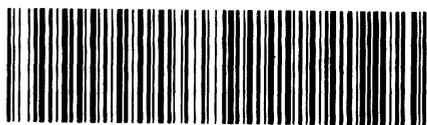


*The Proceedings of the
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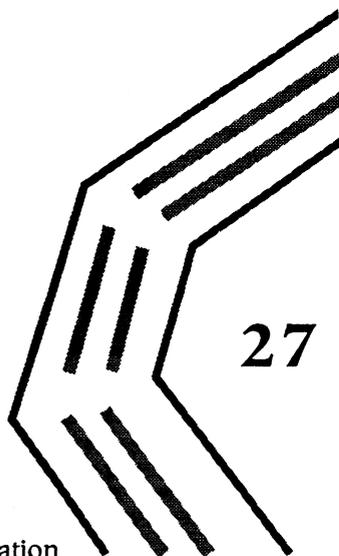
edited by
Eve V. Clark

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Published for the
Stanford Linguistics Association
by the
Center for the Study of Language and Information



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Center for the Study of Language and Information
Leland Stanford Junior University
Printed in the United States

ISBN (cloth): 1-57586-021-X
ISBN (paper): 1-57586-020-1
ISSN: 1042-1080

∞ The acid-free paper used in this book meets the minimum requirements of the American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

z94.149-27

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Linguistic Team-work—The Interaction of Linguistic Modules in First Language Acquisition

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Introduction

Traditionally, a child speaks when she utters her first word. This implies the use of a meaningful form to refer to something. Form and reference along with the knowledge of how to use a word do not appear suddenly. Studies abound which show that formal, referential and communicative capacities develop gradually over time. For instance, Werner and Kaplan (1963) stated that reference can be expressed through the motor-gestural and vocal-articulatory medium, emerging within pragmatic contexts, or by object-directed call-sounds. Pointing and demonstrative vocal forms come to express the function of denotation in interactive situations. Likewise, Bates, Camioni, and Volterra (1975) showed that "referential use of words was preceded by the construction of the same performatives without words" (ibid.:223) and that "gestural and vocal signals gradually give way to increasingly 'word-like' sounds, so that it is difficult to specify the exact moment at which sounds are used to map an underlying symbol structure" (ibid.:223). This problem is further discussed in Dore, Franklin, Miller, and Ramer (1976) who found that "sound and meaning develop partly independently and that the child must learn to put the two together" (ibid.:26).

As stabilized vocal production (e.g., Lewis 1936, Grégoire 1937, Leopold 1939, 1949, Werner and Kaplan 1963, Dore et al. 1976, de Villiers and de Villiers 1978, Carter 1978a,b, Menyuk, Menn, and Silber 1986, Smith 1988, Elsen 1991, McCune 1992) consists of single units which occur repeatedly in combination with specific gestures and/or in similar contexts, it can be seen as a transitional step between babbling and speech. Recurring situations and routinized actions, often together with ritual formulae, help to trace growing pragmatic, symbolic, and articulatory competence (e.g., Bates et al. 1975, Dore et al. 1976, Ferrier 1978a,b, Bruner 1987, Veneziano 1988, Vihman and Miller 1988).

It was found that formal, referential, and pragmatic aspects interact not only for the early single words but also for the transition to multi-word utterances. Phenomena such as the combination of gesture and sound (e.g., Leopold 1949, Werner and Kaplan 1963, Greenfield and Smith 1976), filler syllables (e.g., Stern and Stern 1928, Grégoire 1937, Werner and Kaplan 1963, Smith 1973, Dore et al. 1976, Peters 1977, Ferrier 1978b, Schlesinger 1982, Nelson 1985, Elsen 1991, Peters and Menn 1993), pivot constructions (e.g., Stern and Stern 1928, McShane 1980, Schlesinger 1982, Anisfeld 1984), concurrence of single words (e.g., Stern and Stern 1928, Leopold 1949, Werner and Kaplan 1963, Greenfield and Smith 1976, Rodgon 1976, Dore et al. 1976, Schlesinger 1982, Anisfeld 1984, Veneziano, Sinclair, and Berthoud 1990), amalgams (e.g., Stern and Stern 1928, Schlesinger 1982, Anisfeld 1984), reduced deferred imitations (e.g., Speidel 1989), intonational (e.g., Werner and Kaplan 1963, Dore 1974, Scollon 1976) or functional similarity between one and multi-word productions (e.g., Werner and Kaplan 1963, Halliday 1975, Starr 1975, Greenfield and Smith 1976) were described. Again, formal, referential, and interactional aspects show a continuity between single words and early syntactic utterances.

We know, however, that ways to acquire language are variable. At least two strategies, the analytic and the holistic (which may be found in one and the same child), are described in the literature (e.g., Nelson 1973, Peters 1977, Bates et al. 1979, Peters and Menn 1993, Bates et al. 1994). Distinct stages are even harder to locate in holistic processing because children seem to ignore single items while utilizing complex structures.

The interaction between formal, referential, and pragmatic aspects, the findings about various ways of processing and the knowledge about children's individual ways of learning make it difficult to work with concepts such as *stage* or *period*. The concepts *prelinguistic stage*, *one-word period* and *multi-word period* should be handled with caution. Furthermore, they rest on the assumption that it is possible to define *word* properly. Variations in definition show how shaky the concept *word* really is. Initially, children's words often lack a stable form and/or a stable referent, but may occur in stable situations. *Word* must be defined because we need a unit with which to work. However, it is problematic to define these stages on the basis of words. I would like to make you wary of notions such as *prelinguistic stage* etc. I will present evidence which should lead you to abandon them. To do so I will use longitudinal data from a child learning German showing that the transition from babbling to early words and to multi-word constructions was a smooth one for this child and that linguistic modules influenced one other. Furthermore, the child worked on different linguistic systems at different times, so that the concept of a general stage in language development is lost. I will suggest that if we wish to talk about segments of development we should define phases separately for each linguistic domain. A phase should be defined as a period during which there is high activity within one linguistic area.

Method

Data are from a diary study of my daughter A. learning German. Notes were taken periodically until the child produced her first word (0;8,23). Subsequently, they were collected continually both day and night to the beginning of 2;5 (in overview still longer), when the acquisition of phonology was complete and the number of new entries made it impossible to continue with detailed collection. More on method is given in Elsen 1994, in press.

Results and Discussion

A.'s development of phonology (tab.1) appears to be quite similar to that of children observed in other studies. The child showed the usual steps: cooing, vocal play, repetitive and variegated babbling with front nasals, plosives and central vowels as dominant sounds. Target intonation contours appeared at 0;9 in jargon babbling. At 1;11, many phonotactical problems disappeared. At approximately 2;4/2;5, the last phoneme, [ʃ], was acquired. The child slowly built up her sound system and structures became more and more complex. New sounds appeared in established structures. New structures were formed with acquired sounds (cf. e.g., Werner/Kaplan 1963, Bates et al. 1979, Waterson 1987, Elsen 1991). Data and detailed analysis on phonological development, syllable structures and stress patterns are given in Elsen 1991.

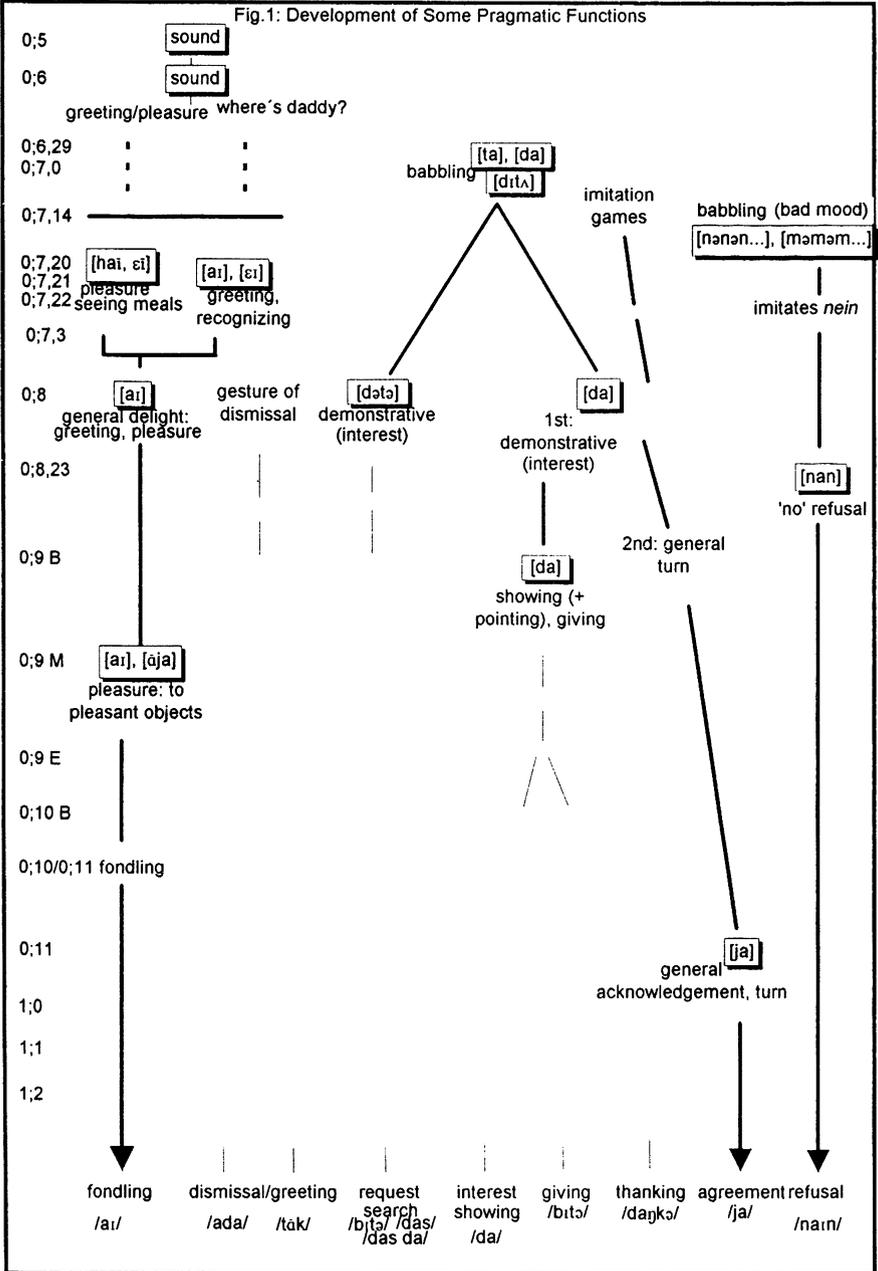
An early attempt to communicate intentionally with the help of the articulatory organs was made at 0;5 and clearly at 0;6, when the girl uttered a single sound (cf. Stern and Stern 1928, Leopold 1939, 1949, Werner and Kaplan 1963, Bloom 1973, Halliday 1975, Ferrier 1978a,b). She established eye-contact and seemed to convey something similar to *hello* or delight when seeing her father, the neighbour etc., even, perhaps, a kind of *where's daddy*, when her father was not present and she was looking intently at his jacket (fig. 1). When this sound disappeared at 0;7,14, word-like forms [haɪ],[aɪ] emerged which were used in similar fashion, namely as a greeting or to express pleasure. That a sound can be replaced by a demonstrative was mentioned by Leopold (1939). At the age of eight months A. was able to convey pleasure and interest verbally ([da], often used in babbling). Daily routines such as eating, diaper changing and playing provided stable frames in which the mother was initially the active person. Gradually the child was able to maintain or even initiate dialogues (cf. Braunwald 1978, Ferrier 1978a,b, Bruner 1987). Again, her development was similar to that of other children.

There is a continuous growth of communicative competence. In some cases the desire to communicate was foremost, for example in greetings, and a dummy sound was used as a vehicle to transfer the message. In other instances a type of formal pattern had already been practiced, e.g., [da], and could in time be used to convey interest and as a general turn. The child continually built up her repertoire of pragmatic functions and used some verbal gestures or proto-forms from 8 months on. Stable routines provided a setting for symbolic reference.

Table 1: Overview of A.'s Development of Phonology

Age	Babbling	Talking
0;1/0;2	cooing: velars, central vowels, ([l, x, d])	
0;2,29	vocal play; [n], dental babbling strings, bilabials, trills, affricates	
0;5	repetitive babbl., mostly [b, m, d, w, j, a]	
0;6	some variegated babbling	
0;7,0	[dɪʌ]	
0;7,11	frequent imitation games	
0;7,17	some clusters ([bl-], [dl-]); mostly front voiced plosives and nasals, [a, ə]; some velars, syllabic [m, n]; rare: fricatives, affricates, trills, clicks, [ɾ, ɔ, ʊ/ʉ]	
0;8	often [R]; bad mood: [nənən..., məməm...]	proto-words
0;8,23		first word 'no' ([nan], [nab], [nən], ...)
0;8 E	gibberish	/a/ ([a, ʌ, ə, aɪ, əə, ...]), /m, n/; [mama]
0;9	jargon (in 'dialogues'), mostly non-reduplicated syllables, dominant: [m, n, d, l, ə, a]	/d/, mostly open syllables; [da] 'there', [baba] 'daddy', [aɪ] caressing, [aɪ] 'egg'
0;10	more [m, b, d, ə, a] than [i, p, t]	voiceless plosives, lengthened vowels, word-medially homorganic clusters of pl+pl, pl+nas.; rare: velars, fric., laterals, [h, w, j, i, ə, ɛ]; /b/
0;11 E	more words than babbl. strings, mostly [b, d, m, n, l, w, a, ʌ, i, ə, ɪ], diphthongs; some [h, ɔ, œ, R, r, s, ʃ, ʧ]	first three-syllable word without reduplication: [na'maina] 'banana', plosives more frequent than nasals, word-medially voiced and voiceless nasals and plosives of various places of articulation, syllables mostly open; /j, l, e/
1;0		fricatives appear, established syllable patterns contain new sounds
1;1 E	syllables often end with [t,d]; often [(d)r]	(/ɔ/)
1;2		ratio of fr. increases, some rare syll.-final clusters
1;2 E	sibilants mostly interdental, some clusters	word-stress no longer always on penultima; many reduplications, deletions, occlusions given up; rising production of fricatives, mostly syllable-finally; schwa often no longer represented as full vowel, some clusters; /-p, -t, -k, -x, (h)/
1;3 -1;9		various three- and four-syllable words produced with targ. stress pattern, partly with targ.-like clusters; /-p-, t-, k-, r, ɲ, o, ø, œ, ε, a, i, ɪ, aɪ/
1;6/1;7	babbl. strings contain words; fillers	
1;9	babbling infrequent	grouping of fr. (front [(w), v, w], middle [x, θ, ʂ, z, s, z, ʃ, ʒ, ʧ], back [x, ɣ, h, (ʔ)]) dissolves, syllable-initial clusters differentiate, more and more syllable-final and word-medial clusters, many unstressed syllables no longer deleted, one-syllable words complex ([kɪkɪkst], [kvɪtʃt]); /ɔɪ/
1;9 M	babbling ceases	
1;11	invented sound combinations still in fantasy songs and sound play ...	lip rounding in high vowels; target phonotactics: /t/ in <u>er</u> [ə], nasals in unstressed syllables syllabically produced, tense vowels long under stress
2;4/2;5	...	last phoneme: //

Fig.1: Development of Some Pragmatic Functions



Pointing and demonstrative vocalizations [da] *express* and do not *refer*. Gradually, they are transformed from pragmatic to depictive forms, *da* 'there'.

We have a further source for later words: imitation (e.g., Bates et al. 1979). There is a time when children imitate many different noises. After a period of close imitation, with temporal and local proximity to the object, imitative expressions can be used as natural symbols even when the represented items are not there. Various objects in the girl's surroundings were labelled by imitating the noise they made (dogs, cows, crows, clocks, bees, ...) or by a related noise ([namnam] for meals). Sometimes words were used only within stable situations and the child had to disjoin referent and context (cf. e.g., Bloom, 1973, Ferrier 1978b, Bates et al. 1979, Anisfeld 1984, Bruner 1987, Dromi 1987, Bates et al. 1988). In another case we have an example of 'narrowing down'. A phonetic form, [mama], was used in babbling (for example in a bad mood), later to label everything, then mainly for the mother and then exclusively for the mother. A form then, can be used globally and non-specifically and then in a more and more limited way to label restricted referents or groups of referents. The distance between vocal pattern and depicted event decreases and forms shift from signal to symbol, from pragmatic to depicted forms (cf. e.g., Bates et al. 1975, Carter 1978b, Ferrier 1978a, Bates et al. 1979, Anisfeld 1984).

Considering such a smooth growth of communicative, phonological, and referential abilities, I find it rather difficult to define the onset of speech with the production of the first word, although I, too, work with *words* because they are a popular unit of language. Words can be counted. In the subsequent sections, I will present some facts about vocabulary growth.

In fig. 2 we see data from three different diary studies: Clark's son learning English, Dromi's daughter learning Hebrew and A. learning German. The use of words to refer to distinct objects is not a matter of course. Children must work out that words are names for things. It is often assumed that the vocabulary spurt, a sudden increase in the acquisition of new words, is an indication of the *naming insight* (e.g., Stern and Stern 1928, Nelson 1973, McShane 1980, Anisfeld 1984). At the age of 14 and a half months (---) we find that many words were imitated only once. There were hardly any imitation games—mother and child repeating a word again and again. Several homonyms were split. Previously, different words with related contents like *Papier* 'paper' and *Buch* 'book' were expressed by one form, [ba]. Now they could be differentiated formally because of advanced articulatory capacities. That is, a change in acquisitional and mapping behaviour was noticed shortly before the spurt. This girl's first lexical spurt (—) occurred at the end of 14 months. At this point in time several overextended words received regular meanings and many baby talk forms were substituted by target forms. Furthermore, more words were now acquired in the first instance (*one-trial learning*) (e.g., Dromi 1987, Nelson 1988, Barrett et al. 1991). In this child's development the daily acquisition of new

Fig. 2:
Cumulative Lexicons of Keren, A., Damon

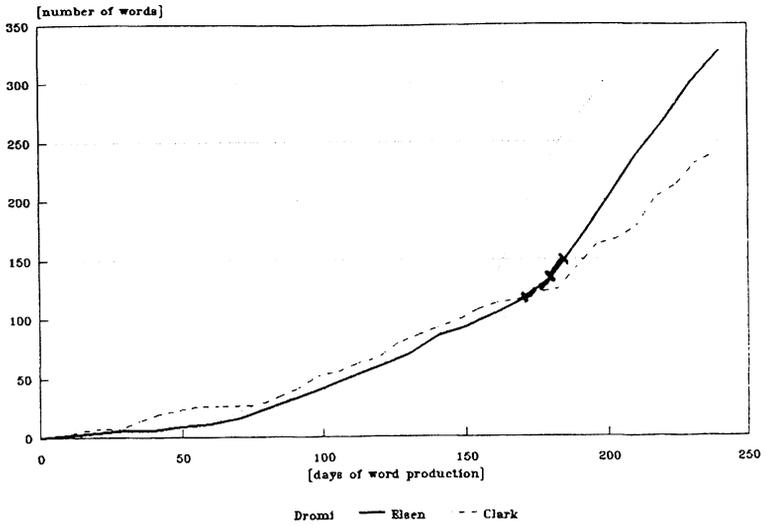
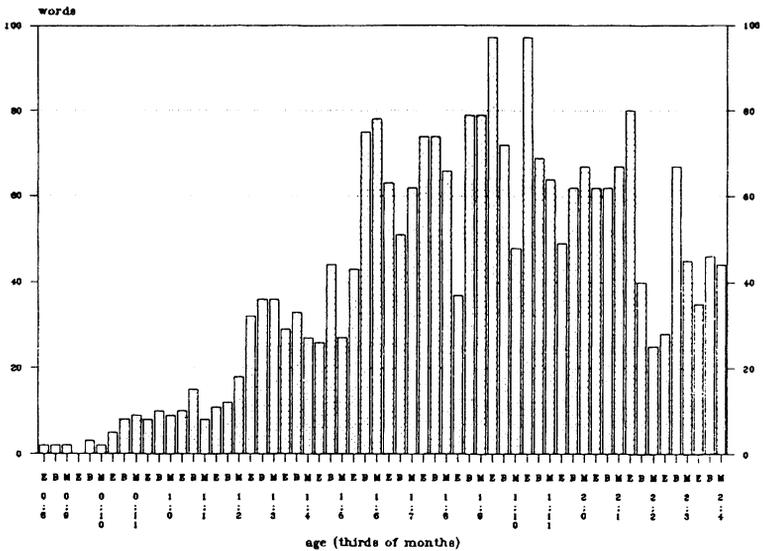


Fig. 3 Number of A.'s New Words
(by third of month)



items *did not decrease* after the spurt *but increased* some time later (fig. 3). We also do not find a sudden beginning of syntax. Contrary to other reports which assert that the first multi-word utterances appear shortly after the vocabulary spurt (e.g., Leopold 1939, 1949, Halliday 1975, Bloom 1973, McShane 1980, Anisfeld 1984, Dromi 1987, Bates et al. 1988), this child already produced several two-word phrases *before the spurt*.

The transition to syntax was not as sudden for A. as for children observed in other studies. Some early two-word utterances appeared towards the end of the first year. One month later, A. frequently uttered two-word combinations and occasionally three-word phrases. Her sentences were predominately composed with /da/ 'there' and were used to name, direct attention and request. Sometimes babbling sequences or gestures were added to words. Fillers made utterances appear sentence-like, jargon was mixed with speech (cf. Stern and Stern 1928, Werner and Kaplan 1963, Ferrier 1978, Menyuk et al. 1986). The girl used only a few amalgams. This type of holistic speech style, which varies from child to child and within a single child, was preferred in situations with high communicative demands. At the age of 15 months most words were embedded in constructions. Towards the end of 15 months multi-word utterances consisted of various words. That is, we do not have a clear-cut change from single- to multi-word speech nor a sudden switch from two- to three- (and more) word phrases. We cannot speak of *one-word* or *two-word stages* for this child.

Some early, morphologically complex, words appeared as rote forms at 1;5: plurals and verb inflections. At 1;9, plurals were correctly applied numerically. Towards the end of 1;9, deviant plural inflection appeared in appropriate situations. The child probably used a rule now because the *-n*-marking was overgeneralized. At 1;9, rule governed verb inflections appeared. The child built infinitives, participles and present tense forms (mainly 3 SG). At this age she further produced various compounds spontaneously, many with reversed order. There were even some innovations. We see, that the child showed improvements in morphology at 1;5 and 1;9.

One striking fact about A.'s lexical development is the rising and falling number of new items. Let's look at what happens around the time of a spurt.

Towards the end of 1;2, penultima-stress is abandoned in favour of ultima, penultima or prepenultima stress according to target. Many reduplications, deletions and omissions are given up, which served to avoid fricatives. The production of fricatives increases. Syllables are now often closed (by voiceless fricatives). The schwa is no longer always produced as a full vowel. Many baby-talk terms are replaced by target terms (counted once!). Many overextensions disappear. Many new words are acquired spontaneously on the first attempt. Mapping becomes more accurate, that is, there are less deviant extensions.

The phonological system is enriched by the rising production of fricatives and new stress patterns. Consequently phonologically easy baby-talk terms can be replaced with target terms and many words which were previously avoided

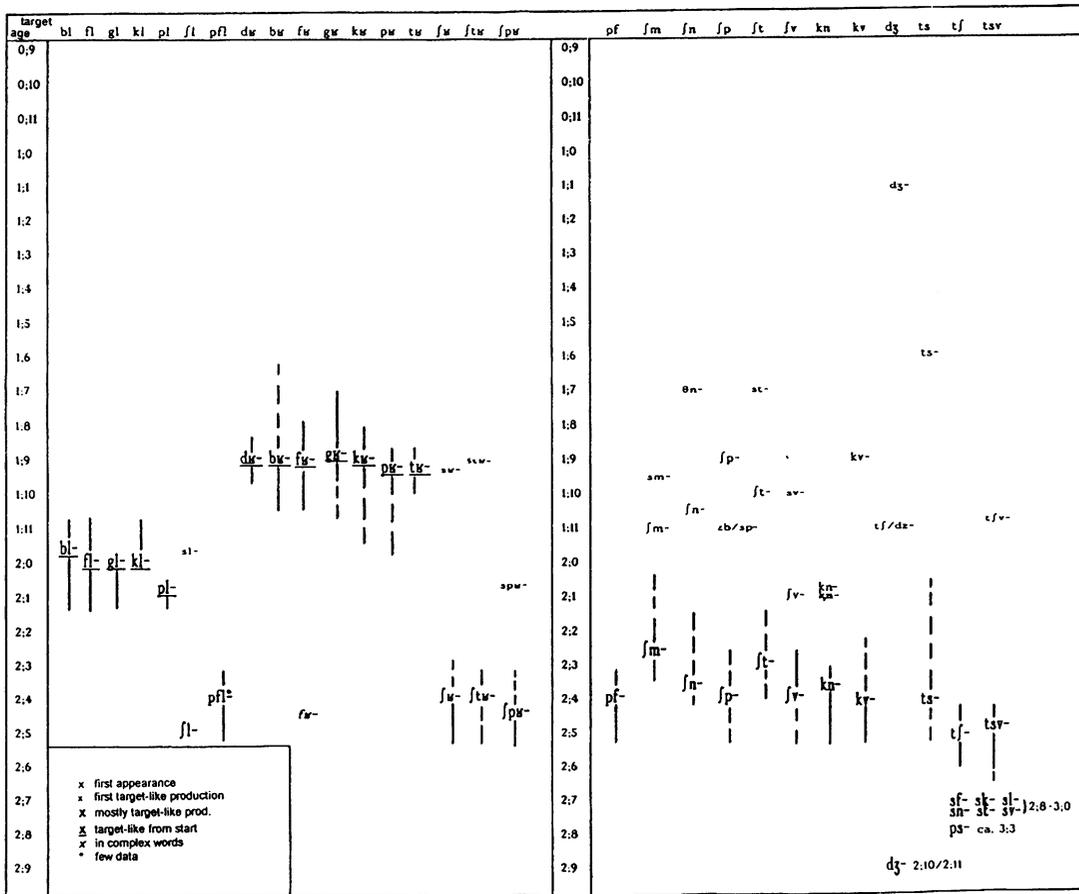


Fig. 4: The Acquisition of Onset Clusters from Eisen 1991:102f by permission of DUV

can now be produced. Consequently, some homonyms can be split. Additionally, mapping behaviour changes which, too, may influence the rate of acquisition. However, some change in mapping and acquisition behaviour was noticed before the spurt. There is no connection between lexical and syntactic development.

Towards the end of 1;5, the first morphologically marked verbs appear and the number of new verbs rises considerably.

Towards the beginning of 1;9, many unstressed syllables are no longer deleted. The grouping of fricatives dissolves. Syllable-initial clusters are differentiated. The number of new words with onset clusters rises considerably. Rule-governed, morphologically complex words appear and the number of spontaneously produced nominal compounds nearly doubles. At the middle of 1;9, babbling ceases. Again, the phonological system improves. The child produces considerably more words with onset clusters. Phonological and phonotactic improvements clear the way for complex words. This and rising morphological abilities cause the number of compounds to double. Both factors influence the rate of acquisition.

For the slump at 2;2, developments in other cognitive domains may be responsible. At this time the girl begins doing arithmetic and uses the pronoun *I* rather than her name. Furthermore, at approximately 27 months the acquisition of [j] and [ʃ]-clusters starts with perhaps strengthening influence on talkativeness (fig. 4). These are, of course, speculations. At present, I cannot offer more plausible explanations for this slump.

Conclusion

Taken together, we see that systems influenced each other and that the child worked on different linguistic systems at different times. For example, improvements in phonology led to a rising number of new words and might have been the reason for the production of morphologically complex words. There were interrelations between semantic and phonological development (Elsén 1994). Several simultaneous changes created the impression of a more general change in competence.

I hope to have shown that improvements in two systems, e.g., morphology and the lexicon, should not be considered as a double indication for a new phase when interrelations can be investigated and sources of progress in one domain are found in another. We should separate direct from indirect progress, that is, we must check if improvements within one domain are caused by improvements in another. One aim of future research should be to investigate whether there is a causal relationship between simultaneous changes (e.g., in phonology and mapping behaviour), if they cooccur by chance, or if they are the result of a third factor.

To conclude, child language *in toto* develops gradually. There are no differences between prelinguistic and linguistic behaviour. The concept *word* is problematic. Linguistic systems interact and improvements appear at different

times. Therefore, the concepts of *prelinguistic stage*, *single-word stage* and *multi-word stage* cannot be sustained. If we want to talk about segments of development we should consider the linguistic systems separately. As abrupt changes are rare, it would be better to talk about phases and to define them as times of high activity within one linguistic domain.

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