzel 1994). The current data analysis shows that the children have not yet classified the nouns according to these criteria in the acquisition phase under investigation. With respect to plural formation, they still appear to view the nouns for the most part as a mere undifferentiated class of words. Of interest for the acquisition in this phase is the quantitative relation of the plural forms in the target system. The most common plural marker with respect to type frequency are *-(e)n* and *-e*. Over 95% of all feminines (fem.) and the class of so-called weak masc., a very large

[2] To Dressler 1995 and Dressler and Karpf 1995, the third phase of morphology acquisition is the phase in which the modules of the traget grammatical system and the subclassifications within the modules are fully developed. In other words, the child acquires the specific criteria for the assignment of the individual symbolizations and the lexical storing of singular forms. Cf. also the three acquisition phases of morphological structures assumed in Slobin 1973 and Peltso 1991.

class due to word formation,[3] form the plural with *-(e)n* (*Schlange-n*, *Burg-en*, *Tourist-en*). More than 60% of all masc. and ntr. form their plural with *-e* or *-e* + umlaut (*Höf-e*, *Brot-e*) , and additionally about 40 fem. have *-e* + umlaut (*Wänd-e*, *Kräft-e*). Because of the higher number of masc. than fem. in the noun lexicon of German the type frequency of *-(e)n* and *-e* is similar. These two plural markings are at once the most productive. Among masc. and ntr. ending in an unreduced vowel, *-s* is productive (*Uhu-s*, *Kino-s*), and among fem. *-s* competes in this context with *-(e)n* (*Firma-s* vs. *Firm-en*, *Kobra-s* vs. *Div-en*). Because of so few nouns end in an unreduced vowel, *-s* has a rather low type frequency. An even lower type frequency is that of *-er* and *–er* + umlaut (*Brett-er*, *Däch-er*). This marker is simultaneously unproductive. Symbolization of the plural by umlaut alone (*Öfen*) has the lowest type frequency of all. Even the total lack of plural marking on the noun (*die Segel*, *die Koffer*) is more common.

As already made clear at the beginning of this paper, natural and cognitive morphology have demonstrated that for the assessment of the symbolization properties of the individual plural forms a series of further criteria are involved. Nevertheless, we will first present the data situation. Then we will discuss the criteria we believe relevant to the interpretation of the data.

3. Morphological analysis of the data

In our data sample, all children use nominal plural forms from the outset; cf Sabrina (1;11) *bilder*, *fotos*, *fisse* (=fische); Hannah (2;0) *vöge*, *augen*, *noten*; Katrin (2;01) *trümpfe* (=strümpfe), *nüsse*, *bücher*.

In the first recordings, Sabrina, Hannah, and Marlies are still in the phase in which they almost exclusively form one-member noun phrases consisting of a noun unaccompanied by any other material. Since number agreement on the verb has not yet been acquired in this phase, the plurality of the nominal referent can be linguistically symbolized only by a pronominal unit (*mehr*, *alle*; D. Bittner, 1999) or a nominal plural form.

Among the approximately 600 nouns (tokens) that were used in plural contexts in the corpus as a whole, there are 67 nontarget forms. This corresponds to an error rate of 11%. The 600 tokens represent 122 types. As an approximation of the input ratios, which are not included here, Table 1 shows the target plural formation displayed by these types and tokens.

Both as a token and as a type, the suffix *–e* occurs with the greatest frequency; the suffix *–s* is the least frequent. Interestingly, *-er* has the second-highest token frequency but the second-lowest type frequency. The positions of *–(e)n* are relatively balanced, since it exhibits medium frequency in both case.

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[3] Beside the approx. 100 native weak masc. (*Bär*, *Mensch*, *Löwe*), numerous nonnative morphemes allow formation of agent nouns that inflect weakly, e.g., *Student*, *Soldat*, *Doktor*, *Poet*.

