My response to Fey's article (1985; reprinted 1992, this issue) focuses on the confusion caused by the application of simplistic phonological definitions and models to the assessment and treatment of children with speech delays. In addition to having no explanatory adequacy, such definitions/models lead either to assessment and treatment procedures that are similarly focused or to procedures that have no clear logical ties to the models with which they supposedly are linked. Narrowly focused models and definitions also usually include no mention of speech production processes. Bemoaning this state of affairs, I attempt to show why it is important for clinicians to embrace broad-based models of phonological disorders that have some explanatory value. Such models are consistent with assessment procedures that are comprehensive in nature and treatment procedures that focus on linguistic, as well as motoric, aspects of speech.

KEY WORDS: phonological, disorders, assessment, intervention

It is now 15 years since Ingram's (1976) seminal work on phonological disorders in children. Five years ago, when Marc Fey (1985; reprinted 1992, this issue) wrote the article that leads this clinical forum, he noted that the notion of phonology and its role in speech pathology was a source not just of debate, but of confusion as well. I agree with Fey when he says that the application of the concepts of phonology to the assessment and treatment of children with speech delays has produced more confusion than clinical assistance. He suggests that part of this confusion is due to the expectation that clinical techniques based on phonological concepts should differ radically from old techniques that filled our textbooks on articulation disorders. In Fey's article, he discusses how phonological concepts impact on assessment and intervention; he also points out some of the problems with phonological assessment procedures. The problems that Fey noted 5 years ago, as well as other problems that will be discussed in this article, have not gone away.

The organization of this article parallels Fey's: terminological issues are discussed first, followed by sections on assessment and treatment. In the final section of the article, I review some recent attempts to relate phonological rule systems to speech production and conclude with a list of guidelines to address the terminological, assessment, and treatment issues raised. Although the overall tone of the article might seem negative to some, the negativity reflects my frustration with what I perceive to be a widespread acceptance of simplistic and narrowly focused definitions/models of phonological development and disorders. In addition to having no explanatory value, such definitions/models lead either to assessment and treatment procedures that are similarly focused or to procedures that have no clear logical ties to the models with which they supposedly are linked.

TERMINOLOGY

Until the last 10 years or so, the term articulation and its derivatives were found in research articles, textbooks, and course titles throughout the country. Many students in the 1970s took courses called Articulation, and Articulation Disorders, using books such as Winitz's (1969) Articulatory Acquisition and Behavior. The transition years were marked by the diagnostic dichotomy of phonological and articulation disorders, courses called Articulation and Phonological Disorders, and books like Bernthal and Bankson's (1981) Articulation Disorders, in which the chapter on phonological development was surrounded by chapters on normal aspects of articulation, articulatory assessment, and articulatory intervention. The current state of affairs finds the term phonological predominating, although vestiges of articulation still exist. The second edition of Bernthal and Bankson's book is entitled Articulation and Phonological Disorders (1988). Of the eight chapters in the book, only the first chapter on normal aspects of articulation contains the term articulation. Many books focus solely on phonological development and disorders, such as Hodson and Paden's (1991) Targeting Intelligible Speech: A Phonological Approach.
to Remediation and Stoel-Gammon and Dunn’s (1985) Normal and Disordered Phonology in Children.

Like many in the field, I personally was caught in the transition from articulation to phonology. In the fall of 1974, I took one of my two formal graduate courses in articulation with Bob Milisen; the text was Travis’s (1971) Handbook of Speech Pathology and Audiology. Five years later, I was teaching a course called Articulation and Phonological Disorders at Case Western Reserve University. Phonological notions, such as those described in Ingram’s (1976) seminal work on phonological disorders, were perfectly suited to my background and training in language and cognition, psycholinguistics, and child language disorders. In Ingram’s little green paperback book, he showed how phonological notions provided a much richer framework for describing normal and disordered speech development. Particularly attractive to child language specialists like myself was the way in which Ingram linked phonological development to the child’s developing cognitive and linguistic systems. No arm twisting was necessary to convince me to jump on the phonological bandwagon with its mentalistic, constructivist notions and to join in the swelling chorus denouncing the simplistic discrimination speech production notions that characterized articulation disorders and speech treatment for so long.

