

THE CHARACTERIZATION OF DISORDERED CHILD PHONOLOGY

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ABSTRACT

Phonetic and phonological studies of disordered child phonology are regularly reported in the clinical linguistic and speech pathological literature. The characterization of the disordered phonology is adult-centred and heavily influenced by current phonological theory. In consequence a clinical phonological assessment is an error analysis and phonological change is an all-or-none phenomenon. The basic phonetic and phonological concepts have yet to make an impact on the clinical investigation of child phonology.

INTRODUCTION

This presentation, like the two other contributions to this symposium, focuses on child language disorders, specifically developmental phonological disorder (or disability). A linguistic definition of this disorder is: "a linguistic disorder manifested by the use of abnormal patterns in the spoken medium of language" [1]. Many attempts have been made to characterize this disorder using analytical and assessment techniques derived from phonological theory. These descriptions have tended to be comparative error analyses that do not consider the children's pronunciation patterns as an independent phonological system. In consequence the clinical evaluation and management of the disorder do not take into account the dynamics of phonological functioning and phonological change.

DEVELOPMENTAL FRAMEWORK

Phonological process analysis has, since the early 1980s, become the dominant framework for the characterization of developmental phonological disorders. This approach has however become somewhat removed from the original theory upon which it is based, viz: Natural Phonology [2]. Stampe's theory is an attempt at an explanatory theory which is rooted in the phonetic bases of human language [3]. A substantial proportion of Stampe's evidence for his theory is child speech data. It is not doubt this fact which made his framework attractive to clinical phonologists. There is however a discontinuity between Stampe's theoretical exposition and the practical applications of his concepts in the clinical context. At the most basic level, many of the developmental phonological processes included in clinical assessment procedures such as Natural Process Analysis [4], Assessment of Phonological Processes [5] and Phonological Assessment of Child Speech [6] are not mentioned by Stampe by name nor even described by him.

Stampe's approach to phonology is also attractive clinically because his key theoretical concept, the phonological process is defined by him as a "phonological substitution". This concept therefore enables the traditional approach of error analysis to be presented in phonological terms. Process analysis focuses on the patterns in children's mispronunciations, with little regard to issues of naturalness. The processes are

presented as developmental patterns and the characterization of disorder is therefore in a developmental framework.

The five characteristics of developmental phonological disorder in this framework are:

- * persisting normal processes
- * chronological mismatch
- * unusual processes
- * variable use of processes
- * systematic sound preference

[6].

The first three of these are clearly developmental in nature being defined by what is expected to occur in normally developing phonologies. The last two are also developmental in definition but in addition refer to characteristics of the occurrence of processes in disordered child phonology. As such they could be viewed as phonological rather than developmental characteristics (see further below). Excluding these two, the developmental characteristics can be summed up as involving delayed, uneven and deviant phonological development, each type occurring in some measure in each case.

Unusual Processes

Within this framework attempts have been made to identify the characteristics of unusual processes, most notably by Leonard [7]. He identifies three types:

- * Salient but unusual sound changes with readily detectable systematicity.
- * Salient but unusual sound changes with less readily detectable systematicity.
- * Subtle phonological behaviours.

The first type includes unusual substitutions defined developmentally, such as late sounds occurring before early sounds, phonologically, such as use of sounds absent from the model language and phonetically, such as use of sounds absent from natural language. The second type includes context-based substitution patterns such as assimilation,

dissimilation, metathesis and consonant-vowel interactions. The third type includes children's pronunciations that are perceived by adult listeners as homophones eg *tea* and *key* as [ti] but which instrumental analysis (either spectrographic or electropalatographic) reveals to be different. This characterization of unusual processes goes beyond the deterministic view of phonological development presented by Natural Phonology and beyond the constraints of phonological process analysis as employed in clinical assessment procedures. It shifts the focus from the developmental dimension to the phonological.

PHONOLOGICAL FRAMEWORK

Within a phonological framework three parameters have been identified on which disordered phonological patterns can be described. These parameters are:

- * system
- * structure
- * stability

These are the fundamental parameters of phonological organization and functioning. Phonologies operate with systems of contrastive units, within structural constraints determining the sequence and order of these units and in a state of relative stability or homeostasis.

