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Introduction

A Bridge from Practice to Theory?

Speech therapists are remarkably successful in changing child speech patterns which deviate from the norm. The literature describes many procedures for altering children's speech productions published over many years by experienced and excellent clinicians who have been convinced of their benefits. (Van Riper & Irwin (1958) Van Thal (1969) McDonald (1964) Winitz (1976) Wood (1988) In many instances the descriptions are backed by case studies which illustrate their effectiveness (e.g. Johnson & Hood (1988), and in a much smaller number controlled experimental studies are presented to make the case in a more scientific way, ^{d. Osborne} (Costello (1976) Compton (1970)). The fact that speech therapy has followed the example of the medical profession by presenting evidence for success mainly in terms of clinical and anecdotal accounts does not detract from the point. Speech therapists have long been convinced that they can improve children's speech production, and the conviction is largely in accord with the objective evidence.

It is from this starting point of relative success that any theoretical essay must begin. For the clinical accounts we possess are either atheoretical (Kellett, Lee & Mobley (1984) ^{Centre Programme} Nuffield Dyspraxia (1985)) or rooted in a variety of 'competing' theoretical positions. Thus a recent review by Newman, Creaghead and Secord (1985) can record therapeutic descriptions

based on 'traditional articulatory' (largely atheoretical) approaches, through therapies based on behavioural theories, communication centred approaches and linguistic approaches. It would be cynical to suggest that speech therapists recast their existing practices in terms of whichever theories of speech acquisition and production are currently available: *it is* rather that the remedial procedures which an individual therapist adopts reflect the assumptions he or she makes about the nature of the problem. These assumptions will in their turn reflect the theoretical postulates adopted, explicitly or implicitly, by the therapeutic profession as a whole. It may be relevant to look hard at therapeutic practice, and in particular therapeutic discourse, to enable hypotheses to be formed about how and why therapy sometimes proves effective in altering phonological realisations.

Parallel to, but separate from the therapeutic literature there has been a growth in theories which account for phonological acquisition and change in the normally developing child. Such theories should, in order to have general applicability, be able to account for those children seen by the speech therapist whose phonological realisations deviate from the norm. It seems sensible to look at these theories, as well as at therapeutic practice, to determine whether and how a bridge can be made between the two. We are to some extent suggesting that speech therapists 'pick a theory', and will review some likely candidates, but our criterion of what constitutes a 'useful' theory is that it should help to explain

why therapeutic practice is at least sometimes successful, as well as helping to inform and direct that practice.

2/ Linguistic Description and Phonological Intervention

Linguistics has contributed much towards intervention by way of helpful descriptions of children's speech productions, and by pointing out patterns and the rule-governed nature of disordered speech output. In these ways, descriptions of phonological acquisition have revolutionised the field of speech pathology. The considerable impact of linguistic description upon the assessment and analysis of child speech has not been paralleled by a shift in practice. ^{- the recognition that speech is rule governed}

towards a phonologically principled approach to remediation. Grunwell (1983) comments on the fact that phonological approaches to the description of disordered speech have been instrumental in suggesting to therapists where they might intervene in children's phonologies, and in pointing out the patterns and processes which need to be altered, but that the actions taken by therapists to attempt to make changes have hardly varied as a result of increased linguistic knowledge.

If this is true, it may suggest that therapists are reasonably happy with their existing techniques. Otherwise, it may reflect the fact that it is difficult, and perhaps unwise, to attempt to move from a description of a child's speech directly to an intervention procedure. When we step beyond the

descriptive level, and try to apply models derived from studies of children's developing phonologies to remedial practice, we come up against a number of unresolved issues which militate against the direct application of phonological models to therapeutic practice.

The main problem relates to the difficulties inherent in establishing the psychological reality of linguistic models of children's phonological systems. This point is made by Milroy (1985), who cautions against making any simplistic connection between phonological abstractions and psychological or neurological realities. She stresses that models of phonological representation and descriptions of the 'rules' governing patterns of realisation constitute convenient and economical theoretical constructs, but ~~that no correlation of~~ *one cannot make the assumption* ~~that these~~ *that these* ~~their~~ abstract forms ~~may~~ have any psychological reality for a speaker. Therapists clearly cannot intervene in elegant theoretical fictions.

The usefulness of linguistic descriptions to the speech therapist may ~~therefore~~ be to code and classify speech data and to provide taxonomies which allow the therapist to compare an individual child's speech output with the commonality of children acquiring language (and speech therapists' data will have reciprocal value in refining and further developing linguistic models of developing phonologies).

A linguistic description and analysis will therefore be useful in suggesting to a speech therapist whether there is any need to intervene in a child's development of speech, and will

point out the areas where change is needed. It may also be useful in suggesting which patterns and processes ought to be altered first, and even the order in which phonological changes might be targeted (Ingram, 19⁸6a). There is nothing in a linguistic description, however, nor even in a linguistic model, which considers the processes by which phonological change takes place. Something other than a map and a model is needed.

In order to overcome these difficulties, and to find a point where linguistic analysis and therapeutic practice can meet, a theory is needed which takes into account the processes through which children acquire their phonological systems. Such a theory would have to take into account individual variation amongst children (speech disordered children being highly individual and indeed at times completely idiosyncratic in their phonological output), as well as accounting for well-documented regularities in disordered speech systems (Grunwell (1985)). It would preferably lead to certain types of intervention procedures, in terms of tasks and styles of interaction, which would be of maximum benefit to the child, and allow change to be predicted along certain specific lines as a result of intervention.

Phonological acquisition cannot of course be accomplished without accompanying speech motor development. We believe that the most effective way to bring about change when working with speech disordered children is to increase their phonological

knowledge but this change must ultimately be brought about through revision of phonetic production. *

* Phonetic Development

Phonetic development was discussed by Hewlett in the previous chapter, and we will only reiterate that it is a developing motor skill dependent on neurological and physiological maturation and co-ordination. Children initially have little control over phonetic production, and control develops gradually becoming progressively more automatic (Menyuk, Menn & Silber, (1986 .) and is known to continue developing in some respects long after phonological contrasts are well established.

Our knowledge about phonetic development has implications for remediation. As a skill depending upon physical maturation phonetic development is different from other aspects of language development. We would argue that external intervention is unlikely to have much direct effect on maturation. This should not prevent the therapist from utilising knowledge about phonetic development to provide remedial situations which will maximise the opportunity for the child to develop and practice emerging skills. ^{However,} we would also suggest that therapeutic effort directed towards developing phonological knowledge may prepare the child for making the most effective use of those developing phonetic skills.

Our reservations about the limited influence of external intervention relate only to developmental disorders where no specific causative factors are evident. The general principles of intervention that are the concern of this chapter are

* In the next section of the chapter we will review aspects of phonetic development pertinent to remediation. After this we will consider theories of phonological acquisition with particular emphasis on cognitive theories; the theories which in our opinion are of most relevance to therapeutic intervention.

potentially applicable to many speech and language disorders. But additional considerations will apply when there is known anatomical, neurological or auditory impairment. Intervention for these disorders will require the use of special techniques designed to maximise available potential, and provide compensatory strategies where appropriate. Specific therapeutic intervention for these disorders ^{is} ~~are~~ discussed in section two of this volume.