	-e	-"e	-en	-er	-"er	-∅	-"∅	-s
token: 600	156	103	120	115	28	29	19	30
	43%		20%	24%		8%		5%
types: 122	21	21	35	7	8	18	3	9
	34,5%		28,7%	12,3%		17,2%		7,4%

Table 1. *Type and token analysis by target plural formation*

Let us now look at the plural forms produced by the children. Table 2 lists all nontarget forms, arranged according to the plural marker of the target language. It appears that among the nontarget plural forms two types predominate. First, 31.3% of the nouns in plural contexts (22 of 67) are formed without a plural suffix; see the columns *-∅* and *–"∅* under "target marker forms." Aside from three forms with umlaut (Katrin *die zähn*; *strümpf, meine strümpf*), the singular forms of the noun are employed here. Second, 26.8% (18 of 67) are overgeneralizations of the plural suffix *–(e)n*, sometimes in combination with umlaut; see the columns *–en* and *–"en* under "target marker forms." The preference for *–(e)n* as a plural marker is further underscored by the double forms. In four of the five cases in which a second suffix is added to an *-er* plural, the second suffix is *–n*; see the column *–ern* under "double forms." Of note is also the plural formation with umlaut and a reduction of the singular form by elision of final /l/ used by several of the children (*vöge, fußnäge*); see the column labelled "umlaut + reduced word end" under "individual forms." These forms represent 15% of the nontarget plural forms. The resulting plural form pattern with umlaut and final /ə/ is also found in the four instances of *möhre* (Annelie 2;07, Marlies 2;08) and in *die känguruhne* (Katrin 2;05).

Thus, in the age range under study, three strategies can be isolated:

(1) omission of plural marking on the noun
(2) formation of the plural by suffixing *–(e)n*
(3) acceptance of the pattern "umlaut + final /ə/" as a plural

Strategy 1 is to be expected when the children are uncertain about the plural form to be used or when the lexically stored plural form cannot be activated quickly (or confidently) enough in the production process and no patterns or regularities for plural formation have been established yet. Strategy 2 shows that the suffixation of *–(e)n* has been established as a pattern or regularity of plural formation—or is in the process of being established. Strategies 2 and 3 show that hypotheses concerning "good" plural forms or "plural schemata" (Köpcke 1993, 1998) have been made.

name/ age	plural datum	target marker	plural form used									
			target marker forms						double f.		individ. f.	
			-∅	-"∅	-en	-"en	-e	-s	(")ern	(")ers	UL + reduc endg	-ne
Hann. 2;1	Nöten					I						
	viele Uhr	-en	I									
Katrin 2;5	Plätten					I						
Antje 2;5	drei Hase		I									
2;7	drei Junges							I				
	Elefante						I					
Annel. 2;7	zwei Papabär		I									
	Möhre		III									
	kleine Hemde						I					
2;8	kleine Hemd		I									
	große Hemd		I									
Marl. 2;8	Möhre		I									
Antje 2;9	viele Hase		II									
Veren. 2;4	Krokodilen				I							
	Pferden	-e			I							
	mehr Puzzleteil		I									
	Tieren				I							
	drei Kamel		I									
Antje 2;5	die Punkten				I							
Katrin 2;5	die Schuh		I									
Hann. 2;1	Füßen					I						
	Klötzen	-"e				I						
Sabr. 2;1	Turme						I					
Katrin 2;2	Nüssen alle					I						
	viele Nüssen					I						
2;3	die Zähn			I								
Antje 2;3	viele Balle						I					
2;4	Frosche						I					
Katrin 2;5	viele Kuh		I									
	die Hahne						I					
	Strümpf			I								
	meine Strümpf			I								
	Baukörzen					I						
	die Strumpf		I									
2;7	Aketzen (=Bauklötze)				III							
Veren. 2;8	Gänsen					II						
Marl. 2;8	Mause						I					
Inga 2;6	viele Bildern								I			
	Bilders	-er								I		
Veren. 2;7	die Bild		I									
Antje 2;8	die Kindern								I			
Annel. 2;9	meine Bildern								I			
Katrin 2;2	mehr Manns							I				
Inga 2;6	drei Buchen	-"er			I							
2;7	mein Buchen				II							
	zwei Buchen				I							
Marl. 2;8	die Blättern								I			
Katrin 2;5	die Känguruhne											I
Antje 2;5	viele Mammut	-s	I									
2;8	keine Baby		I									
Hann. 2;1	Vöge										IV	
Katrin 2;3	Fußnäge	-"∅									I	
Marl. 2;5	mehr Vöge										IV	
Antje 2;8	Vöge										I	

Table 2. Nontarget forms of nouns in plural contexts

In contrast to the target situation established in Table 1, the suffixation of *–e* does not play a dominant role. Input frequency is evidently not the crucial factor for the acquisition process.