One would expect to have confusion in terminology when a field is undergoing a major paradigm change. The proliferation of courses and textbooks on articulation and phonology led to many discussions about ways to differentiate articulation from phonological disorders. Shriberg and Kwiatkowski (1982a, p. 228) attempted to resolve the issue by proposing a diagnostic classification system in which the term phonological is used “as a cover term to encompass the entire speech production process, from underlying representations to phonological rules to the behaviors that produce the surface forms of speech.” In this system, a child may have a problem that is limited to the articulation process, but still be considered to have a phonological disorder. Many researchers embraced Shriberg and Kwiatkowski’s “cover term” suggestion; some have extended the scope of the term to include the entire speech perception process as well.

Shriberg and Kwiatkowski (1982a) pointed out two problems with their cover term suggestion: (a) the lack of consensus about the definition of the term phonological, and (b) its morphological inflexibility (i.e., one can misarticulate a speech sound, but not “misphonological” it). During the past 10 years, several more serious problems have become apparent with the term phonological. The most serious one is that, despite the term’s general acceptance among many professionals in speech-language pathology (particularly those in university settings), it continues to be unfamiliar to most teachers, special educators, parents, administrators, and other individuals who are not speech-language pathologists. One reason for this is that many clinicians continue to use the terms speech or articulation in professional as well as nonprofessional communications. This is especially true in school settings, where eligibility guidelines continue to refer to speech or articulation disorders. A second reason is that most of the clinicians who use the term phonological do so only with other speech-language pathologists and not with parents and other educators. I was surprised to find at a recent Child Phonology Meeting that some of the staunchest phonologists rarely used the term phonological disorder with parents. This admission led to some lively discussion between those who advocated using the term in all settings and those who favored restricted use. Interestingly, Shriberg and Kwiatkowski (1982a), who are known to favor broad use of the term, prefer the term delayed speech “for convenience” instead of delayed phonological development.

The disagreement among child phonologists about the use of the term phonological is to me an unequivocal indication that the term never will receive widespread acceptance. The lack of popular acceptance or knowledge of a professional term is not unique to our profession. In a recent book on phonology, Kaye (1989, p. 2) noted that a standard joke among linguists is that the first question one gets after revealing one’s avocation is, “Oh, so you’re a linguist. How many languages do you speak?” How many people outside of academia know what a cognitive psychologist, social psychologist, or psychometrist is? How many people know why some speech therapists refer to themselves as speech-language pathologists?

One might argue, however, that technical terms often are added to the popular vernacular. Twenty years ago, not many people knew what an audiologist was and were unfamiliar with diseases such as Alzheimer’s, ALS, AIDS, and Tourette’s syndrome. But, unlike the term phonological, the terms that became part of the vernacular did not replace previously existing terms. Speech-language pathologists and non-speech-language pathologists have communicated quite well with one another using familiar terms such as speech problem or phrases like “the child has difficulty producing sounds.” The use of the term phonological by a non-speech-language pathologist would have to be followed by an explanation using familiar terms and phrases. That is, a parent could not tell a friend or a relative that his or her child has a phonological disorder without explaining that this means that the child has a speech problem. One would not expect the parent to rattle off Shriberg and Kwiatkowski’s “cover term” definition of phonological, which provides a justification for our use of the term. Moreover, there is no conceptual notion in the simple definition of phonology that makes the term semantically different from the familiar term speech that it is supposed to replace. In short, there appears to be no compelling reason why non-speech-language pathologists should use phonological terms instead of speech terms.

Is there a way to resolve the terminological muddle? Probably not. It is unlikely that professionals in speech-language pathology will revert to using nonphonological terms. The phonological terms have served us well, despite the lack of consensus surrounding notions such as phonological disorder. It is likewise unlikely that phonological terms ever will have widespread use among educators, teachers, parents, and other non-speech-language
pathologists. This state of affairs does not have to be problematic, as long as the professionals using the terms understand what makes an assessment or treatment procedure phonological in nature. Unfortunately, as I will point out in the next section, this is often not the case.