The knowledge that phonetic accuracy develops gradually over time in normal acquisition has implications in the clinical situation. The therapist should expect and allow for gradual change when evaluating the child's response to remediation. The principle of gradual learning is an important facet of our therapeutic model and we will discuss it in some detail later.

In the process of speech development children must not only master the articulatory gestures of individual sounds but learn to order and coarticulate them appropriately. "Easier" speech sounds and simple syllable shapes are acquired earlier than "difficult" sounds and complex syllable shapes (Stoel-Gammon & Dunn, ¹⁹⁸⁵ ~~op-cit.~~). This concept of ease of production has a long history of application in remediation and it would appear sensible to continue to apply it in determining the choice and progression of phonetic contexts and target words for therapy. Children are also more likely to produce correct realisations for certain word types and in stressed positions (see Hewlett, this volume), a further factor which should influence therapeutic targets.

Although some opportunity to experiment and practice with individual phonemes may be essential for some children, the dynamics of co-articulation suggest that the greater emphasis should be on producing sequences of phonemes, preferably in real words, as soon as possible.

It cannot be assumed that lack of mastery of phonemes can necessarily be attributed to motoric factors. In the previous chapter Hewlett stresses the cognitive aspects of phonetic development, and observes that children may fail to produce certain phonemes because they lack knowledge of the appropriate articulatory gestures. This possibility should be considered when planning remediation and indicates the need to provide the child with as much information as possible about the specific characteristics of phonemes. This may for instance require the provision of a combination of visual, kinaesthetic and auditory cues.

✓ Acoustic Analysis

Much of the available information about phonetic development has come from acoustic analysis. This type of analysis can provide a very detailed picture of some aspects of phonetic production. It can therefore be used to support and refine auditory analysis (Weismer, 1984) and can specifically reveal how a child controls his production (Moss, 1985). There is therefore promising potential for acoustic analysis in the investigation of developmental speech disorders and the provision of consequent remediation, and we therefore provide a

few examples of this potential in this section of the chapter. (See also Weismer (op. cit.) for a detailed discussion of the various methods of investigation that have been used).

Acoustic analysis appears to be particularly valuable for providing insights into the relationship between phonetic and phonological ability and variation in phonetic production in developmental disorders. One can take as an example of the former the spectrographic representations of V.O.T. These may show measurable phonetic differences in the production of pairs of voiced and voiceless stops that have not been detected during phonetic transcription. Evidence of the production of such differences demonstrates that the child is able to perceive distinctions between two phonemes and has some phonological knowledge, in that he is aware of the need to make a contrast between the phonemes. Information of this kind should help the therapist to determine the therapeutic methods likely to be maximally effective.

Analysis which reveals differences in the production of the same phoneme in different phonetic contexts can also provide information about the extent of the child's phonological knowledge (Weismer, ¹⁹⁸⁴~~op. cit.~~), that is whether a child has partial or no knowledge of a particular phoneme or structure. This information can then be used to determine what phonemes should be targets for remediation.

Although acoustic analysis is potentially a very valuable resource for influencing remediation a word of caution is required. Analysis of this kind may provide evidence, for

instance, that the child is aware of the need to make a contrast between sounds but it does not tell us why there is failure to reach the adult target. The child may perceptually recognise a difference between two phonemes but the basis of this recognition and internal representation may not be identical to that of the adult and production may reflect these differences. The problem may be a cognitive one in that the child may be unaware of the need to make further changes to achieve adult-like production, alternatively neuro-motor limitations may prevent adult-like realisations.

Acoustic analysis cannot finally rule out any potential explanation of disordered speech but it extends our knowledge about the relationship between phonetic skills and phonological knowledge. This can assist in the proposition and justification of explicit therapeutic strategies.

To summarise, phonetic production is a skill, which is subject to maturational constraints and is influenced to an extent both by phonetic context and environmental situation. It may also be subject to cognitive influences. ~~Finally, we should add that~~ There may be a discrepancy between phonetic and phonological development, which can be detected by phonetic and phonological description and analysis and by acoustic investigations. Some children may have phonological knowledge in advance of phonetic skills or vice versa. Relative stages of development should be taken into account when determining therapeutic strategies. For instance a child with a restricted phonetic inventory will require opportunities to extend his or

her phonemic range, whilst a child who has a wide range of phonemes but many simplifying processes requires opportunities to exercise contrastive use of those phonemes.

7/ Phonological Development

A variety of theories of phonological acquisition and change exist. These will be reviewed to determine which appear to be most appropriate for adoption by those who wish to provide intervention for phonologically disordered children.

Currently no theory of phonological acquisition exists which can account for all stages and aspects of phonological development. Rather there are a variety of competing but not necessarily conflicting theories. Stoel-Gammon & Dunn ⁽¹⁹⁸⁵⁾ ~~(1986)~~ provide a useful overview, which includes, amongst others: structuralist theory (Jakobson, 1968), behaviourist theory (Mowrer, 1952, 1960, Winitz (1969) and Olmsted, (1966), ~~and~~ (1971)), natural phonology theory (Stampe, (1969) ~~and~~ (1973)), cognitive theory (Macken & Ferguson, (1983), interactionist discovery theory (Menn, (1976), Kiparsky & Menn, (1977) and biological theory (Locke, (1980), ~~and~~ (1983).

Three interrelating dimensions predominate across these theories. These are:- universalism versus individual difference, -innateness versus environmental influence, ~~and~~ the role of the child as an active or passive participator in his development, ~~and~~ ^{These} these three dimensions have relevance for therapeutic procedures.

2 Universal Characteristics Versus Individual Differences

According to structuralist theory (Jakobson, ¹⁹⁶⁸ ~~op.~~ cit.) phonological development follows a universal pattern. Children may acquire phonemes at varying rates but the order in which they acquire them is innately determined by a set of structural laws. Universal patterns of development are also an essential characteristic of natural phonology theory (Stampe, ~~(1969)~~, ~~and~~ (1973)) although the developmental process is believed to be very different, and According to this theory children do not develop phonemes but learn to suppress processes that do not occur in their language.

Universalist theories are valuable to the speech therapist in that they provide guidelines for expected levels of development. They enable the therapist to compare disordered and normal children and they are therefore helpful in deciding whether a problem exists and its nature and extent and consequently whether intervention is required. They provide certain indications for therapeutic planning and progression. They are however of limited value in determining specific strategies and tasks which will enable the child to suppress processes or acquire feature contrasts.

Theories which stress individual differences in acquisition, such as cognitive and interactionist discovery theories are potentially more valuable. Such theories appear to offer much more potential for therapeutic intervention to influence changes in behaviour, and the consequent determination of activities to bring about such change.

