ISSUES IN NORMAL AND DISORDERED CHILD LANGUAGE: FROM PHONOLOGY TO NARRATIVE

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INTERRELATIONS BETWEEN PHONOLOGICAL AND LEXICO-SEMANTIC DEVELOPMENT *

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INTRODUCTION

In the literature on child language development, a non-linear acquisition rate of lexical items is reported repeatedly. After a time in which acquisition of new lexical items occurs infrequently, a gradual increase in vocabulary is observed. Then words enter the lexicon at a high rate within a short period of time (cf. Plunkett 1993 for Danish, Gillis 1986 for Dutch, e.g. Nelson 1973 for English, Elsen 1996a,b for German, Dromi 1987 for Hebrew). This phenomenon is called the *vocabulary spurt* and probably occurs for all children (Mervis & Bertrand 1995). The purpose of this investigation is to look for possible reasons that might be responsible for this sudden non-linear increase in the lexicon.

The investigation of several linguistic aspects was possible upon analysis of data from my diary study. In general, competence in various linguistic domains developed gradually (cf. Elsen 1996a). Some changes in the phonological system became evident which indicate interrelations between phonologico-phonotactical and lexico-semantic development. On the one hand, advanced articulatory capabilities enabled the child to substitute early baby talk forms such as [wawa] for dogs (which previously served to avoid more complex adult expressions) with the target forms. On the other hand, homonyms - a special case of overextension when the overextended form covers the meaning of two separate but related target items which show formal and/or conceptual difficulties for the child - could be split as a result of improved phonological abilities. Both phenomena appeared concurrent with the first sudden non-linear increase in the lexicon ('spurt'). The idea that

* The ideas and data presented here are further elaborated in Elsen (in prep.).

phonology may influence lexico-semantic development was already mentioned by Leopold (1939), Hoek, Ingram & Gibson (1986), Plunkett (1993), Elsen (1994). My data shows that changes in the phonological system can be interpreted as an influencing factor upon the acquisition rate of lexical items.

METHOD

Data is taken from a diary study of a German-speaking girl, A., an only child (Elsen 1991). The mother was the only observer-recorder. Notes were taken periodically from birth to her first word at 0;8,23. Subsequently, data on pronunciation and essential linguistic and non-linguistic situations was collected continuously (IPA phonetic transcription) during the whole waking time of the child. All new items (all new words, word forms, novel pronunciations of established items) were documented. Imitations were distinguished from deferred imitations and spontaneous productions. Notes were transferred to filing-cards twice a day with additional comments on situation, frequency of use and changes in articulation. The inventory of sounds, words and word forms was checked three times a month. Estimations of relative frequency such as 'often, rare, none' were made so that insights into non-linear use of a lexical item or morpheme were obtained. Continuous notes ended when A. was 2;5 and had completely acquired the phonological system. That is, she was able to distinguish and produce phonemes and replace foreign sounds by German ones in non-native words (Elsen 1991). As the mother and child were together permanently throughout the study, a complete recording of items and phonological development during this period of time was obtained. Although the study concentrated on phonology, notes included word forms and word combinations. Comments on situation and referents and information about frequency and mortality of individual lexical items were also recorded. Additionally, twice, later once a month audio-recordings were taken to allow for later checks (from 0;4 up to age 8). Some audiotaped data was verified by sonagrams and a trained phonetician. Agreement rates were over 80%. Thus, for approximately 21 months, information on phonological and lexical development was collected continuously and was complemented by notes on frequency, mortality, syntax, morphology, reference, and situation whenever possible.

After 2;5 notes, especially on morphology and syntax, were taken first daily, then periodically.

RESULTS

Before the end of 1;2, the prevalent stress pattern of A.'s words was penultima word stress. The most frequent syllables had the pattern CV, rarely CVC. Two syllable words usually consisted of reduplicated syllables. Three-syllable words were extremely rare. Pretonic syllables were deleted. There were hardly any final consonant groups. Words containing fricatives were avoided or produced without fricatives with the help of reduplication, deletion, occlusion. When the first fricatives appeared at the age of 1;0, they were still quite infrequent. Dominant consonants were nasals, front plosives, /j/. Words like [mama] 'mummy', [baba] 'daddy', [ba] 'book', [dɛdɛ] 'teddy', [pɪpɪ] 'mouse', [nana] 'no', are typical for this period of time.

Due to reduced phonology, important words like *Hund* 'dog' or *Schlüssel* 'key' could only be produced with substitutional forms. *Hund* 'dog', referring to something the child was clearly interested in, was a word she perfectly understood because she reacted repeatedly in various situations. It was not produced for some time. Only when her grandmother used the baby talk form /vaʊvaʊ/, did the child start to produce a form like [wawa] which enabled her to talk about dogs (cf. Elsen 1994). That is, she used a phonologically simple baby talk term as a substitute for a phonologically more complex target.