4. Theoretical interpretation of the morphological data

Strategy 1: During the transition from the premorphological to the protomorphological phase, avoidance of a plural form and use instead of the singular form is the expected reaction when the child is uncertain as to which plural form is required. For the vast majority of nominals, the singular form is the more salient, more permanently stored form of the noun. It comes out clearly that the search for a plural form is especially neglected in those cases where the noun is associated with a quantifier. Nearly 50% of the ∅-forms cooccur with a quantifier; cf. Hannah (2;01) *viele uhr*, Antje (2;05) *drei hase*, Verena (2;04) *drei kamel*, Katrin (2;05) *viele kuh*. Quantifiers do not appear this frequently with any of the other plural forms (the two nontarget forms with an *–s* plural, both of which are associated with quantifiers, are not sufficient to disprove this claim). In addition to the use of a quantifier, it is evident that a form in /ə/ that already has an umlaut in the singular can also be a reason for not suffixing in the plural (cf. strategy 3). We find three instances of *möhre* in Annelie's data at 2;07, plus *möhre* in Marlies' utterances at 2;08; Annelie (again at 2;07) furthermore produces *möhresuppe* (instead of *möhrensuppe*).

Strategy 2: Among the seven (or eight) possibilities accessible from the input, the first to be filtered out as a plural formation pattern is plainly *–(e)n* suffixation. This is consistent with the fact mentioned at the outset that *–(e)n* is one of the most frequent plural marker in German. Cognitive morphology includes type and token frequency among the criteria for the signalling strength of a marker (Köpcke 1993:82). Also language acquisition studies partly make reference to the ascertainable proportions of words in the input. In naturalness-theoretic investigations it is postulated that frequency is an epiphenomenon of other criteria (Mayerthaler 1981; A. Bittner 1996). One might then ask on the basis of what properties the suffixation of *–(e)n* might be favored both in the target language and in first language acquisition. Naturalness-theoretical considerations lead us to derive the following: The principle of constructional iconicism, which Köpcke 1993 adds to the criteria of cognitive morphology alongside the similar criterion of salience, holds that *–(e)n* and *–er* should be preferred over *–e*, *-s*, and umlaut. Umlaut is only minimally iconic as a modifying marker; *-s* is less iconic than *–(e)n*, *–er*, and *-e*, since it does not constitute a syllable. And *–e* (or /ə/), because it is of little formal (and phonetic) substance, is in its turn less iconic than *–(e)n* and *–er*, with their final consonants. Still, convincing arguments for why of the two syllabic consonant-final suffixes it is *–(e)n* which is preferred are hard to construct on the basis of the above-mentioned naturalness criteria.

In the German system of nominal inflection (if one can even limit consideration to this subsystem at all), the suffix *–(e)n* is neither transparent nor uniform. As a matter of fact, it is less transparent than *–er*. Nothing but the obviously higher productivity of *–(e)n* would lead one to postulate that this suffix has a greater system adequacy and thus better symbolization properties

than *–er*. However, we can say the same thing about the productivity of a marker as about its frequency: it should be an epiphenomenon of other factors. In addition, in the target system *–(e)n* is productive only in certain areas, namely, fem., and animate masc. ending in /ə/ or in a stressed, nonnative suffix not with final /r/, /l/, or /n/ (*Hase, Galerist*). Elsewhere *–e* is the productive marker (D. Bittner 1993, 1994). With nonfem., a singular form ending in a consonant typically has a plural form ending in a vowel, e.g., *Heft – Heft-e, Wolf – Wölf-e*. With fem., a singular form in a vowel typically takes a plural form in a consonant, e.g., *Zange – Zange-n, Tanne – Tanne-n*.