**ASSESSMENT**

I do not have much to add to Fey's comments on assessment. Some of his points deserve to be highlighted, however. Fey lists five questions that "will almost certainly" be addressed in the assessment of an individual's phonology. The questions provide information about the child's phonetic repertoire, syllable shapes, phonological contrasts, the level at which the problems are occurring (e.g., perceptual, organizational, articulatory), and phonological rule system. The information obtained from Fey's five questions is consistent with the information obtained from comprehensive phonological assessment procedures described by several authors, such as Ingram (1981), Grunwell (1985), and Stoel-Gammon and Dunn (1985). Phonological notions clearly have had a tremendous impact on assessment procedures in speech-language pathology. The advantages of a comprehensive phonological assessment over traditional articulation assessment procedures are apparent to anyone who has performed such an assessment.

Nevertheless, despite the general agreement about the kinds of information that should be obtained in a comprehensive phonological assessment and the advantages of performing such an assessment, I don't think many practitioners actually perform them. For most clinicians, a phonological assessment involves some kind of phonological process analysis. One problem with phonological process analyses, as Fey points out, is that some processes, such as velar fronting and liquid simplification, affect only two or three sounds. The use of phonologically-based terms such as these thus provides little advantage over the traditional (segmental) place-voice-manner analyses. For example, based on phonetic principles alone, clinicians know that training of /k/ is likely to improve production of /g/. One even can question the advantage of processes that involve larger number of sounds, such as stopping and cluster reduction, because the sounds affected by these processes rarely are acquired at the same time. For example, studies on fricative acquisition in word-initial position (e.g., Ingram, Christensen, Veach, & Webster, 1980) have shown that /f/ is acquired first, followed by /θ/ and /s/ were next, with /z/ and /θ/ being the most difficult.

A more general problem with many typical phonological process analyses involves the common assumption that the results of the assessment provide a valid and reliable measure of intelligibility or communicative adequacy (Butcher, 1990). Although common sense tells us that final consonant deletion has a greater impact on intelligibility than gliding, no one has systematically examined the effect specific speech deviations have on intelligibility. Butcher feels that phonological assessments do not accurately reflect intelligibility because misarticulations that cross only phonetic boundaries (e.g., [s] for [g]) are not viewed as a serious impediment to communication. Other aspects of speech that affect intelligibility, such as the assessment of vowel production, suprasegmental features, general language abilities, and consistency of the misarticulations, are also not included in many phonological assessment procedures. Consistency of the misarticulations, for example, has an important effect on intelligibility. Children with highly variable phonological systems are generally more unintelligible than children who make consistent speech errors.

Perhaps the most serious problem with phonological process analyses is that "... calling a pattern a phonological rule or process is only a descriptive exercise. The existence of the pattern does not necessarily explain anything; the pattern itself is in need of explanation" (Fey, p. 230 [citing Locke, 1983]; Shriberg & Kwiatkowski, 1983; Weismer, 1984). Many clinicians, however, use the information obtained from phonological process analyses to diagnose children as suffering from a "phonological disorder." The symptoms of the disorder are the occurrence of various phonological processes. As Butcher (1990) has noted, "This seems rather like diagnosing measles as a skin disorder and 'explaining' the patient's condition as being the result of a process called spotting" (p. 272). Saying that a child is stopping his/her fricatives or fronting his/her velars does no more to explain these speech behaviors than saying that spotting explains measles.

Descriptive assessments, of course, are not unique to evaluating speech disorders. Explaining language disorders, for example, has proven to be just as difficult as explaining speech disorders. Oftentimes, the benefits of explaining the factors that influence a particular speech or language disorder are not apparent. With some justification, many clinicians believe it is not necessary to explain the cause of a particular speech-sound error in order to get the child to produce the sound correctly. So, why is explanation important? An interest in explaining the causes of speech disorders is to me the best safeguard against being swayed by simplistic, narrowly focused models of phonological disorders. The desire to explain various speech behaviors makes one more likely to embrace broad-based, multidimensional models and to use assessment procedures that will provide information about a child's phonetic repertoire, syllable shapes, phonological contrasts, phonological rule system, and the level at which the problems are occurring.