7 Innateness Versus Environmental Influence

Innateness is a logical correlate of universalism. Along this dimension it is probably most important to consider the source of the innateness, which can result from universal linguistic rules or physiological limitations.

Taken to its extreme a theory of innateness would appear to contra-indicate the success of any remediation procedures. This model however can direct the therapist towards discovering factors which may have adversely affected normal development, for example hearing loss or structural limitations, and towards the alleviation of or compensation for such factors. Accommodating to overt problems is obviously an important consideration in therapeutic planning, and even in situations where there is no obvious cause for a problem we should continue to seek more covert possible explanations such as poor perceptual ability or sensorimotor limitations. For many children with developmental speech disorders however causative factors are not clearly discernible, and theories which attribute a more important role to environmental influence may be a more profitable source to guide therapy.

Behaviourist theories and cognitive and interactionist discovery theories attribute to the environment a significant role in phonological development. Behaviourist theory has been used as a basis for devising many intervention programmes both for general language disorders and more specifically for speech problems. Programmes which utilise this theoretical base are useful in emphasising the importance of environmental influences

in the learning process but we suggest that they have some limitations when applied to phonological disorder. (see later discussion). If a child has phonetic difficulties external shaping of articulatory output will probably be a necessary part of intervention. But it is less easy to see how such strategies will be useful if the child's difficulties are related to internal rule organisation rather than production capabilities.

2 Active versus Passive Learning

Although both behaviourist and cognitive theorists suggest a vital role for the environment, they postulate very different roles for the child in phonological development. Behaviourist theories along with Stampe (^{1969, 1973}~~op. cit.~~) and Locke (^{1980, 1983}~~op. cit.~~) imply a passive role for the child whilst the essential focus of cognitive and interactionist discovery theory is a child who is actively engaged in learning (Macken & Ferguson/¹⁹⁸³~~op. cit.~~), Menn, (¹⁹⁷⁶~~op. cit.~~), Kiparsky & Menn, (¹⁹⁷⁷~~op. cit.~~) and Menyuk, Menn & Silber, (1986).

A passive role for the child suggests that in remediation effort must be concentrated on externally shaping and reinforcing correct productions from the 'patient'. Whilst all therapists spend some time on providing this type of feedback to give the essential information about success or otherwise in achieving the therapeutic target, we suggest that cognitive theory can provide the opportunity to add an additional dimension to the learning situation. If the child is actively engaged in learning it should be possible to use this engagement

to provide what is potentially more effective remediation.

2/ Cognitive Theories of Phonological Acquisition

Macken & Ferguson (¹⁹⁸³~~op. cit.~~) provide the most detailed description of cognitive theory. A similar theory (interactionist discovery) has been proposed by Menn (¹⁹⁷⁶~~Menn, op. cit.~~) and Kiparsky & Menn, (¹⁹⁷⁷~~op. cit.~~). The following quotations demonstrate the essential points of these theories:

"At some point the child begins to recognise similarities between classes of sounds and sounds in combination, and to construct rules for relating similar sounds and word shapes, and ~~also~~ to formulate rules that solve the pronunciation difficulties that are encountered. That the process is not automatic can be shown in the variable experimentation forms that the children produce as they search for a solution and in the range and diversity of (different children's) solutions (Kiparsky & Menn, 1977)."

Macken & Ferguson, 1983, p.273

and

"The problem solving theory of the acquisition of phonology views the child as making trial and error attempts at perceptual classification and production of sounds and sound sequences and as developing strategies for production in the attempt to bring adult words within the limited range of existing production abilities."

(1986)
Menyuk, Menn & Silber, ~~op. cit.~~
p.209.

Essentially, these authors see the basic process of phonological development as involving children actively discovering how to communicate with others in their environment. We suggest that it is this process of active discovery which should be replicated in the therapeutic situation.

In providing evidence to support their theory that children are active seekers and users of information Macken & Ferguson ¹⁹⁸³ (~~op. cit.~~) cite three principal aspects of the child's speech production; selectiveness, creativity and hypothesis (rule) formation.

Selectiveness refers to the child's ability to actively select or avoid words with particular structures. Observational studies suggest that children do appear to be particularly likely to acquire words which fit existing articulatory patterns but apparently deliberately avoid using words with different structures even though they may understand these words, (See Macken & Ferguson ¹⁹⁸³ (~~op. cit.~~), Ingram (1986b)). Experimental support for avoidance strategies can be found in Schwartz and Leonard (1982).

Creativity refers to the child's ability to create segments or phonological patterns that do not occur in their adult native language. They are frequently unique to individual children and appear to reflect the child's attempt to approximate his or her perceptions of an adult rule to the limitations of his or her own phonetic and phonological system. Hypothesis formation includes isolated accuracy and experimentation where the child appears to be deliberately practising ways to say a word, and which appears to precede the stable systematic production of words sharing the same features, and overgeneralisation, where the child extends a particular rule or set of rules to an inappropriate structure. Macken & Ferguson ¹⁹⁸³ (~~op. cit.~~) suggest that these phonological overgeneralisations are similar to

reported syntactic and semantic overgeneralisations, such as "wented" and "more read". Regression is the term applied to instances where a word previously correctly produced is incorrectly pronounced. Superficially this appears to be a retrograde step in the child's progress towards the adult system, but it can be interpreted as an attempt to add new sounds to his ^{or her} output within more general production limitations, or an attempt to accommodate a word within a newly constructed rule system. Changing hypotheses occur, and this refers to rule changes which do not represent achievement of the adult target, although they may represent a move towards it. They are taken as indications that the child has changed views about the way to pronounce a sound.

Critics of cognitive ^{explanations} ~~theories~~ play down the amount of individual variance which occurs and ^{the suggestion that} ~~which suggests that the variance can be attributed solely to cognitive factors (Locke 1988)~~ ~~child is actively formulating hypotheses.~~ But there is a considerable amount of evidence to support the observation that children are actively involved in the acquisition of the phonological system of their language, and that there is considerable individual variation within the general developmental pattern of acquisition. ~~(Locke)~~ Some published examples will be reported.

13 Playing with Sounds

The many reported observations of young children spontaneously playing with and manipulating the phonological structure of language in activities which do not appear to have

a communicative function lend support to the view that the child is an active rather than a passive learner. (They may also provide a rich source of ideas for therapeutic applications.)

Playing with speech sounds may take the form of what appears to be deliberate practice or more spontaneous play with phonological structures. Weir (1962) provides classic examples of both forms of this type of activity in her descriptions of the pre-sleep monologues of her son Anthony around the age of 18 months. There are many other reported instances of children spontaneously manipulating and playing with language. Ferguson & Macken (1980) and Clark (1978) provide many examples.

Examples of children's ability to focus specifically on the phonological structure of language comes from observations of rhyme-creation activities. These activities appear to be at their peak when children are between two and three years of age (see for example Cazden ¹⁹⁸³ ~~(1976)~~, Chukovsky (1968), Clark, ¹⁹⁷⁸ ~~(op. cit.)~~, Garvey (1977), Horgan (1981) and Weeks (1979). In this type of activity children use real words or create nonsense words to make rhyming pairs or chains of words. They demonstrate in this activity at least a limited degree of metalinguistic awareness. Children show that they are able to focus on the phonological structure of words divorced from meaning by choosing words or creating nonsense words which share common structural features with the previous word. ^{Waugh} Jakobson ⁽¹⁹⁷⁹⁾ observes that this kind of activity observes only phonological rules and appears to serve no grammatical or semantic function.

There is disagreement about the role played in language

1977
acquisition (Garvey, ~~1977~~), but this type of activity gives support to the acquisition theories which provide the child with an active role in his ^{or her} own development. Observations of children's activity both in communicative and play situations demonstrate that to participate successfully in this type of activity children must be to some extent capable of monitoring their own speech output and must possess some knowledge of the structure of their native language. A theory which views the child as an active rather than a passive learner provides many more opportunities to structure the environment, in this case the clinical situation, to influence the learning situation. In contrast models of acquisition which see the child as essentially passive, and speech development as simply unfolding and developing more or less automatically, are of more limited use for remediation. It is suggested therefore that cognitive theories of phonological acquisition provide excellent opportunities for application in the remedial situation. The case for this application is strengthened by the knowledge that the theory of the child as an active learner is not restricted solely to phonological acquisition.

3 Cognitive Theory Within a Broader Context of Learning

1983
Macken & Ferguson (~~1983~~) observe that the cognitive theory of phonological development is compatible with the general concept of children as active problem solvers. This model of children's cognitive development has its base in Piagetian and neo-Piagetian theory. The work of authors such as

Donaldson (1978, & 1983), and Beveridge & Griffiths (1983) provide detailed examples from several areas of learning which demonstrate that children learn through actively exploring their environment and assimilating the information gained through this exploration. The compatibility of phonological acquisition theory with more general learning theory strengthens the case for application of the model to the remedial situation. It increases the general credibility of the theory, and has implications for application in remediation beyond specific phonological disorder.

The knowledge obtained from the application of, and research into, this model of active learning and development in wider settings provides information about how such application can be maximally effective. For example it has been shown that the social context, in our case the therapeutic situation, can be manipulated to affect learning (Perret Clermont ^{et al.} ~~et al.~~ (1981) and Beveridge & Griffiths (¹⁹⁸³ ~~op. cit.~~)) and that activities such as play (Cazden, 1983) and conversation (Heber, 1981) which we will suggest as remediation activities are valuable in influencing the development of knowledge. A more detailed discussion of the application of this type of learning theory in remediation can be found in Dean & Howell (1986) and Howell & Dean (1987).

1 Reservations in Applying Cognitive Theory to Remediation

Before suggesting ways in which cognitive theory might be applied we should also consider what reservations there might be

in translating this theory into remediation.

The acquisition theory we are advocating has been devised solely to account for normal development. To date there does not appear to have been any published discussion about whether phonologically disordered children go through the same process of learning. Stoel-Gammon & Dunn (¹⁹⁸⁵~~op. cit.~~) make the point that

although there have been many descriptive studies of disordered phonology, very little is known about the process of development in these children, and to what extent their development resembles or differs from the normal pattern. ^(see also Gibbon and Grunwell This volume)

Clinical evidence suggests that some phonologically disordered children do in fact spontaneously devise their own solutions to phonological problems, and these will be discussed in due course.

We are also proposing the utilisation of a model of acquisition for remediation of children who have failed, for whatever reason, to satisfactorily acquire the phonology of their native language during the normal process of development. It can be argued that what these children need is not a second attempt to benefit from the normal interactive process being replicated in the clinical situation but ~~that they require~~ to be provided with a different strategy to facilitate learning. However within the therapeutic situation experiences can be intensified, structured and specifically directed, ^{Thus} ~~and~~ they may possibly provide learning opportunities that were missed in earlier development. Bloom & Lahey (1978) have similar comments to make in relation to intervention procedures for language

disorder in general.

It can also be argued that what is essentially a developmental process that takes place spontaneously cannot be translated into a learning process which involves specific manipulation of the child and the environment. A considerable amount of research does exist however, for example see Robinson (1981) and Robinson & Robinson (1983), which demonstrates that intervention using the types of activities we will suggest can bring about change. Even if intervention of the kind we propose is not able to directly change the child's behaviour we are at the very least providing with information which can be utilised when the child is developmentally ready to change, ~~behaviour~~. We have not the space to discuss theories of how the child might move from one stage of development to another, ~~or~~ to consider the specific cognitive activity that might be involved in the process of development and learning. But, in very general terms within this model, developmental change is believed to occur through resolution of the cognitive conflict that is brought about when the child ^{then} ~~the~~ acquires new information that conflicts with ^{their} ~~his or her~~ existing knowledge. There is consequent restructuring of the child's understanding of the world to accommodate the new information. For a discussion of the developmental process in Piagetian and Neo-Piagetian theory the reader is referred to Beveridge & Griffiths ¹⁹⁸⁵ ~~(op. cit.)~~ Donaldson (1978) and Miller (1983). Ideally explicit consideration of the process of developmental change should be incorporated into the remedial model we are proposing, in

particular the effect of cognitive conflict on the development of reflective ability.

Research into what constitutes effective intervention procedures will provide some resolution of the reservations we have considered. Results from our own research into remediation of phonological disorder, which utilises many of the activities we will suggest, indicates that it is an effective method of bringing about phonological change. Research is also being carried out to determine what characteristics of children and their disorder appear to affect the effectiveness of this type of remediation. (Hill, ^{et al} ~~Howell and Waters~~, ^{in preparation} 1988). This will provide some indication of the extent to which cognitive theory can be utilised in remediation, but much more research of this kind is required.

Fundamentally we would like to suggest that the adoption of cognitive theories of development for intervention purposes means that instead of directly influencing the child's production by the therapist monitoring the child's realisation of specific phonemes, change will be brought about by providing the child with information about the phoneme system of language and opportunities to utilise that information. It is possible to argue that in this way progressive change will be brought about indirectly through influencing the child's internal representations. In the next section of the chapter we will describe these methods in detail.

1/ Therapeutic Application

In Chapter ²~~two~~ of this volume a model of speech production was presented which brings together and clarifies the interrelationship between phonological processing and phonetic production. This model accounts for such behaviours as gradual revision and lexical avoidance which have been addressed by phonological theorists. These explanations reinforce the therapeutic principles we will propose in this section of the chapter.

Chapter ²~~Two~~ states that specification of the level of breakdown is the main implication of this model for speech pathology. Such specification will help the therapist to clarify therapeutic aims. For instance^a/phonological disorder essentially requires the therapist to initiate internal revision of motor programmes whilst a phonetic disorder (as exhibited by a dysarthric patient) requires assistance to maximise limited motor execution ability. We suggest that the model can go further than this however and provide an insight into how intervention processes might be operating to bring about change.

What this model can't do, in common with descriptive analyses of the child's speech as argued earlier, is to determine the most effective way of triggering and maintaining therapeutic change. We believe that cognitive theories of acquisition provide a more satisfactory route towards bringing about this change. In the rest of this section of the chapter we will describe how this theory can be put into practice and, where appropriate, cite instances where information from

knowledge of phonetic development can be incorporated into the theory. At the same time we will attempt to match our practical examples against the appropriate parts of the Hewlett model.

Cognitive theories of phonological acquisition can be used both to determine the type of activities and the environmental climate most appropriate for remediation. Such theory also provides opportunities for interpreting the nature of the child's speech output in terms, for instance of hypothesis testing and overgeneralisation, respectively situations where the child is observed to be actively trying out new phonological patterns to see if they work or not and where a newly learnt phoneme is applied in inappropriate contexts. We can cite as an example of overgeneralisation the child who having acquired a contrast between [ki] and [ti], previously both realised as [ti], then proceeded once again to collapse the contrast, this time to [ki]. Interpreting the child's behaviour according to cognitive acquisition theory has consequent implications for monitoring and utilising this type of response for maximum therapeutic effectiveness.

Fundamental to the translation of this theory of acquisition to the clinical situation is consideration both of how the child learns and the possible factors within the normal developmental environment which foster this learning. These factors must then be formalised and exploited in the clinical setting to create an effective learning environment for the ^{ren with speech disorders.} ~~disordered~~ child. We will first consider some general principles to be followed in the intervention process, the

therapeutic framework and activities and the implications for the therapist's role suggested by the application of cognitive theory. The extent to which these possibilities have been applied in existing remediation programmes for phonological disorder will be discussed later in the chapter.

7 General Principles of Intervention

Certain basic principles emerge from the adoption of this theoretical model of acquisition in remediation.

These can be stated as follows;

1. The therapeutic emphasis should be on learning rather than teaching. This implies that a clinical situation should be provided which facilitates equal participation and a shared process of discovery by child and therapist.
2. The child should be encouraged to be an active rather than a passive participant in the therapeutic setting. Research has found that this may not be the case. Children have been described as passive by Letts (1985) and Ripich & Panagos (1985) report that they conceive their role as passive in the therapeutic situation. Active participation can be encouraged both by the provision of motivating and interesting activities and by careful monitoring of the therapist's input into the remedial situation.

3. Opportunities should be provided for the child to develop ^{their} ~~his~~ knowledge of the phonological system and to apply this ^{their} knowledge to further ~~his~~ phonological development.
4. It is fundamental to this model of acquisition that ~~the~~ ^{rem} child ^{their} solves ~~his or her~~ own production problems. To do this effectively ^{they} ~~she~~ must be encouraged to develop self-monitoring skills.
5. Finally, because effective communication is the essential purpose of phonological development, this must be a basic goal of intervention and the remediation process should therefore focus on communicative situations.

Some examples of how these principles might be combined in providing therapeutic activities and how they might affect the therapist's role in remediation are presented below.

✓ Therapeutic Activities

If we wish to emulate the normal developmental process which starts with trial and error learning and experimentation a therapeutic situation should be provided which encourages such experimentation and gives the child the opportunity to try out sounds and experiment with their combinatorial possibilities, ¹⁹⁸⁰ Ferguson & Macken (~~op. cit.~~ p. 150) for instance suggest that we should encourage children with disordered phonology 'to explore the phonological constraints of the phonological system being acquired'. Playing with language in the way that we referred to earlier in the chapter might accelerate phonological development. This type of free exploration activity is rather

different from the very specific targeting of problem phonemes which is usually suggested in phonological remediation.

Because ^{ren are} ~~the child~~ ^{is} believed to be essentially a problem solver and a constructor of rules it is also important that ~~he~~ ^{they} ~~or she~~ should be given opportunities within the therapeutic situation to work with classes of phonemes and provided with activities and materials which ^{furnish} ~~provide him or her with~~ information about the common properties of groups of sounds rather than be expected to practice single phonemes. In providing the child with information about the common properties of ~~classes of phonemes~~ we aim to assist the development of the child's knowledge of phonological contrasts. Within this framework the therapist can choose to work with those phonemes or structures which do not occur or are not used appropriately by the child, ^{i.e.} ~~that is~~ to help the child to build up knowledge of what is missing in the child's own system. Alternatively, the therapist can assist the child to build up a more general knowledge of phonology.

In situations where the child appears to be having difficulty with the articulatory gestures of certain phonemes he or she may require specific help, a point we made earlier in relation to phonetic development. We would suggest however that this should be focused on providing additional information about the phoneme in question, possibly through a variety of modalities, in preference to the child being asked to make repeated production attempts. We have usually found that the information we provide about the shared and contrastive features

of phonemes is sufficient to enable the child to resolve such problems. This type of activity is in line with Hewlett's processing model. Providing the child with information about the contrasting features of neutralised phonemes or additional new information about specific phonemes can be said to assist motor programming.

In developing knowledge about the phonological system of the child's language we are concerned with developing metalinguistic awareness. Therapists can utilise or develop this awareness in the clinical situation both by encouraging the general play and experimentation mentioned earlier and by more specific activities designed to highlight common properties of phonemes or contrast different classes of phonemes. These therapeutic activities can involve the child in carrying out activities which are related to the properties of the phonemes being acquired, ^{e.g.} ~~For example~~ running long or short obstacle courses in response to fricative (long) or stop (short) sounds or posting letters in front or back doors in response to alveolar (front) and velar (back) sounds. Additional examples can be found in Dean & Howell (1986). We also identify the phonemes with labels which are meaningful and motivating for the children as therapists ^{have always done, e.g.} ~~For example~~ initial consonants are ^(because they 'drive off' a syllable) often termed "engine sounds", whilst glides /l/ and /r/ have been called "Mr Happy" (who sings la la la) and "Mr Grumpy" (who growls a lot). The activities we use require the ability to discriminate between different phonemes, a frequent part of phonological remediation. They do however go beyond

discrimination practice in that they use classes rather than pairs of phonemes and they require the child not only to discriminate but also to classify and categorise sounds according to their common properties.

Metalinguistic awareness can also be developed by using rhyming and sound-matching games, Stackhouse (1985) suggests a variety of activities of this kind. Awareness of phonemes can also be developed by associating them with stable visual referents; colour coding (Kellett et al. 1984) or orthographic cues (Grunwell 1983) provide two possibilities.

The fourth principle of intervention derived from cognitive theory is concerned with the child's self-monitoring ability. During remediation we have observed many instances of self-monitoring and spontaneous repair. For example, Michael aged 4 years and 2 months was attempting to distinguish a contrast between /w/ and /l/ in therapy and when naming pictures was heard to spontaneously produce [wɛtə bɒks] ^(letter box) then corrected ~~(letter box)~~ himself to [lɛtə bɒks] and then to say [wɒʃɪŋ waɪn] then [lɒʃɪŋ laɪn] and finally [wɒʃɪŋ laɪn] for washing line.