In the case of *Schlüssel* 'key', a related observation was made. From 1;1,9 on, A. had a word for shut *zu* [dʒ], later [dɯ], [dɨ]. The word for *Schlüssel* was attempted at 1;0,24 [dl], later [ləl], but given up in favour of [dɨ] at 1;1. The child attempted to produce the word for keys during 1;1, but then used the word for 'shut', apparently because doors etc. can be shut, same as locked in German, with keys. In this case, the girl avoided a phonologically complex target with the help of a conceptually related, but formally easier substitute. The use of 'book' for paper resulted in a doubled extension of *Buch* 'book'. Additionally, it was applied for papers, booklets and journals. 'Book' appeared to be used for a paper in an attempt to substitute the word *Papier* 'paper'. *Papier* had been imitated once at 1;0,4. Then the word for books was used instead.

In the case of homonyms, the child used related labels instead of target items, so that, for a short period of time, a word was not applied to the referent and underextension resulted.

There were several baby talk forms and homonym pairs in the child's vocabulary prior to the sudden non-linear increase of new words. These words consisted of a limited phonological repertoire and mostly of simple CV reduplications. The targets contain an increased variety of phonemes, especially fricatives, consonant groups, non-reduplicated syllable sequences, see Table 1.

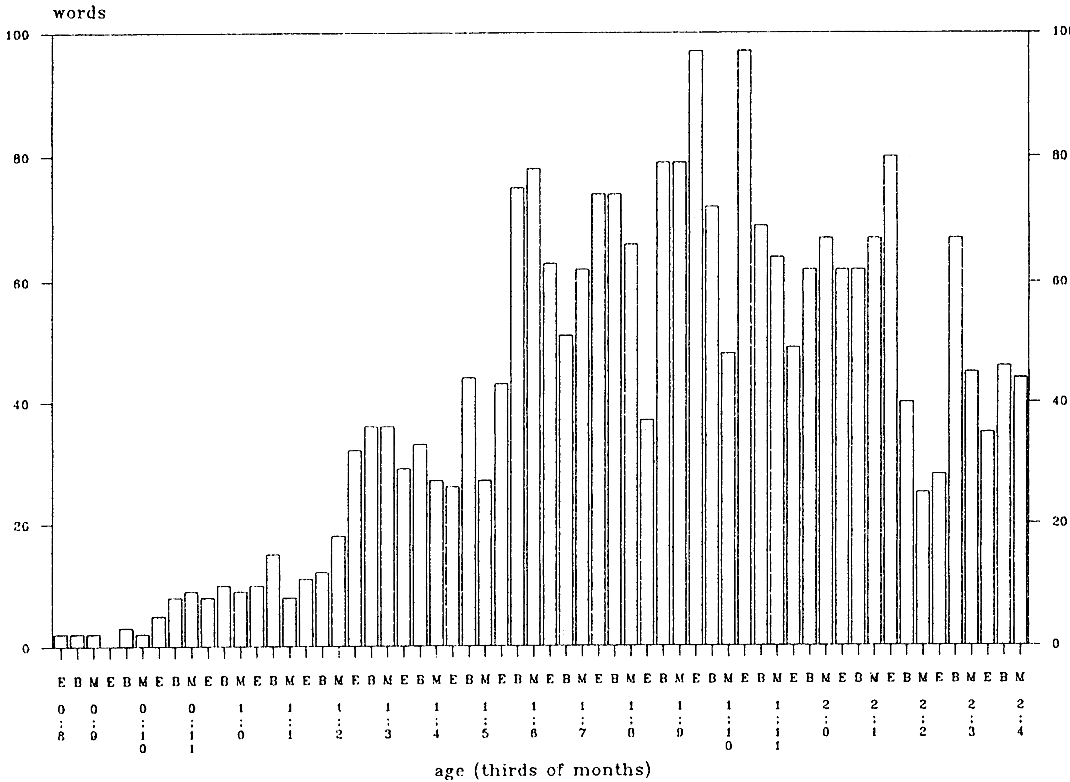
TABLE 1. *Sample of A.'s baby talk forms and homonym pairs*

Child's form	Target	Gloss
[pɪpɪ]	Maus	mouse
'sniff'	Hase	hare[a]
[bm][b]	Auto	car
[wawa]	Hund	dog
[dada]	Tag!	hello!
[pɪpɪ]	Vogel	bird
[m]	Kuh	cow
[ala]	alle, weg	gone
[ba]	Buch	book[c]
[dɯ, dɨ]	zu	shut[d]

[a] not a word!, but, nevertheless, a functional substitute
[b] with initial bilabial trill
[c] also used for paper(s)
[d] also used for keys

At the end of 1;2, a sudden non-linear increase of new words was recorded together with several improvements in the phonological system (see Fig. 1).

Fig. 1 Number of A.'s New Words
(by third of month)



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Word-stress was no longer on the penultima. It could be found on the last syllable or even on the prepenultima, for example *Papier* 'paper', *hatschi* when sneezing, *Luftballon* 'air-balloon'. Fricatives are produced increasingly. Many reduplications, deletions and occlusions which previously served to avoid fricatives were given up. Fricatives formed three groups: front [(w), v, f], middle [θ, ð, s, z, ʂ, ʐ, ʃ, ʒ, ç] and back [x, ʁ, h, (ʔ)]. The schwa was no longer produced as a full vowel. Some consonant clusters appeared. Often, syllables were closed by voiceless fricatives or plosives. Both clusters and final fricatives appeared, especially in one-syllable words.

We notice advanced pronunciation of words which contain fricatives, cf. Table 2.

TABLE 2. *Sample of words with fricatives, advanced pronunciation*

Target	Gloss	Early form	New form	Time of new form[a]
Tasse	cup	[dat^{h}a]	[taza]	1;2,23
Schuh	shoe	[dɯ]	[zʊ]	1;2,25
so	so	[dɔ]	[zɔ]	1;2,26
Nase	nose	[na]	[nəza]	1;3,0
Bürste	brush	[bɔla]	[vɯdzə]	1;3,10
Kissen	cushion	[kɪkə]	[kɪs]	1;3,12

[a] the age as given in *year;month.day*

The proportion of new words with fricatives increased from 60% to 75% (60% at the end of 1;1, 63% at the beginning of 1;2, 57% at the middle of 1;2, 75% at the end of 1;2). For these numbers, formal replacements (e.g. target production of former baby talk forms) were not counted. Many baby talk terms were given up and target pronunciation was attempted, see Table 3. Homonyms differentiated. Repeated attempts at the target *Papier* 'paper' were recorded. The form for books was now produced more accurately - [ba], now [bɯx]. Forms and reference of 'paper' and 'book' differentiated towards the end of 1;2.

TABLE 3. *Sample of baby talk forms with advanced pronunciation*

Target	Gloss	Early form	New form	Time of new form
Auto	car	[bm]	[bm]/ [atɔ]	B1;2[a]
			[ɑtɔ]	1;2,14
Tag!	hello!	[dada]	[tɑk^{h}]	1;2,14
alle/weg	gone	[ala]	[bak^{h}]	M/E 1;2
Hund	dog	[wawa], [vava]	[ʔɯnt]	1;2,26
Vogel	bird	[pɪpɪ]	[ʔəgl]	1;2,28
Hase	hare	sniff	[ɑzə], [ada]	1;2,3[b]
			[hɑdzə], [hasa]	1;2,30
Maus	mouse	[pɪpɪ]	[naɯ]	1;3,9
Kuh	cow	[m][c]	[bɯ]	1;3,15

[a] *B, M, E* means beginning, middle, end of a month, resp.
[b] no productions during 1;2,3 and 1;2,30; [c] no productions between E 1;2, M1;3

The forms for 'belly' and 'toe', after a period of confusion at 1;0 and abandonment at 1;2, re-entered the lexicon with more adult-like pronunciation than before and without confusion of referents. The substitute for 'keys' was abandoned to be replaced by advanced pronunciations of *Schlüssel*, cf. Table 4.

TABLE 4. *Sample of advanced forms of homonyms*

Target	Gloss	Early form	New form	Time of new form
Buch	book	[ba]	[bɯx]	1;2,26
Papier	paper	[ba]	[bəˈdɪ^{ə}]	1;2,30
Zeh	toe	[de]	[dse][a]	1;3,15
Bauch	belly	[baɯ]	[baɯx][a]	1;3,9
zu	shut, locked	[dɯ], [dɨ]		
Schlüssel	key	[dɨ]	[ɨdl]	1;2,27
			[tcl]	1;3,0

[a] no productions during 1;2

We see that at the time of the girl's first sudden non-linear increase of new words a distinct development in the phonological system occurred in phonotactics and repertoire. The improvement of phonology resulted in the articulation of previously avoided fricatives. More syllables could now be closed. More consonant groups appeared. New stress patterns allowed for prepenultima and word final stress. This enabled the child to pronounce her words in a more adult-like fashion. Deletions, reduplications and occlusions, which had served to avoid fricatives could now be given up. Furthermore, rising numbers of words with fricatives indicate that the more sophisticated production capabilities allowed her to attempt more new words. A.'s advanced phonological abilities positively influenced the rate of lexical acquisition. A similar development for plosives was found by Stemberger (pers. com.).

Advanced articulatory capabilities enabled the child to substitute early baby talk forms, which previously served to avoid more complex adult expressions, with the target terms. Homonyms could be split due to improved phonological abilities.

DISCUSSION AND CONCLUSION

For this child, improvements in phonology resulted in abandoning substitutes such as baby talk forms and homonyms. As the investigation of the complete linguistic system was feasible, these connections were recognized and double-entries in the lexicon avoided. When a continuous look at complete language development is not possible, phenomena like baby talk forms and homonyms may be underestimated in the vocabularies of other children. This may positively influence the number of counted lexical entries (overestimating actual numbers).

One further problem is indicated in the data with regard to the relation of phonology and extensions of word meaning. In the case of child homonymy, it is probable that the child initially operated with two different, though related, concepts because two different targets were attempted at least once relatively early. Not only did the girl make use of avoidance and substitution, as seen in the example of the forms for dogs. She also attempted complex target terms before substituting them with related terms as in the case of *paper/book* or *key/shut*. Thus, the interpretation of different concepts is assumed. When, in other studies, comparable expressions are observed in isolation and/or in selected periods of investigation, the interpretation of underextended and

overextended use respectively will result. Words like *paper* will be handled as an example of underextension, whereas words like *book* will be treated as overextension. We can see the danger of investigating isolated language domains in a non-continuous fashion (cf. Elsen 1997a,b). The possibility of interrelations between linguistic domains during language acquisition should not be excluded.

Various explanations for an accelerated word learning have been suggested, such as cognitive-lexical reasons, e.g. the understanding that words can name (e.g. McShane 1980), the insight that things can be categorized (e.g. Gopnik & Meltzoff 1987, Mervis & Bertrand 1994) or environmental factors (cf. Goldfield & Reznick 1990). This may explain the fact that most of A.'s new words were nouns. However, for this child improved phonological capabilities allowed for an increase in new words with previously avoided sounds and enhanced phonotactics. Thus, improvements in phonology can be interpreted as an influencing factor upon the rate of lexical acquisition.

REFERENCES

Dromi, E. (1987). *Early lexical development.* Cambridge: Cambridge University Press.

Elsen, H. (1991). *Erstspracherwerb.* Wiesbaden: DUV.

____ (1994). Phonological constraints and overextensions. First Language 14, 305-315.

____ (1996a). Linguistic team-work - the interaction of linguistic modules in first language acquisition. E. Clark (ed.) *Proceedings of the 27th annual child research forum.* Stanford: CSLI Publications.

____ (1996b). Two routes to language: stylistic variation in one child. *First Language* **16**, 141-158.

____ (1997a). Acquiring verb morphology: German past participles. In E. Hughes, M. Hughes & A. Greenhill (eds) *Proceedings of the 21st annual Boston University conference on language development, Vol. 1.* Somerville: Cascadilla Press, 160-169.

____ (1997b). The acquisition of verb morphology: One or two mechanisms? In R. Fabri, A. Ortmann & T. Parodi (eds) *Models of inflection.* Tübingen: Niemeyer.

____ in prep. Auswirkungen des Lautsystems auf den Erwerb des Lexikons - Eine funktionalistisch-kognitive Perspektive. In J. Meibauer & M. Rothweiler (eds) *Der Erwerb des Lexikons*. Tübingen: Francke, UTB.

Gillis, S. (1986). This child's 'nominal insight' is actually a process: the plateau-stage and the vocabulary spurt in early lexical development. *Antwerp Papers in Linguistics* **45**.

Goldfield, B. A. & Reznick, J. S. (1990). Early lexical acquisition: rate, content and the vocabulary spurt. *Journal of Child Language* **17**, 171-183.

Gopnik, A. & Meltzoff, A. (1987). The development of categorization in the second year and its relation to other cognitive and linguistic developments. *Child Development* **58**, 1523-31.

Hoek, D., Ingram, D. & Gibson, D. (1986). Some possible causes of children's early word overextensions. *Journal of Child Language* **13**, 477-494.

Leopold, W. F. (1939). *Speech development of a bilingual child. Vol. III*. New York: AMS Press. Reprint 1970.

McShane, J. (1980). *Learning to talk*. Cambridge, MA.: Cambridge University Press.

Mervis, C. & Bertrand, J. (1994). Acquisition of the novel name-nameless category (N3C) principle. *Child Development* **65**, 1646-1662.

Mervis, C. & Bertrand, J. (1995). Early lexical acquisition and the vocabulary spurt: a response to Goldfield & Reznick. *Journal of Child Language* **22**, 461-468.

Nelson, K. (1973). Structure and strategy in learning to talk. *Monographs of the Society for Research in Child Development*. **149** (88), 1-2.

Plunkett, K. (1993). Lexical segmentation and vocabulary growth in early language acquisition. *Journal of Child Language* **20**, 43-60.