**TREATMENT**

I argued earlier that there is no compelling reason for non-speech-language pathologists to use phonological terms instead of speech/articulation terms. There is, however, one scenario that might lead to the use of phonological terms by non-speech-language pathologists. The scenario is when the non-speech-language pathologist has reason to believe that there is something different or
unique about a phonological problem or phonological approach to treatment. For example, several years ago a parent informed me that the clinician working with her child was going to use “a new phonological approach to therapy that she had just learned about.” The clinician, a former student of mine, was actually not using a treatment approach that might be considered phonological in nature (e.g., minimal contrast treatment); all that she appeared to be doing was using phonological process terminology to describe the child’s speech problems. Some of my students, like many others (myself included), had jumped on the phonological bandwagon sweeping the nation without stopping to question what it was about their treatment that made it phonological in nature.

The question of what makes a treatment approach “phonological” in nature is not a trivial one. A popular response to this question is that a treatment approach is phonologically-based if it targets phonological processes. That is, an approach is phonological because “stopping” is being eliminated rather than a t/s substitution. In this view, the specific procedures used to treat the problem have no bearing on the phonological nature of the approach. Fey (this issue) notes that the actual procedures used to achieve phonological-based goals are essentially the same as the procedures used to achieve nonphonological goals. The reason for the similarity in procedures, as Hoffman points out (this issue), is that speech-language pathologists who sought to use phonological insights for structuring treatment found themselves relying on previously developed treatment strategies and psychological models of learning.

Fey (this issue) suggests that there are three basic principles that underlie phonologically-based approaches to treatment: (a) a focus on the modification of a group of sounds affected by the same process, (b) emphasis on previously neutralized phonological contrasts, and (c) greater emphasis on the use of speech sounds for communicative purposes. Fey found only one treatment procedure that met all three criteria: the minimal contrast approach. Although theorists and practitioners probably would agree with Fey that the minimal contrast approach is a phonological one, they probably would have some alternative views on the specific principles that underlie a phonological approach. It is unclear, for example, what the relationship is between phonological and communicative notions.

One can get around the question of whether or not a treatment approach is phonological in nature by embracing or proposing a model that incorporates phonological notions. Treatment that adheres to the basic tenets of a phonologically-based model must, by definition, be phonological in nature. That is, if the conceptual framework for treatment is consistent with the proposed model/definition of phonology, the phonological nature of the treatment cannot be debated without questioning the model itself. Consider, for example, Shriberg and Kwiatkowski’s (1982a,b) diagnostic classification system for phonological disorders. The system is based on a model of phonological development/disorders. The management approach advocated by Shriberg and Kwiatkowski (1982b) is phonological in nature because it is based on their phonologically-oriented classification system. If one wished to contend that the treatment approach was not phonologically based, one must take issue with the phonological tenets/nature of the proposed model of phonological disorders. For example, one could argue that the model is too narrow because it fails to include other aspects of language or communication and does not include speech perception. The model does, however, include speech production components (Shriberg & Kwiatkowski, 1982a, p. 234), so treatment that targets articulatory aspects of speech is consistent with the model.

Grunwell (1985) has provided another excellent example of consistency between theory and practice. Her phonological treatment principles derive from the basic assumption that pronunciation patterns are rule-governed and predictable (p. 98). Based on this assumption, Grunwell has proposed six principles of phonological treatment, including the following three: (a) treatment is based on a phonological assessment; (b) it aims to change the child’s phonological patterns; and (c) it must be communicative. Although Grunwell recognizes the phonetic/articulatory dimensions of children’s problems (e.g., p. 95), she argues that “treatment procedures should concentrate exclusively upon the meaningful use of speech” and that “non-linguistic speech sound drills are not part of the repertoire of phonological treatment procedures” (p. 97). Grunwell’s commitment to her phonological principles is obviously strong enough for her to prohibit the use of traditional speech treatment techniques.

The recognition that speech problems often occur together with language problems has led some theorists and practitioners to embrace multidimensional models that attempt to treat phonology as one of several language components involved in communication. Representative of such a model is Hoffman’s (this issue) multi-level communication-based model, that contains a hierarchy of interacting processing levels (e.g., meaning, propositions, concepts, syllables, phonemes, and gestures). Not surprisingly, Hoffman advocates a communication-oriented treatment approach for children with phonological disorders.

The approaches advocated by Shriberg and Kwiatkowski, Grunwell, and Hoffman are consistent with their theoretical approaches to phonological disorders. It is far more common, however, for there to be inconsistencies between one’s definition/model of phonology and the framework for treating phonological disorders. This is hardly surprising, given that the procedures used to achieve phonological and nonphonological goals are essentially the same. For example, Elbert, Powell, and Swartzlander (1991) readily acknowledge and defend the use of behavioral techniques to remediate phonological disorders. The use of behavioral treatment techniques, however, is clearly at odds with the generative phonological model that underlies the comprehensive assessment procedures used by these authors (e.g., Dinnsen, 1984; Gierut, Elbert, & Dinnsen, 1987).
Another example of inconsistency between a definition of phonology and a framework for treating phonological disorders is Hodson and Paden’s (1991) well-known phonological approach. According to Hodson and Paden, this approach takes advantage of the systematic nature of speech deviations by focusing on more basic components (i.e., phonological processes) of the child’s system, rather than on individual sound segments. It is difficult, however, to develop an assessment and treatment approach based solely on the notion that speech deviations are systematic in nature. Whereas Hodson and Paden’s assessment procedures primarily are limited to identifying children’s systematic phonological patterns (deviations), their treatment approach is based on seven underlying principles that reflect a much broader view of the factors that influence phonological development. The principles not only include general cognitive/learning notions, such as “children are actively involved in their phonological acquisition” and “phonological acquisition is a gradual process” (p. 76), but they also emphasize the importance of kinesthetic feedback and phonetic environment. It generally is acknowledged that Hodson and Paden’s approach is effective for children with severe phonological disorders. I believe that the approach is effective because it is based on a broad-based view of phonological disorders, rather than on the narrow view that underlies their assessment procedures.

A broad-based view/model of phonological disorders represents in some form the factors/processes that might cause disruptions in the system and the levels at which breakdowns may occur. At least three general levels seem to exist: perceptual, cognitive-linguistic (organizational), and speech production. A comprehensive treatment approach would include objectives and procedures designed to address difficulties at each of these levels. For example, an organizational problem, such as using s/f and t/s, might be addressed by having the child sort pictures according to the initial consonant sound. Contrasting word pairs (see Fey, this issue) and using activities that heighten children’s awareness of the syllables and sounds in words (Catts, 1991) also may prove effective in eliminating organizational problems. To facilitate accurate speech production of particular sounds, clinicians can refer to a number of sources that review a wide range of speech treatment techniques (e.g., Bernthal & Bankson, 1988; Creaghead, Newman, & Secord, 1989; Hoffman, Schuckers, & Daniloff, 1989; Weiss, Gordon, & Lillywhite, 1987).

SPEECH PRODUCTION PROCESSES VS. PHONOLOGICAL RULE SYSTEMS

It should be clear by now that there are several problems with applying simplistic and narrowly focused definitions and models of phonology to the assessment and treatment of children with speech delays. In addition to lacking explanatory adequacy, such definitions/models lead either to assessment and treatment procedures that are similarly focused or to procedures that have no clear logical ties to the models with which they are supposedly linked. Narrowly focused models and definitions also usually include no mention of speech production processes (e.g., speech motor control, planning, execution, articulation, etc.). Indeed, the study of speech production processes represents only a small part of the research on speech disorders, although broad-based models of phonological disorders usually include speech production components. This lack of research focus is reflected in phonological assessment procedures that emphasize the description of phonological patterns, but rarely include systematic measures of speech production proficiency. Many speech-language pathologists are either unaware of the advances that have occurred during the last 10 to 15 years in the identification and measurement of speech production processes or unable to make use of advanced technology because of lack of training or budgetary limitations.

On the positive side, in recent years a number of clinical phonologists and speech scientists (e.g., