

PRE- AND PROTO- IN POLISH PHONOLOGY AND MORPHOLOGY AND THEIR INTERRELATIONS

KATARZYNA DZIUBALSKA-KOŁACZYK

Adam Mickiewicz University, Poznań

1. Stages in the development of phonology

The main idea of this paper is to demonstrate the interdependence between the acquisition of first language phonology and morphology. The theoretical framework is that of Natural Phonology and Morphology, supported by the constructivist approach to language acquisition (cf., among others, Donegan and Stampe 1979, Dressler 1984, 1996, Dressler et al 1987, Dressler and Karpf 1995). Parallel to the assumption of the three stages in the acquisition of morphology, I assume three respective stages in the acquisition of phonology:

A. PRE-PHONOLOGY: Physiological restriction is still present (cf. the differences between the infant's and the adult's vocal tract¹, general cognitive principles are applied (like the figure-and-ground principle), while the two main functions of phonology (ease of articulation and clarity of perception) are not respected. It is the stage of extra-grammatical, non-prototypical phonology: onomatopoea, marked sounds and sound sequences.

B. PROTO-PHONOLOGY: Phonological system starts to develop, but is still mainly equipped with universal natural processes, also non-prototypical ones (e.g. consonantal and vocalic harmony), which tend to be unbalanced and irregular in their application. The system may also manifest a lack of the application of some universal processes. Consequently, the produced forms manifest transitional organizations and reorganizations of the system, some of them incompatible with the ultimate language-specific phonology. Underlying representations are stored, but they still diverge from the adult ones (language-specific perception starts). Extra-grammatical properties (e.g. of reduplicative babbling) are preserved in first words.

¹ "The infant vocal tract has a broader oral cavity, a shorter pharynx, a gradually sloping oropharyngeal channel, a relatively anterior tongue mass, a closely approximating velum and epiglottis and a relatively high larynx" (Kent 1992: 69).

C. LANGUAGE-SPECIFIC PHONOLOGY: The beginning of this phase marks the onset of "order" in the application of language-specific phonological processes, i.e. the development of the language-specific phonological module.

2. Detailed predictions for the development of phonology

The table below² presents the parallel between the psycho-physiological development of an infant and the construction of his/her intermediate phonological representations due to self-organizational processes. For the sake of further discussion, the staging in the acquisition of phonology into pre-phonology and proto-phonology has been incorporated into the self-organization column of the table. Onsets or transitions between stages have been indicated as spans of time relative to the development of the psychomotorics, perception and speech abilities of an infant.

Table 1. Psycho-physiological development and self-organization

AGE	MOTOR DEVELOPMENT AND PRODUCTION	PERCEPTION	SELF-ORGANIZATION: PREDISPOSITIONS/ REPRESENTATIONS
0-2 months reflexive phonation	cry cough grunts and sighs	[s]/other sounds/voices, mother/others, intonation/monotone (silence/sound)	physiological restriction, discovering the vocal tract perceptual domains difficult to distinguish
2-4 months control of phonation (1-4 months cooing)	cooing sounds V-like and C-like sounds n̄ ṽ C-like sounds at tongue-palate contact (→ back Cs) strings of vocalizations vocal learning	3-5 months – vocal imitation based on auditory EXTEROCEPTION (hearing ambient language) and PROPRIOCEPTION (hearing own language) of Vs articulatory movement and sound-related visual imitation (of facial movements)	at 4 months – the vocal tract starts assuming more adult-like form stored representations (since infants able to improve their production) AUDITORY-ARTICULATORY MAP evidenced (v. preliminary categorization)

² For a detailed discussion of the content of the table, which is not directly relevant for the argument of the present paper, cf. Dziubalska-Kołaczyk, MS in preparation. The following sources were consulted when compiling the table: Smith et al. (1995), Bohn and Polka (1995), Clement and Koopmans-van Beinum (1995), Kuhl and Meltzoff (1995), Kuijpers (1995), Davis (1995), Studdert-Kennedy (1981), Kent (1992), Werker and Pegg (1992), Jusczyk (1992), Wode (1994).

5-6 months expansion vocal play (3-6 months expansion)	increased coordination of articulation and phonation (front Cs → visual imitation) short/long sounds marked sounds and sequences possible (since the beginning) onomatopoea	up to 5.5 months – v. few differences between NH (normally hearing) and HI (hearing impaired) after 5.5 months – auditory feedback influences production (more)	phonological functions not served yet (rather: vocal & perceptual gymnastics) EXTRAGRAMMATICAL phonology ↑ PRE-PHONOLOGY ↓
7-9 months canonical babble (5-10)	reduplicated babble, repetitive CV's CV CV CV CV (CV) ... mandibular oscillation cycles: close and open phases CV's – articulation place dependent general propensity for rhythmical movement b d (preferred among stops) m n j w h left-quadrant Vs	perception of close and open phases – CV's perceived and imitated (still UNIVERSAL PERCEPTION) hand-waving ↔ leave taking formula 7-11 months – infants perceive SC (silent centre) /dVt's (German)	FIGURE and GROUND principle listener-friendly function ease of articulation (speaker-friendly function) ↑ onset of PROTO-PHONOLOGY ↓

10-14m variegated babble and first words (10-18m meaningful speech)	complex babble trochee segmental and prosodic features of babble preserved in early words variability in word-production. b (preferred among stops) words: CVCV, CVC, (CVC+CVC →) CVCCV(C), (CV)CCV(C) etc.	ca. 1 year – lg-specific perception starts	SEGMENTATION OF INPUT INTO GROUPS (feet, words) vowel harmony [central] C-harmony [labial] trochaic rhythm [stress] EXTRACTION of features/gestures of CV's, later – also for VC's: FORTITIONS (lg-specific phonotactics) LENITIONS – make articulation of the above easier, e.g. ke → kje lg-specific development of rhythm
14m → first 50 words	(phonemic perception and production start (?))	(4-and 6-year olds still have problems with phonemic categorization)	(segments ↔ writing “knowing” about phonetic segments) *** overproductivity of lenitions fluctuations (unsystematic application of processes) variability (intra&inter) onset of phonology proper: lg-specific phonology starts dissociating from extragrammatical phonology and morphology regularization (“order”) (function-dependent hierarchies of processes)

3. Predictions for the interdependence between phonological and morphological development

In the acquisition of morphology the following stages are distinguished (Dressler and Karpf 1995):

(a) **PREMORPHOLOGY**, when morphological operations occur (extragrammatical as well as precursors of later grammatical ones), but no system of grammatical morphology has yet dissociated from a general cognitive system. The latter is evi-

denced in the violations of the principles of grammatical morphology by premorphological operations (their outputs must therefore belong to the lexicon).

Extragrammatical morphological operations are exemplified by: reduplications, e.g. *koki koki*, *dudi dudi* (word repetition), *lala*, *baba* (reduplication of CV's constituting words), *ciuch ciuch*, *fufu*, *kra kra* (onomatopoeic reduplications); back-formations, e.g. *bap* < *babuś*, *kol* < *kolko*; truncations, e.g. *ciuch* < *ciuchcia*, *kloo* < *klocki*, *ko* < *kolko*; surface analogy, e.g. *kufka-tufka*, *pudynie-matenie*; blends, e.g. *mabusie* < *mama* + *babusia*, *bama* < *baba* + *mama*, *taja* < *tak* + *aja*. All examples quoted here stem from the two Polish children investigated in this paper, Zosia and Filip.

(b) **PROTOMORPHOLOGY**, when the system of morphological grammar and its subsystems start to develop, according to the principles of Natural Morphology, without having reached the status of modules and submodules. It is predicted that non-prototypical categories (e.g. diminutives as a non-prototypical representative of derivational morphology) should emerge early, that they should be even less prototypical than later in the development, and that they are likely to preserve some properties of extragrammatical operations.

(c) **MORPHOLOGY** proper, when the subsystems of inflectional, derivational and compounding morphology start to develop and pass their initial stages, which marks the end of the protomorphological stage. In this stage language-specific system adequacy appears.

Extragrammatical phonology and extragrammatical morphology may be difficult to distinguish, as demonstrated by the examples above. For instance, is truncation only phonological or also morphological? The reason for this is that neither extragrammatical phonology nor morphology is handled by grammar, i.e., respectively, phonology or morphology, and therefore neither of them dissociates to become a separate module. It is the system of language-specific phonology that starts to dissociate from both extragrammatical phonology and morphology. This marks the onset of the stage of proto-phonology. Therefore, the extragrammatical forms of a protophonological stage are morphological rather than phonological, although some types (like reduplication and truncation) can easily be seen as both morphological and phonological. Phonology needs to modularize first, since, predictably, the existence of phonological signantia constitutes a prerequisite for any morphological or syntactic manipulation. Thus, we can foresee the following staging for the development of phonology and morphology in L1:

pre-phonology	} extragrammatical forms
pre-morphology	
proto-phonology	
onset of modularized phonology	
proto-morphology	
modularized morphology	

In this way we gain a double perspective for the solution of the demarcation problem in morphology. On the one hand, the symptoms of the shift from pre- to

proto- & then to modular morphology can be deduced from the theoretical assumptions concerning morphology itself. On the other hand, they are also deducible on the basis of the necessary unidirectional relationship between phonology and morphology in early language development.³

4. Morphology-internal predictions for demarcation in morphology

Solely on the basis of morphology-internal theoretical premises one can expect, among others, the following characteristics signalling particular phase-shifts in the acquisition of morphology (cf. e.g. Dressler 1997a, b):

- (a) an increase of rote-learned forms and analogy signals the shift from pre- to proto-morphology, whereas the discovery of rules resulting in grammatical productivity – the shift from proto- to modular morphology,
- (b) a drop in extragrammatical productivity (e.g. extragrammatical diminutives) on behalf of e.g. an increase in the formation of grammatical diminutives and, at the same time, the appearance of noun classes and verbs, marks the shift from pre- to proto-morphology,
- (c) the end of class shifts in nouns and the appearance of more verbs signals the shift from pre- to proto-morphology,
- (d) better class differentiation (e.g. into subclasses) and the appearance of more cases signals the shift from proto- to modular morphology.

5. Phonology-driven predictions for demarcation in morphology

What does one need phonologically to “realize” morphology in Polish? For instance, the following phonological ‘material’ appears to be necessary:

- (a) final consonants to realize inflectional suffixes,
- (b) nasalized vowels to realize inflectional suffixes – although they get replaced by oral vowels or VC-combinations and can themselves appear later (in modular morphology),
- (c) consonant clusters, e.g. to realize infinitives,
- (d) palatalization – e.g. to realize diminutives like *stos-stosik* [s – ɕ],
- (e) some phonotactic constraints, e.g. triggering Pl. -i after velars [k, g + i] and Pl. -y after dentals [t, d + i],
- (f) voice agreement in consonant clusters to realize partly analytic inflection, e.g. w + N, z + N, aspectual prefixes etc.,

³ Phonological means are necessary to express morphological meanings on the surface. Morphological meaning, however, may be present in a given form underlyingly before phonological means to express it develop: in this way underdeveloped phonology blocks morphological expression. When language-specific phonotactics establishes itself, it establishes also the limits of morphological expression. Thereafter, morphology is “sufficiently equipped” to manifest its semiotic priority over phonology (e.g. by feeding or bleeding phonological processes, cf. morphonology). Thus, the unidirectional relationship between phonology and morphology necessarily exists and manifests itself in the surface output produced by the child, whereas underlyingly this relationship may be hypothetically more complex.

- (g) prosodic features, e.g. feet longer than binary ones, to realize more complex forms like verbal Pl. inflection (cf. a frequent mistake **umią* instead of *umieją*).

6. The data

Below the early data of two Polish children, Filip and Zosia, will be used to show examples of shifts from one stage to another in the development of phonology and morphology, and their interrelations.

6.1. FILIP⁴ (in the age span from 1;1.18 to 2;4.15)

6.1.1. Focus on phonology

The examples below illustrate the transition from pre-phonology to proto-phonology: (A) pre-phonology → (B) onset of proto-phonology (the data to the left of the arrow illustrate the pre-phonological stage (A), to the right – the onset of the proto-phonological one (B)).

Beginning with 1;1.18 Filip’s speech demonstrates the following characteristics:

Table 2. Transition from pre-phonology to proto-phonology in Filip’s speech

pre-phonology → proto-phonology	
6.1.1.1. (A) no word-final or unit-final consonants, the only exceptions: 1;2.7 <i>tiś</i> , 1;3.16 <i>kej</i> , 1;4.28 <i>daj</i> (more tokens later on – rote-learned), 1;5.27 <i>babon</i> , 1;6.17 <i>tutuś</i> , <i>diduś</i> , <i>aduś</i> , 1;10.16 <i>kutik</i> , 1;11.27 <i>jeś</i> , 2;0.6 <i>duś</i> , <i>juś</i> , 2;1.18 <i>siń</i> ;	(B) from 2;3.29 some more C-final words appear (<i>dom</i> , <i>dam</i> , <i>kam</i> , <i>miś</i> , <i>pan</i> , <i>siam</i>), but still the tendency to reduce them is observed (<i>ode</i> < <i>odejdz</i> , <i>mi</i> < <i>miś</i> , <i>si</i> < <i>siń</i> , <i>pu</i> < <i>puśc</i> , <i>sio</i> < <i>siok</i> , <i>no</i> < <i>nos</i> , <i>pi</i> < <i>pić</i>)
6.1.1.2. (A) idiosyncratic, very long, canonical and then variegated babble sequences ⁵ of predominantly CVs, i.e. reduplications of various sorts (onomatopoeic: <i>bou bou bou</i> , <i>ko ko ko</i> , <i>ya ya ya</i> , <i>fu fu</i> ; of CVs: <i>bububu</i> , <i>didididi</i> , of CVs constituting CVCV words: <i>mama mama</i> , of words: <i>kutik kutik</i>) which persist in huge quantity	(B) far fewer of those sequences after 1;11.6; those reduplications which get shorter (i.e. e.g. reduce from a sequence of 22 CVs to a trochaic sequence like 1;3.16 <i>niania</i> < <i>mniam mniam</i> ...) seem to receive some morphological function, e.g. from 1;7.27 <i>niania</i> means ‘a given agent is eating’ or

⁴ Filip, a Polish boy, had been recorded at ten day intervals since the age of 1;1.18. The data have been collected for the international project on “The acquisition of pre- and proto-morphology” reported on in this volume. Filip’s speech has been recorded and transliterated by Filip’s parents, as part of the Poznań contribution to the project, coordinated by the present author. Filip was born healthy and is a normally developing child.

⁵ These sequences could be named after Sobkowiak “wild paronomasia” (Sobkowiak 1991: 35).

till at least 1;11.6 (with one month "break" between 1;8.16 to 1;9.16); e.g.: 1;5.16 <i>tu du bu tojo deko teko kodeko kodeko koteko. kodekoteko tekoteko kodeko tikedeko tikodejtikodej. tekoteko dikoteko tij tu du tu tu du tu du ta taa. taa toa nie nie tekodekotekoteko tekodeko tekodeko. tekodeko tekodeko tekodeko todekoteko tekodeko. tekodeko nie deko tekoo teko.</i> 1;10.16 <i>kodikodikodikodikodikodiko. godigodigodikul~a.</i>	'food', i.e. they get differentiated from purely phonological reduplications, which means that phonology starts dissociating itself (towards proto-phonology)
6.1.1.3. other extragrammatical phenomena in abundance (cf. below 6.1.2.1. for examples, and 3. above for discussion)	
6.1.1.4. (A) "non-Polish" phonotactics e.g. [ti di ke ki]	(B) after ca. 2;2.6 those sequences become rarer
6.1.1.5. (A) difficulties with imitation (language-specific perception at its very beginning): 1;3.26 <i>czapka > bua, kloeki > bua bua, czapka > tajtje</i> ; 1;7.27 <i>biedroneczka > tjulabdibibl~abdi, tiutiujel~apl~ap, bab dada</i> ; some early successful cases: <i>pie < plain pies, kaaau < kopciuszek</i> (prosody);	(B) from ca. 2;3.21 better imitation
6.1.1.6. no nasalized vowels	
6.1.1.7. palatality and labiality preference (universal ease of articulation)	

6.1.2. Focus on morphology

The examples below illustrate the phase in the development of Filip's speech in which pre-morphology starts evolving towards the proto-morphological stage due to the parallel evolution of proto-phonology.

Beginning with 1;1.18 Filip's speech demonstrates:

Table 3. Correlation between morphological and phonological development in Filip's speech.

pre-morphology → morphological development correlated with the onset of proto-phonology	
6.1.2.1. extragrammatical operations: truncation (<i>dzia, dzi < dzidzia, kloo < kloeki, ka < piłka, bwau < ubrał się</i>), blend (<i>bama < mama</i> and <i>pomarańczka, taja < tak</i> and <i>aja</i>), surface analogy (<i>ena < edzia, ciuku < siuku</i>)	
6.1.2.2. few diminutives: single tokens – <i>tutuś, diduś, aduś, jacio, dziciuś, misio</i>	
6.1.2.3. (A) rote-learned verb forms (types): 1;1.18 <i>je (jest, 3PSg być 'to be')</i> , 1;4.28 <i>daj (Imp 2PSg dać 'to give')</i> , 1;3.16 <i>gra (3PSg grać 'to play, e.g. of a recorder')</i>	(B) from 2;3.29 <i>dam</i> (cf. <i>daj</i> in (A)) – Filip noticed 1PSg of this verb (cf. 6.1.1.1. (B) above, i.e. appearance of phonological, non-rote-learned, unit-final consonants)
6.1.2.4. -u forms (i.e. vowel-final forms): 1;3.16 <i>ju, udu, dziju, sidziii (?idzie, 3PSg iść 'to go')</i> , 1;5.27 <i>jedziu, dziudziu (?jedzie, 3PSg jechać 'to drive')</i> , 1;6.7 <i>ciu ciu (śpi, 3PSg spać 'to sleep')</i> – used consistently in this function, e.g. 2;4.5 <i>bubu ciu (piesek śpi 'doggie is sleeping')</i> ; 1;10.27 <i>dziu mama (idziemy do mamy 'we are going to Mum')</i>	
6.1.2.5. drastically reduced verb forms: 1;10.16 <i>i (idzie 'he goes')</i> , 2;0.6 <i>aa (otwiera 'he opens')</i> , also 2;1.7 <i>oo (otwarte 'it is open')</i>	(B) 2;0.6 <i>aa (otwiera 'he is opening')</i> , <i>siuka (szuka 'he is looking for')</i> ; 2;1.18 <i>ciutka ciutka (uciekają 'they are running away')</i> ; then <i>puszczać 'to drop', pukać 'to knock', przepraszać 'to apologize'</i> (i.e. a movement away from analogy towards the discovery of a rule)

<p>6.1.2.6. (A) <i>-a</i> verb forms (i.e. vowel-final forms with the prototypical vowel <i>a</i>), leading towards Macroclass IV KOCHAĆ⁶ (after the first rote-learned <i>gra</i>; this class enables Filip to maintain <i>a</i>-final forms by analogy): 1;8.16 <i>kwa</i> (<i>kręci się</i>) - very systematic afterwards, but both for the action and for the object which rotates; <i>etul~a</i>, <i>siusiul~a</i>, <i>tul~a</i>, <i>kul~a</i> (as if verb forms referring to his own actions or those in his environment);</p>	<p>(B) after 2;3.29 increase in nouns, correlated with the increase of word-final consonants (cf. again 6.1.1.1. (B))</p>
<p>6.1.2.7. (A) only 21 nouns, Nom Sg (9 fem <i>-a</i>, 1 fem <i>-i</i>, 2 masc <i>-a</i>, 2 masc <i>-C</i>, 1 neut, 4 masc. C shifts to <i>-u</i>, <i>-o</i>, <i>-a</i>, 1 fem <i>-a</i> shift to <i>-e</i>, 1 neut <i>-o</i> shift to <i>-a</i>), 2 of which appeared also in Pl <i>-a</i> and <i>-i</i>, and 2 – only in Pl); in the whole period exclusively vowel-final noun forms till 2;3.29</p>	<p>(B) 2;4.15 <i>ja siam</i> 'I myself' (cf. again 6.1.1.1. (B))</p>
<p>6.1.2.8. (A) other adaptations of morphological forms to phonological gestalt (cf. 6.1.1.1. (A) and 6.1.1.2. (B)): 2;2.6 <i>siam</i>, <i>sama</i> (instead of <i>sam</i>, i.e. a feminine form instead of a masculine one) – persists irrespective of corrections by parents till 2;4.15</p>	

When applied to the above data, criteria (a) through (d) listed in section 4 place Filip in the period analyzed in a very early transition phase from pre- to proto-morphology.

Filip's development is a case which shows clearly the dependence of morphological development on phonology: he expresses himself but has not enough material to manipulate, and is therefore forced either to choose forms according to or adapt forms to the available phonological gestalt (e.g. selects Macroclass IV of verbs and shifts towards *-u*). The above examples of Filip's speech illustrate at least points (a), (d) and (g) listed in section 5 above, i.e. that the lack of phonological

⁶ For the classification of Polish morphological classes according to the principles of Natural Morphology see Dressler and Dziubalska-Kołodziejczyk (in press).

material as specified in these points does influence the development of morphological forms.

6.2. ZOSIA⁷ (in the age span from 1;7.4 to 2;0.25)

In the case of Zosia, I will restrict myself to the presentation of one characteristic in her development which demonstrates the dependence of morphological development on phonology. Generally, in the analyzed period, Zosia appears to be at the transition from proto-phonology to modular phonology (e.g. in her stabilization of word-final consonants, consonant clusters, nasalized vowels) and at the transition from pre-morphology to proto-morphology.

At about the same time, when Zosia only produced very few oblique case forms (mostly Gen Sg in *-a* or *-i*), she produced many Nom Pl forms instead of Nom Sg forms. 92 tokens are morphotactically correct (*kotki*), 50 incorrect (*parasole*) (best interpreted as class changes, incl. macroclass changes towards the neuter), but the meaning is never plural. 91 of these 142 tokens are forms in *-i* (87 morphotactically correct), as in:

kot 'cat', DIM *kot-ek* → 1;7.5: *koti*, *kuki*, *koki*, *kotki*; 1;7.16: *kuki*, *kutki*, *koki*; 1;8.8 and 1;9.1 and 1;9.14: *koti* (together: 18 tokens); *pilka* 'ball' → 1;8.8: *papi*; 1;8.18: *papi*, *pupi*, *pipi*; 1;8.19 and 1;9.1 and 1;9.20 and 1;10.3: *pupi* (together: 15 tokens)

Zosia's *-i* forms are extragrammatical (occur together with other extragrammatical phenomena) and are phonologically conditioned.

In 65 of these 91 tokens, Zosia replaced a consonant-final Nom Sg form with a vowel-final form (*piasek* → *-i* vs. *pilka* → *-i*). Among the remaining 51 forms in *-e* and *-a*, the correct Nom.Sg. would have been consonant-final in 37 instances (*kotek* → *kote* vs. *pilka* → *pupe*). This immediately induces us to think of phonological conditioning, i.e. avoidance of consonant-final words or preference for CV structures.

Other reasons for assuming phonological conditioning are: similarities of phonological gestalt of the words concerned of which all but 3 are of a binary foot pattern and manifest consonantal harmony (e.g. *papi*, *pupi*, *koki*).

The lack of final consonants, consonantal harmony and trochaic foot pattern are characteristic of a proto-phonological stage in the acquisition of phonology.

Extragrammatical operations and the lack of morphological productivity⁸ are typical of the premorphological period. Also the lack of the morphosemantic category of plural and phonological reshuffling of morphotactically mainly correct forms

⁷ Zosia is another Polish child whose data have been collected for the purposes of the project on the acquisition of morphology (cf. Note 4). The recordings started at the age of 1;7.4. Zosia's speech has been recorded and transliterated by her mother. Also Zosia was born healthy and is a normally developing child. Zosia's morphology has also been discussed in e.g. Dressler et al. 1996 and Dressler and Dziubalska-Kołodziejczyk 1997.

⁸ 60 out of 91 tokens in *-i* refer to 4 words only, i.e. *pilka*, *czapka*, *piasek* and *kotek*.

of the input rather indicate a period where the protomorphological precursors of inflectional categories have not yet clearly emerged.

We can identify the time of the loss of the "wrong plural forms" (and of the nominative *u*-forms which Zosia also used), which can be located around the end of the second year of life (at 2;0.25 two forms still present), as the beginning of the protomorphological stage. Morphologically, the decline of "wrong plural forms" (particularly those in *-i*) coincides with the emergence of double number-reference, i.e. morphosemantic distinction of singular and plural: at 1;10.3 the first double number-reference turns up – *ipy/ipa (ryby/a)* 'fish', as well as with the increase of oblique case forms. Phonologically, it coincides with the increase of consonant-final word shapes, which marks the onset of modular phonology.

Recapitulating, the shift from proto-phonology towards modular phonology triggers the shift from pre- towards proto-morphology (of course, there is no clear-cut boundary, but a gradual transition). (The fact that few "favourites" of Zosia remain quite long in use is predictable for the phonological behaviour: babbling preferences are said to dictate the choice of words in the first-words and first-fifty-words periods.)

7. Conclusion

In conclusion, the development of first language morphology has been demonstrated in the paper to strictly interrelate with the development of phonology. A unidirectional developmental relationship between phonology and morphology (at least proto-phonology prior to proto-morphology) has been claimed, until disproved to be only overtly (surface-phonetically) valid. The usefulness of the criteria delimiting stages in the acquisition of morphology and phonology has been illustrated on the basis of the examples taken from the speech of two Polish children.

REFERENCES

- Bohn, O.-S. and Polka, L. 1995. "What defines vowel identity in prelingual infants?" In Elenius, K. and Branderud, P. (eds.). 1995. Vol. 1. 130-133.
- Clement, C. J., den Os, E. A. and Koopmans-van Beinum, F. J. 1995. "The development of early vocalizations of deaf and normally hearing infants in the first eight months of life". In Elenius, K. and Branderud, P. (eds.). 1995. Vol. 1. 138-141.
- Davis, B. L. and MacNeilage, P. F. 1995. "Articulatory preferences in first words: The frame content hypothesis". In Elenius, K. and Branderud, P. (eds.). 1995. Vol. 1. 150-153.
- Dinnsen, D. (ed.). 1979. *Current Approaches to Phonological Theory*. Bloomington: Indiana University Press.
- Donegan, P. and Stampe, D. 1979. "The study of Natural Phonology". In Dinnsen, D. (ed.). 1979. 126-173.
- Dressler, W. U. 1984. "Explaining Natural Phonology". *Phonology Yearbook* 1. 29-50.
- Dressler, W. U. 1996. "Principles of naturalness in phonology and across components". In Hurch, B. and Rhodes, R. (eds.). 1996. 41-52.
- Dressler, W. U. 1997a. "On productivity in inflectional morphology". *CLASNET* 7. Montréal.
- Dressler, W. U. 1997b. "Morphological richness vs. complexity in inflection". A paper presented at the XVIth International Congress of Linguists, Paris 1997.

- Dressler, W. U., Mayerthaler, W. Panagl, O. and Wurzel, W. U. 1987. *Leitmotifs in Natural Morphology*. Amsterdam: Benjamins.
- Dressler, W. U. and Karpf, A. 1995. "The theoretical relevance of pre- and protomorphology in language acquisition". *Yearbook of Morphology* 1994. 99-122.
- Dressler, W. U., Dążyk, R. and D., Dziubalska-Kołodziej, K. and Jagła, E. 1996. "On the earliest stages of acquisition of Polish declension." In Koster, C. and Wijnen, F. (eds.). 1996. 185-195.
- Dressler, W. U. and Dziubalska-Kołodziej, K. 1997. "Contributions from the acquisition of Polish phonology and morphology to theoretical linguistics". In Eliasson, S. and Jahr, E. H. (eds.). 1997. 379-399.
- Dressler, W. U. and Dziubalska-Kołodziej, K. In press. "Polish inflection classes within Natural Morphology". *Biuletyn PTJ*.
- Dziubalska-Kołodziej, K. forthcoming. "Stages in the acquisition of first language phonology: pre- and protophonology". MS.
- Elenius, K. and Branderud, P. (eds.). 1995. *Proceedings of the XIIIth International Congress of Phonetic Sciences*. Stockholm: KTH and Stockholm University.
- Eliasson, S. and Jahr, E. H. 1997. (eds.). *Language and its Ecology: Essays in Memory of Einar Haugen*. Trends in Linguistics. Studies and Monographs, Vol. 100. Berlin: Mouton de Gruyter.
- Ferguson, C. A., Menn, L. and Stoel-Gammon, C. (eds.). 1992. *Phonological Development: Models, Research, Implications*. Timonium, MD: York Press.
- Hurch, B. and Rhodes, R. (eds.). 1996. *Natural Phonology: the State of the Art*. Berlin: Mouton.
- Jusczyk, P. W. 1992. "Developing phonological categories from the speech signal". In Ferguson, C. A., Menn, L. and Stoel-Gammon, C. (eds.). 1992. 17-65.
- Kent, R. D. 1992. "The biology of phonological development". In Ferguson, C. A., Menn, L. and Stoel-Gammon, C. (eds.). 1992. 65-90.
- Koster, C. and Wijnen, F. (eds.). 1996. *Proceedings of the Groningen Assembly on Language Acquisition (GALA) held at the University of Groningen, 1995*. Groningen: Centre for Language and Cognition Groningen.
- Kuhl, P. K. and Meltzoff, A. N. 1995. "Vocal learning in infants: development of perceptual-motor links for speech". In Elenius, K. and Branderud, P. 1995. (eds.). Vol. 1. 146-149.
- Kuijpers, C. T. L. 1995. "Production-perception relationship in the voicing contrast for medial stops in children and adults". In Elenius, K. and Branderud, P. 1995. (eds.). Vol. 1. 134-137.
- Myers, T., Laver, J. and Anderson, J. (eds.). 1981. *The Cognitive Representation of Speech*. Amsterdam: North-Holland Publishing Company.
- Smith, A., Goffman, L. and Stark, R. E. 1995. "Speech motor development". *Seminars in Speech and Language* 16, 2. 87-99. (guest editor: Anthony J. Caruso, *Motor Speech Disorders in Children*.)
- Sobkowiak, W. 1991. *Metaphonology of English Paronomastic Puns*. Frankfurt am Main: Peter Lang.
- Studdert-Kennedy, M. 1981. "Perceiving phonetic segments". In Myers, T., Laver, J. and Anderson, J. (eds.). 1981. 3-10.
- Werker, J. F. and Pegg, J. E. 1992. "Infant speech perception and phonological acquisition". In Ferguson, C. A., Menn, L. and Stoel-Gammon, C. (eds.). 1992. 285-311.
- Wode, H. 1994. "Speech perception and the learnability of languages". *International Journal of Applied Linguistics* 4, 2. 143-168.