Placed against Hewlett's model it can be argued that the therapeutic aim of encouraging self-monitoring is to discourage habitual selection from the output lexicon and encourage the child to re-route his processing through the motor programmer to enable ^{them} ~~him~~ to reconstruct an alternative, appropriate, motor plan.

We will look at specific repair strategies and the type of

verbal input which might encourage repair⁵ later in the chapter but here we will consider possible ways of generally developing self-monitoring. This can perhaps be optimally encouraged in situations which require the child to be a successful communicator. Tasks in which a listener has to understand and carry out instructions from a speaker can provide this type of situation. The use of minimal-pair words where understanding hinges on one phoneme or articulatory feature provides a common and effective medium for forcing change in such tasks. The ability to change production in response to perceived communicative need was also referred to during the discussion of phonetic development.

Opportunities for developing different aspects of learning are provided if these activities involve the child and therapist alternating between the roles of speaker and listener. This type of role reversal is also relevant to the basic principle of active and equal participation by the child in the therapeutic process. The following is an example, from John aged 4 years and 2 months. It demonstrates both the therapeutic use of minimal-pairs to bring about change and the active role he was playing in the therapeutic situation. Learning to distinguish voice and voiceless velar stops he said "Go and stick the goat - no not that one - the coat" as the listener (the therapist) made a move towards the goat. Two months later he was still being instructive but this time he was talking to himself. He was working on a different problem, making stop/fricative contrasts. When asked for a short sound by the therapist he

said "[s], no not that one, no, that's a long sound".

During this type of activity, which is influential in encouraging self-monitoring, the therapist is required to exercise skills in deciding what constitutes acceptable communication and tailor responses to the child accordingly. We will consider this interaction in the next section of the chapter.

7 Therapeutic Interaction

Within a general framework of sharing information and encouraging the child to reach his own solutions to the problem of achieving adult speech patterns, certain intervention strategies are indicated. As we have already seen, certain types of activity and ways of carrying out these activities involve the sharing of information.

Conversation with the child about speech sounds and comment by the therapist about the phonological output of both him/herself and the child, where appropriate, can provide another opportunity to share information. Our experience shows that phonologically disordered children often initiate conversations and comment about speech sounds in the therapeutic situation, concrete evidence that they are actively reflecting about the phonological structure of their language. Jenny aged 4 years and 7 months working on establishing a contrast between /r/ and /l/ observed one day that her cat (Lady) started with a "happy sound". Liam aged 5 years and 3 months working on the same contrast said "When I say that word (pointing to a picture

of a rake) it sounds like lake".

The provision of opportunities for the child to experiment with the production of sounds or structures is as we have seen an important part of remediation. In practical terms this implies refraining from correcting the child and allowing him or her to make mistakes. Indeed the cognitive theory of phonological development suggests that external correction is unlikely to be effective. Hypothesis testing, including overgeneralisation and regression which occurs in normal development may also occur and indeed should be encouraged in the remedial situation. Because the therapist is working towards an adult target he or she possibly sees such occurrences as unproductive and his or her instinctive impulse therefore may be to correct such occurrences. A model for intervention based on cognitive acquisition theory suggests an alternative approach in that it should be more profitable for the therapist to accept such overgeneralisations as part of the child's developmental progression. His or her therapeutic skills can be used to assist the child in this development by determining for instance how much to encourage or redirect overgeneralisation. Therapeutic skills of this kind can also be used when the child has acquired or appears to be acquiring a new phoneme or a new process. In this situation the therapist must be alert in providing further examples and further information for ~~him or her~~ ^{the child} to utilise. The therapist's judgement and provision of information in these situations will be assisted both by his or her general phonological knowledge and by specific knowledge of

the child's phonological system derived from detailed analysis.

The utilisation of the therapist's knowledge of phonetic development in terms of "easy" and "difficult" sounds and contexts will help determine what phonemes or classes of phonemes should be targeted first, and the phonetic contexts which should be provided to help the child practice newly acquired patterns.

Hypothesis testing, including overgeneralisation and regression by the normally developing child, is an indication/ that the child does not realise an adult target suddenly, but reaches it gradually through a series of experimental stages. Ingram (1976) suggests that intervention should emulate normal development by taking the child through successive phonological stages which get progressively nearer the adult target. Given the individuality of children's experimental progression towards adult forms it is difficult to see how specific targets could be pre-planned, but by giving the children therapeutic space to learn and by exercising therapeutic skill in supplying them with information in the ways we have suggested earlier a therapeutic environment can be provided to encourage such gradual learning.

Lawrence, aged 4 years and 10 months, provides an interesting example of this behaviour. Initial consonant deletion (I.C.D.) and backing in word final positions were two predominant processes operating in his speech. We worked with him first of all on eliminating I.C.D. Lawrence successfully started to produce and generalise stops word initially, but the example we

used, alveolar voiceless stop /t/ was initially realised consistently by him as [k]. It was not until we provided him with information about the alveolar/velar /t/-/k/ distinction word finally that he achieved the appropriate adult target. The stages in progression towards the adult target /ti/ (tea) can be summarised as follows. [i] → [ki] → [ti].

In relation to Hewlett's model we could be said to be enabling the child to refine a new motor plan which will lead eventually to rule change and change in the output lexicon making it available for automatic quick route access.

One aspect of therapeutic discourse which has received special consideration in the implementation of speech change is the concept of repair. Repair sequences can be identified in dialogue where some part of the message is misunderstood knowingly or unknowingly, by the listener. The forward progression of the dialogue is temporarily arrested while a 'side sequence' (Jefferson (1972)) is implemented, which serves to 'repair' the misunderstanding. Requests for clarification and repetition are frequently made, and these often result in re-formulations of the original problematic utterance. (see e.g. Gallagher (1977) for a discussion of typical repair sequences). The importance of this aspect of therapeutic dialogue is obvious, ~~It~~ it is one of the few devices occurring in normal conversation which tends to focus on the form of an utterance and the way in which form affects meaning. Since this is the essence of the communication problem for the phonologically disordered child repair sequences form a key part of our therapeutic approach.

Children with phonological disorders have been shown to be somewhat sensitive to demands from listeners that they clarify their utterance, and on occasion ^{do} alter their phonological realisations within repair sequences. (McCartney 198¹ - see also McTear (1985)). From a theoretical point of view, the use of repair sequences conforms to our fifth principle of intervention, by focusing on the need for phonological change in the interests of successful communication.

The ways in which therapists use this powerful technique are varied. It is certainly used extensively in therapy settings (McCartney 1988), and often combined with information, explicit and implicit about the properties of phonemes. No systematic research has been undertaken, to our knowledge, to sift out which aspects of therapeutic dialogue are specifically and differentially effective in implementing phonological development, and so suggestions here can once again only come from theoretical principles, and from the study of current ^{therapeutic} theoretical practice.

A therapist's request for clarification brings a phonologically disordered child^{ren} up against the need to re-formulate ^{their} ~~his or her~~ utterances. Re-formulations are often creative and are not always in the direction of more accurate production. However, by encouraging a child^{ren} to explore alternative phonological realisations, and to vary habitual selection from the output lexicon, we are once again asking that they alter phonological realisations in the interests of communicative success. 'Repair' of an inadequate message is a

very real phenomenon is this context.

Repair sequences have a number of forms, and the form used by the therapist constrains the reply made by the child. Thus a therapist clarification request in the form of a 'neutral' question ('Pardon?' 'Sorry?' 'What did you say?') gives the child no information about the location of the problem in the utterance, and allows the child a wide variety of responses such as repeating or re-formulating ^{their} ~~his or her~~ utterance. A request by a therapist for a particular constituent of an utterance to be repeated ('You want a what?' 'What jumped over the moon?') specifies the particular part of the child's utterance which provided the focus of the difficulty. It also requires the child to repeat the problem constituent, offering a chance for revision ~~on~~ of the utterance. However, it throws the child very much back on his or her own resources - it gives no information about what a 'better' production would be like. In this way it is different from a simple request for confirmation where a therapist repeats all or part of a child's utterance with a 'question' intonation. (You went to the seaside? A cup of tea?) This form requires only a simple yes/no response from the child (although a more elaborate response such as a repetition, is often forthcoming) but it does allow the child to hear a model of the correct adult form of the utterance. It is therefore particularly useful in providing the child with a 'good example' of the appropriate form.

Repair sequences as discussed, indicate some communication

failure. However, similar sequences of utterances are also used to indicate incredulity, or surprise ('A handbag?'). The difference is mainly in the intonation used (Stokes 1977). Some therapists exploit this form, repeating the child's 'error' utterance with a question intonation, apparently as a means of drawing the child's attention to the difference between the child's form and the 'adult' version.

They may follow the repetition with a version of the correct, target version, and the therapist's 'correct' version frequently exaggerates the aspect of the lexical item which the child mispronounces, for example by lengthening a phrase, increasing intensity, stressing a syllable etc. Sometimes explicit information about the item or about a phoneme is given, using a code or meta-language previously worked out with the child which gives further information about the differences between her or his production and the required version; ^{for example} (C 'Play in the part'. T. 'Part'? C. 'No, park' T. 'That's right. Good girl. Look. There's another one with that. Look. (McCartney, unpublished data)).

Such sequences can not of course occur on occasions when the therapist really is in communication difficulties, and cannot decode the child's utterance. The discussion of ^{these} under the heading of 'repair' is justified to some extent by the fact that the child is being asked to change: from the point of view of the child there are considerable similarities. The sequences discussed under the 'repair' heading occur much more frequently in 'speech-teaching' sessions than in normal conversation,

et al
(Schegloff, ~~E.A.~~, ~~Jefferson, G.~~ and ~~Sacks, N.~~ 1977).

Therapists in all these exchanges are in all probability setting up cognitive conflict within the child - the child's productions selected from the output lexicon do not match the adult model. Therapists do not actually correct the child's production, as an externally controlled event, but allow opportunity for the child to re-construct a phonological production in order to improve communication.

/ Patterns of Intervention

Phonological learning is a gradual process not only in relation to the way a child reaches a specific adult target but also in the sense that the child will require time to assimilate newly-acquired pronunciation patterns and generalise them to new lexical items and new situations. This should also be recognised in therapeutic expectations and allowed for in therapeutic planning. In practice it may mean working on more than one process at a time or leaving one class of phonemes and returning to it later to see if generalisation or development has taken place. Gradual learning is taken account of in the therapeutic suggestions of Hodson & Paden (1983) and Ingram (1986^a).
/ .

The notion of the child as a gradual learner may have implications for general management strategies. If learning takes place gradually as we have suggested the child will require time to assimilate new information. We should therefore be thinking about factors such as frequency of therapeutic

sessions to allow new information to be assimilated and generalised by the child.

Because we have been discussing theories of phonological development rather than articulatory proficiency in this section of the chapter it is appropriate that this discussion about therapeutic application should be concerned primarily with phonological rather than other problems of disordered speech development. However, because the cognitive theory of phonological development can be accommodated within a broader context of learning we would suggest that the basic principles we have outlined in this section of the chapter can be applied to disorders which are not purely phonological. For other disorders a combination of strategies may be most effective. For example where a combination of phonetic and phonological difficulties co-exists and/or where a specific discrimination or articulatory deficiency has been determined, remediation should include specific activities directed towards improving such deficiencies. Stackhouse (1984) makes some specific therapeutic suggestions and suggests how remediation of phonetic and phonological difficulties might be combined (see also Section Two, this volume).

To summarise the therapeutic application we have discussed we will consider our therapeutic principles against the four conditions which Hewlett (^{p. 32}~~op. cit.~~) suggests need to be met in the revision of phonetic production, the process which remediation should bring about. We believe that our therapeutic model is clearly able to satisfy these conditions.

The first condition, awareness of insufficiency of current

production is met by the emphasis which we place on the development of self-monitoring ability, (our fourth general principle of intervention). This principle is supported and reinforced by the emphasis we place on the therapist's essential role in providing the child with feedback about his or her communicative competence, and the use of repair sequences.

The second condition, a desire to change, is not addressed so directly by our model. We would suggest however that this must in large part result from an awareness of current insufficiency and the need to be understood. If feedback is provided when communication fails this, we would argue, should bring about a desire to change. The provision of motivating activities to promote active learning will lead to successful change, consequently maintaining the desire to change.

The third condition, knowledge of relevant crucial articulatory targets is consonant with our third principle of intervention, the provision of opportunities to develop phonological knowledge. The therapeutic tasks we suggest are mainly directed at fulfilling this principle, although we prefer to stress the phonological rather than the phonetic aspects of development as this, arguably, relates more directly to improving communicative competence, the fundamental consideration of speech therapy.

The fourth condition, sufficient dexterity of the vocal apparatus to implement at speed and in a variety of phonetic contexts, relates to the phonetic skill aspect of development and production. We have already argued that this

skill-development cannot be directly influenced to any great extent using the technique we describe. But we have incorporated into our model opportunities to encourage emerging skills, and acknowledge the need for special techniques to maximise motor execution ability where required.

/ Other Therapeutic Approaches

The question arises as to how our approach, as outlined above, differs from other approaches to therapy. The framework used by Newman, et al. ¹⁹⁸⁵ (~~op-cit~~) will be used to discuss this further, and to compare our principles of intervention with those cited by other authors.

Newman et al. review the last 40 or so years of therapists' work with unintelligible speech, and as stated identify 'traditional' approaches, behavioural approaches, communication-centred approaches and linguistic approaches, leaving aside discussion of conditions with organic origins. These approaches are not mutually exclusive and therapeutic programmes and methodologies have been developed using ~~combinations~~ ^{combinations} of principles from different theoretical orientations. Nevertheless these remain the major theoretical perspectives, and will be discussed in turn.

/ 'Traditional' Approaches.