In seeking to characterize disordered phonology it is necessary to examine the phonological patterns within these three parameters. In the evaluation of *system*, the size of the child's phonetic inventory and the child's contrastive system is analyzed by comparison with the adult targets attempted. In assessing *structure*, the distribution and combination of consonants and the syllabic structures in the child's pronunciation patterns are analyzed by comparison with the adult targets attempted. In regard to *stability*, the consistency or variability in the child's realizations of the adult targets is

examined.

Clinical research indicates that children's disordered phonologies can be definitively characterized using these three parameters. Disordered phonological systems are characteristically restricted and symmetrical. The asymmetry is evident in that potential contrastive feature combinations are not exploited. For example, this is the consonant inventory of one phonologically disordered English-speaking child:

m	n		
p	b	t	g
f			

This child's inventory contains all the possible feature-contrasts to create the adult system, viz: nasal/plosive/fricative; bilabial/alveolar/velar; voiced/voiceless; but it does not combine them to produce the maximum number of contrasts.

Disordered phonologies are structurally restricted in similar ways. Some children have markedly different consonant systems at different places in structure.

For example the consonant distribution patterns for one English speaking phonologically disordered child were:

SIWI: m n b d g h w j
SFWF: m n p t f v s z

Another example of a child having the potential to realize many adult targets but exploiting that potential. Further typical instances of structural asymmetry that have been frequently observed in phonologically disordered English-speaking children are the tendencies for one position in syllable and word structure to be relatively well-developed vis-a-vis the others. The most common tendency is for the range of contrasts in word initial position (SIWI) to be larger and more closely matched to the target system than in other word positions. Typically in within word positions (SIWW) there will be a very restricted

range of consonants; often glottal consonants [ʔh] are dominant; and in word final position, (SFWF) zero realizations predominate, ie the open syllable is the canonical structure. Where English is the target language this type of patterning is seriously dysfunctional and communicatively inadequate; with other target languages, for example Italian, this would not be so.

The parameter of stability reflects the finding that disordered child phonologies tend to evidence variable realizations of the same adult targets. It is important to examine the occurrences of stability and variability in order to identify whether there is any latent potential to expand the system of contrasts. Logically, there are four types of consistency/variability:

* consistently correct match:
/t/ -> [t]

This so-called 'correct' realization may be compromised, however, if the same phone (i.e. [t]) is used to realize another target, e.g. /k/->[t]. In such a situation the child's [t] is not phonologically contrastive.

* consistently incorrect match:
/k/ -> [t]

This is likely to entail a lack of contrast as in the above example. However if one target is uniquely realized by a phone not in the target system, e.g. /s/ -> [n]. This would not result in phonological inadequacy.

* inconsistently correct match:
/k/ -> [k t]

The contrast is potentially present; this is progressive variability.

* inconsistently incorrect match:
/k/ -> [t d g]

There is no apparent potential for the contrast to develop. This variability does not appear to be progressive.

Using these three parameters to

characterize disordered phonologies enables a phonological analysis and assessment which identifies the dynamics of phonological functioning and the potential for phonological change. Treatment aims are therefore defined by the characteristics of the child's phonology. They extend and expand on the potential within the child's patterns.

CONCLUSION

This paper has focused on the phonological characteristics of disordered child language in an attempt to define this type of developmental disability in linguistic terms. In this conclusion a number of other issues that are pertinent will be mentioned as items for further exploration and discussion.

This paper, following the vast majority of the literature, solely discusses the nature of consonantal patterns. In a review of recent studies, Grunwell [8] discusses the characteristics of disordered vowel patterns. Whilst at present there are relatively few studies, it would appear that vowel disorders also show phonological patterning in that (i) vowel errors shared features in common with the targets and (ii) the errors entail losses of contrasts. More evidence is required to investigate this area further.

As has already been mentioned some children signal contrasts imperceptibly. On the other hand some children use very unusual patterns for certain targets, such as /k/ and /p/ -> [k̥]. These phenomena prompt the question: what is the phonetic basis of these realizations? It highlights the fact that children are abstracting perceptual information from the speech they hear and on the basis of this information attempting to create their own phonetic and phonological systems. It is apparent that in some instances children seem to attend to aspects of the speech signal that are not salient for mature speakers. This is another area

which would profit from further investigation.

Finally clinical phonetics and phonology needs to investigate further the interaction between phonological development and the presence of a physiological impairment to the speech production mechanism, such as a repaired cleft palate. As reported by Grunwell [9] in many instances phonological development follows an essentially normal path in spite of the physical abnormality. Further investigations of other types of abnormalities are required to enhance our understanding of the nature of phonological development and phonological disorder.

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