Even if the children have not yet acquired "area-specific" aspects of these relations, one can nevertheless assume that in the development of plural formation regularities they assess what a typical singular form and a typical plural form are. In our opinion, this aspect goes beyond the simple determination of uniformity and transparency of markers. It is captured in cognitive morphology by the term *cue validity*: speakers evaluate the cue validity or "signal validity" (Köpcke 1993:82f.) of the possible markers or formatives appearing in marker positions. Köpcke 1988, 1993 argues that the frequency with which the phonetic material for plural symbolizations shows up in singular nouns influences the validity of the affix in question as a plural sign. Due to the high incidence of singular forms in /ə/ in the basic vocabulary of German (*Junge, Schleife, Birne*), the ending *–e* has low cue validity as a plural marker. The same obtains for the cue validity of *–er*, since there are many singular forms in *-er* (*Koffer, Gewitter, Kiefer*), in the end almost infinitely many, because *–er* is a productive derivational suffix for agentive and instrumental nouns (*Taucher, Bohrer, Mixer*). That *–er* forms are easily interpreted as singulars is shown by the five cases in which an extra plural marker is added to an *–er* plural form, cf. Inga (2;06) *viele bildern, bilders*; Antje (2;08) *die kindern*; Annelie (2;09) *meine bildern*, and Marlies (2;08) *die blättern*, as well as the use of *blätter* in singular contexts, e.g., Marlies (2;08) *ich hol auch ein blätter, mein blätter is fertig*. The highest cue validity clearly is that of *–(e)n*. To be sure, there are also a number of singular forms in *–en* (*Kissen, Wagen*), but *–en* is not used in derivation like *–er* and also *–e* (*der/die/das Blaue, der/die/das Mutige*). An equally high cue validity can be inferred for *–s*; however, in the target system suffixing *-s* often leads to a violation of system adequacy. To be system adequate, German plural forms are at least bisyllabic; in other words, they typically have a greater number of syllables than the corresponding singular forms. So the system adequacy parameters demand higher iconicity for plural markers than *–s* contains.[4] Higher iconicity or

[4] In the target language *–s* appear primarily on nouns in which the syllable-forming, vowel-initial plural suffixes are disfavored for phonological reasons, e.g., *Kino - *Kino-e/Kino-s*, . Sometimes *–s* competes with *–n*, as in the sg./pl. *Stiefel - *Stiefel-en* vs. *Stiefel-s/Stiefel-n*.

salience[5] in their turn are important criteria for the perceptibility and assessment of markers in language acquisition.

Consequently, the deciding criteria for the preferred perception and interpretation of *–(e)n* suffixation as a plural formation pattern are the comparatively high degree of iconicity, cue validity, and system adequacy of this pattern.

Strategy 3: We believe that the plural *vöge* employed by several children and the similarly formed *fußnäge* produced by Katrin, as well as the forms *känguruhne* and the occurrences of *möhre* in plural contexts, imply that the children view final /ə/ as a good plural pattern, despite its low cue validity and iconicity, when it is associated with umlaut of the stem vowel. At first glance, this appears to be contradicted by the cases in which the children leave out either the umlaut or the *–e* suffix for target plurals in umlaut plus *–e* (*turme, viele balle, frosche, die hahne; die zähn, strümpf, meine strümpf*). In contrast, however, the "error" data from later plural acquisition phases of Pauline (K.-M. Köpcke's daughter, 2;11 to 3;07) display a clear tendency toward overgeneralization of umlaut in *–e* plurals, e.g., *die pünkte, die büsse, die böte, die schäfe* (Köpcke 1998). The omission of umlaut or *–e* in the Clahsen data may be observed up to about 2;05 (an exception is Marlies at 2;08). A nontarget combination of umlaut with other plural suffixes occurs in only two cases (Hannah 2;01 *nöten*; Katrin 2;05 *plätten*). In our opinion, one can conclude from these observations that the association of umlaut and *–e* is interpreted as a good plural pattern relatively early; compare Hannah 2;01 *vöge* [4x]; Katrin 2;03 *fußnäge*). However, the ability to assign two plural markers – the suffixing marker *–e* and the modifying marker umlaut – simultaneously and thus to carry out a complex generating operation, as Pauline does, is obviously acquired only later, possibly only after the pure suffixing techniques, so that corresponding overgeneralizations appear later as well.

In the spirit of Dressler and Karpf's reflections on the development of the modularity of grammar in language acquisition, strategies 1 and 2 can be interpreted as the basic strategies in the transition from the premorphological to protomorphological phase. Whereas strategy 1 marks the end of pure rote learning and the lexical storing of plural forms (premorphological phase without morphological module), strategy 2 shows that an analysis of the input has taken place, a first hypothesis has been formed, and the abilities needed to apply this as a plural formation pattern have been developed. That is, (proto)morphological patterns and operations have established, and this is tied to the constituting of a morphological module. Strategy 3 is likewise an expression of the constituting of independent morphological patterns. It also reflects the fact

[5] "Salience ist die Bestimmung des Ausmaßes, mit dem eine morphologische Markierung vom Hörer identifizierbar ist, also ihre akustische Prominenz" [*tr.* Salience is the determination of the extent to which a morphological marking is identifiable, in other words its acoustic prominence] (Köpcke 1993:82). Suffixes located word-finally, and thus in perceptually prominent position, can be said to be salient.

that an analysis has taken place and a hypothesis formed. Nonetheless, the translation of this hypothesis into a target morphological pattern cannot be observed in the Clahsen data, which extend to 2;11. Dressler 1997 indicates that in language acquisition, the establishment of nontarget morphological patterns ("blind alleys") is to be reckoned with. The plural formation by /l/-reduction and umlaut of the word stem (*vöge, fußnäge*) may represent such a case.

Now we turn to a discussion of what can be said about the course of the acquisition process and the strategies established on the basis of the data set as a whole for the individual children of the Clahsen corpus.

5. The plural formation of each child over time

Tables 3 and 4 present a comparative analysis of the number of plural forms attested for each child, the number of nontarget forms, and the frequency of the most common "error" types.

name/age	total pl. con-texts	nontar -get pl. forms	% of non-target pl. forms in pl. contexts
Sabrina 1;11 - 2;02	58	1	1.8%
Annel. 2;04 - 2;09	58	8	14.4%
Antje 2;03 - 2;09	67	12	17.2%
Marlies 2;04 - 2;10	52	7	13.5%
Hann. 2;00 - 2;07	67	8	12.0%
Katrin 2;01 - 2;06	197	18	8.7%
Verena 2;04 - 2;08	58	8	14.4%
Inga 2;04 - 2;09	41	6	14.6%

Table 3. *Amount of nontarget forms in the total plural contexts*

nontar -get pl. forms	sg. form for pl. form -∅ pl.	% of nontar -get pl. forms	overgene ralization of *–(e)n* pl.	% of nontar -get pl. forms
1	/		/	
8	6	75%	/	
12	6	50%	1	8%
7	1	15%	/	
8	1	12,5%	2	25%
18	5	28%	6	33,3%
8	3	37,5%	5	62,5%
6	/		4	67%

Table 4. *Percentage of -∅ and –(e)n forms among the nontarget plurals*

The percentage of nontarget forms among the plural forms used (Table 3) varies from 1.8% (Sabrina) to 17.2% (Antje). There can be no doubt that Sabrina, who employs only one nontarget form and is simultaneously the youngest child in this corpus, is still in Phase I of the acquisition of nominal plural formation. She knows just about all the plural forms she uses (22 types in all) purely lexically. With the older children, for whom there are a comparable number of plural contexts to Sabrina's in the data (Annelie, 58; Marlies, 52; Verena, 58), it is a different story. They have nontarget forms at about the 14% level. Annelie tends to avoid the plural form, that is, to use the singular form instead of the plural form. Marlies appears not to have settled on any single strategy as yet. Beside the four utterances of *mehr vöge*, she suffixes *–e* once (*mause*), *-er* + additional *-n* once (*die blättern*), and uses the singular form once (*möhre*). Verena, in contrast, seems to have filtered out *–(e)n* as the most significant plural marker and established a corresponding plural formation pattern. The same is true for Inga, who likewise has about 14% nontarget plurals.

The children named exhibit different tendencies or strategies, despite similar, high proportions of nontarget forms. Table 4 shows that this can be

interpreted as an ordered acquisition sequence. Whereas Sabrina is still clearly in the premorphological phase, the application of strategy 1 by Annelie and Antje, like the great variation and lack of strategy in Marlies and Hannah – interpretable as a search for a regularity or a serviceable pattern – plainly indicate the end of the premorphological phase. Katrin and Verena, who favor *–(e)n* suffixation (strategy 2) but still do apply strategy 1 (the singular form in lieu of the plural form), are just making the transition to the protomorphological phase. Verena is more advanced than Katrin. She does not produce any other nontarget forms, whereas Katrin still applies seven other forms, hence displaying some uncertainties. Finally, Inga does not use any (more) singular forms in plural contexts, and nearly all her nontarget forms follow strategy 2 (are overgeneralizations of *–(e)n*). Consequently, Inga is the most advanced in the protomorphological phase.[6]

Thus, the data under investigation lead to the following hypothesis regarding the sequence of acquisition in nominal plural formation up to age 3;0:

use of lexically stored plural forms >
avoidance of plural marking on the noun >
overgeneralization of the –(e)n plural

A data extract from a different corpus of older children (2;05 to 3;11) made available to us by Katrin Lindner shows as well, that the tendency to overgeneralize *–(e)n* clearly comes to dominate after 2;06. Of the 57 nontarget forms of the Lindner corpus, only 5 represent substitution of the singular form for the plural form. This is opposed to 17 occurrences of overgeneralized *–(e)n* (*fischen, drei pferden, foton*) and 18 instances of adding *–n* to a singular or plural form in /el/ or /er/ (*gürteln, kindern, rädern, monstern*). The same observation obtains for the Lindner data as for the Clahsen data: no other plural marker is overgeneralized with comparable frequency.

6. Conclusion

Analysis of the nontarget plural forms has brought to light that the transition from the storage of lexical forms as (relatively) independent lexical units to the derivation of plural forms from singular forms is first indicated by an increase in the failure to mark plural on the nouns (strategy 1). The next overgeneralization to be observed, that of the *–(e)n* plural (strategy 2), is an expression of the fact that children attempt to establish a "rational" method of plural formation. The storing and activating of every plural form individually as a lexical unit becomes too costly once utterances and the lexicon itself have reached a certain level of complexity. The children strive for systematization of linguistic devices

[6] It is to be remarked that the same three children (Sabrina, Marlies, Hannah) who at the beginning of recording still largely form single-member NPs (containing just the noun) have neither strategy 1 nor strategy 2 clearly developed. This suggests that the transition to the protomorphological phase has as a prerequisite the acquisition of a more complex NP-grammar, or is at least linked to this.

via "grammaticalization". As Dressler and Karpf have proposed, this is linked to dissociation processes (and modularity if you will), since grammatical regularities are always area-specific.

As could be shown above, the derivation of regularities from the input is not frequency-dependent. Although *–e* exhibits very high frequency values (cf. Table 1), it does not become established as a means of plural formation. Only in combination with umlaut is it accepted as a plural pattern (strategy 3). The suffix *–er*, which has the second highest token frequency (cf. Table 1), is not analyzed by the children as a plural marker at all. On the contrary: sometimes an extra plural marker is added onto *-er* plural forms. The establishment of the first plural formation regularities proceeds on the basis of an analysis of the formal structure of nouns in the singular and the plural, whereby the children seek among the given forms a symbolization contrast of perceptively sufficient significance.

References

Bittner, Andreas. 1996. Starke "schwache" Verben - schwache "starke" Verben. Überlegungen zur Struktur des deutschen Verbsystems im Rahmen der natürlichen Morphologie. Tübingen: Stauffenberg.

Bittner, Dagmar. 1993. "Die außermorphologische Struktur von Flexionssystemen oder Was ist eigentlich Paradigmenökonomie?." In: Tonelli, Livia & Wolfgang U. Dressler (eds.), Natural Morphology - Perspectives for the Nineties. Padua: UniPress. 75 - 88.

Bittner, Dagmar. 1994. "Die Bedeutung der Genusklassifikation für die Organisation der deutschen Substantivflexion." In: Köpcke, Klaus-Michael (ed.), Funktionale Untersuchungen zur deutschen Nominal- und Verbalmorphologie. Tübingen: Niemeyer. 65 - 80.

Bittner, Dagmar. 1999. "Erwerb des Konzepts der Quantifikation nominaler Referenten." In: Meibauer, Jörg & Monika Rothweiler (eds.), Das Lexikon im Spracherwerb. Tübingen: Franke. 51-74.

Bybee, Joan. 1985. Morphology: A Study of the Relation Between Meaning and Form. Amsterdam: Benjamins.

Bybee, Joan. 1988. "Morphology as Lexical Organization." In: Hammond, Michael & Michael Noonan (eds.), Theoretical Morphology. San Diego: Academic Press. 119-141.

Bybee, Joan. 1991. "Natural Morphology: The Organization of Paradigms and Language Acquisition." In: Thom Huebner & Charles Ferguson (eds.), Crosscurrents in Second Language Acquisition and Linguistic Theories. Amsterdam: Benjamins. 67 - 92.

Dressler, Wolfgang U., Willi Mayerthaler, Oswald Panagl & Wolfgang U. Wurzel. 1987. Leitmotifs in Natural Morphology. (Studies in Language Companion Series; 10) Amsterdam: Benjamins.

Dressler, Wolfgang U. 1995. "Wealth and Poverty of Functional Analyses with Special Reference to Functional Deficiencies." In: Millar, S. & J. Mey (eds.), Form and Function in Language. Proceedings of the 1st Rasmus Rask Colloquium. Odense: Odense University Press. 11-39.

Dressler, Wolfgang U. 1997. "Introduction." In: Dziubalska-Kołaczyk, Katarzyna (ed.), Pre- and Protomorphology in Language Acquisition. Papers and Studies in Contrastive Linguistics. Volume 33. Poznan. 9-14.

Dressler, Wolfgang U. & Annemarie Karpf 1995. "The Theoretical Relevance of Pre- and Protomorphology in Language Acquisition." Yearbook of Morphology 1994. 99-122.

Köpcke, Klaus-Michael 1988. "Schemas in German Plural Formation." Lingua 74. 303-335.

Köpcke, Klaus-Michael. 1993. Schemata bei der Pluralbildung im Deutschen. Versuch einer kognitiven Morphologie. (Studien zur deutschen Grammatik 47) Tübingen: Narr.

Köpcke, Klaus-Michael. 1998. "The Acquisition of Plural Marking in English and German revisited: Schemata versus Rules." Journal of Child Language 25. 293-319.

Mayerthaler, Willi. 1981. Morphologische Natürlichkeit. Wiesbaden: Athenaion.

Slobin, Dan I. 1973. "Cognitive Prerequisites for the Development of Grammar." In: Ferguson, Charles & Dan I. Slobin (eds.), Studies of Child Language Development. New York: Holt, Reinhart & Winston. 175 - 208.

Wurzel, Wolfgang Ullrich. 1984. Flexionsmorphologie und Natürlichkeit. Berlin: Akademie-Verlag.

Wurzel, Wolfgang Ullrich. 1994. "Gibt es im Deutschen noch eine einheitliche Substantivflexion? oder: Auf welche Weise ist die deutsche Substantivflexion möglichst angemessen zu erfassen?." In: Köpcke, Klaus-Michael (ed.), Funktionale Untersuchungen zur deutschen Nominal- und Verbalmorphologie. Tübingen: Niemeyer. 29 - 44.