Despite the implications of the word 'traditional' and its long history in the speech therapy profession. (Van Riper

(1939) Van Riper & Irwin (1958) 'traditional' approaches to speech change are still being published and disseminated, with the occasional nod towards other approaches and with some internal development (Van Riper & Emerick (1984). The child is given a period of 'ear' training' preceding or concomitant with 'production' training', where the child is encouraged to realise (usually) one phoneme, and this is followed by a lengthy period where the child is taught to produce the speech sound accurately in increasingly complicated contexts, eventually transferring the production to untutored contexts and to spontaneously generated conversational speech. The procedure is then repeated with another phoneme, although sometimes 'new' phonemes are added before the carry-over stage is complete.

This approach clearly differs from our own in a number of details - the concentration on individual sounds, the careful targeting of contexts and the overt correction of deviation. However, when we consider the general principles of intervention which we have described the differences are even greater. Traditional approaches stress therapists' teaching rather than child learning, and the construction of appropriately simplified production contexts rather than exploration and active processing. The child's phonological knowledge is not focused upon, nor is communication integral to the approach. Self-monitoring is encouraged, however, using ear-training. How different actual therapeutic practice and therapeutic discourse might be under these two theoretical perspectives will be discussed later.

Behavioural Approaches

Behavioural approaches to intelligibility problems, as discussed for example by Mowrer & Case (1982), state even more clearly what the child is expected to do and to produce. Ideas such as increasing phonological knowledge or developing phonological awareness are seen as extraneous to the therapeutic situation, partly because they cannot readily be ^{nt}qualified (but see Elliot, ~~1981~~, 1981,) and cannot be observed, and partly because it is not seen to be relevant to introduce such ideas in order to change speech therapy behaviour. Decisions about a child's speech productions (what the child will do under what conditions, and to what criterion of accuracy) rest firmly with the therapist and on occasion pass beyond the clinician to the therapy programme, which can be used by a variety of children and clinicians (Mowrer, 1985). ~~The~~ ^{few are} child certainly not seen as ~~a~~ problem-solver, nor as ~~someone who can be~~ ^{their} actively involved in ~~his or her~~ own phonological development, to the extent that some behaviourally orientated therapists do not inform the child of the changes that are expected. It would be hard to reconcile any of our general principles of intervention with a purely behavioural approach.

Linguistic Approaches

Linguistic and communication centred approaches to speech difficulties appear to be closer to our linguistically and cognitively principled approach. Many details such as the

analysis procedures and the variety of phonemes used over short time periods (cf. ^{compare see} Hodson & Paden's ^{op. cit.} (1983) discussion of 'cycles'), the concentration on contrasts (Fokes, 1982), communication and repair (Weiner, 1981, & 1984) [are familiar] and the use of minimally paired words in therapy. However many published therapeutic approaches with a linguistic orientation appear to move directly from descriptions of phonological analysis techniques to a variety of situations and exercises with a rather 'traditional' flavour, and add ~~some~~ rather ad hoc discussion of how some therapeutic discourse features might aid phonological organisation. It is in attempting to bridge the gap between descriptive linguistic analysis of deviant speech and therapeutic intervention, ^{The differences lie in the introduction} ~~by introducing~~ of a cognitive processing element which considers how change might be effected and ^{the suggestion as to} ~~by suggesting~~ how therapeutic practice might be directed by considerations of processing, [that we believe our approach differs from the approaches outlined above.] We are encouraged to note that other therapists are also beginning to adopt complementary approaches. ^(Blodgett & Miller 1985) ~~(refer to Miller 1985 etc.)~~

Nonetheless it is necessary to return to the point made at the start of the chapter. However divergent the theories discussed, all can and do claim some empirical success in changing deviant speech in children. We can make no experimentally validated claims for our approach (but see Hill ¹⁹⁸⁸ ~~op. cit.~~) and cannot know whether it is differentially successful with speech disordered children. Even to address this question in the light of present knowledge would beg what

is perhaps the more interesting point - how can procedures motivated by such different theoretical constructs all apparently show sufficient success to motivate their proponents, ourselves included, to share them with others in the profession?

Any reply can only be speculative, but in reviewing the literature on therapeutic intervention in deviant phonologies two factors become clear. One is how little we are told about actual therapeutic dialogues, and the other is that published dialogues appear to have a remarkable amount of commonality. Snippets of dialogue between therapists and speech disordered children have been published since Van Riper's seminal text ¹⁹³⁹~~(1939)~~, although early accounts are often in the form of reported speech examples taken from the writer's store of background information, and only recently have transcribed recordings of actual therapy sessions been available. Taking all these examples at face value, the dialogues that take place between therapist and child have a remarkable amount of similarity. Therapists set up tasks that focus upon the phonological properties of words. They model words, and emphasise parts of words and phonemes differentially, often the phoneme (s) that have been targeted for change. They give children additional meta-linguistic information about the properties of phonemes ('A long sound.' 'A snakey sound'. 'A rabbit sound'). They point out to the child how successful his or her attempt has been, and try by a variety of means to encourage change. [We have listed a number of devices which we

feel to be useful from our theoretical orientation, and suggested that others are contra-indicated. Examples of all these devices can be found in published accounts of therapy dialogue, from a variety of theoretical viewpoints and indeed can be coded with in therapy dialogues carried out by a variety of therapists with a variety of clinical backgrounds (McCartney ¹⁹⁸⁹ ~~op. cit.~~ 1988). We may do less overt correction and provide a little more chance for the child to explore a phonological system, but the difference in practice as opposed to theory may be a difference of emphasis and style rather than a radically new approach to speech therapy. This may be because there are a limited number of conversational devices which impinge upon speech production, and in this sense speech therapists have very few (and relatively crude) techniques open to them. It may well be that therapists say the same sort of things, whatever their theoretical background might be.

From this perspective, it ^{could seem} ~~would be possible to argue~~ that therapeutic practices and dialogues which happen to have hit on procedures of which we approve have been successful, ^{It would therefore be} ~~possible to argue~~ that the reason therapies from all theoretical frameworks have been somewhat successful is that they all contain elements of these procedures at a discourse level, and indeed that the closer they have come to 'our' techniques the more successful they have been. This would of course be quite unjustified ^{as} we have absolutely no evidence that this is the case. The point is that it would be possible to investigate the hypothesis, If theories predict that certain types of therapeutic intervention should be

successful it is possible to set up these intervention procedures, and investigate actual therapeutic dialogue and children's phonological change. Relationships and patterns shown could indicate pointers towards effectiveness, and help substantiate theoretical claims ^{and thus influence} ~~to direct~~ therapeutic practice.

This may prove to be the next important step in the 'linguistic revolution' which has hit speech pathology. Having provided taxonomies to code, classify and interpret the 'messy' speech data produced by our unintelligible children, linguistics could now provide ways of coding therapeutic dialogue so that both the child and therapist's contribution to the process of speech change can be described, debated, and perhaps manipulated, to provide more precise and focused techniques for effecting speech change.

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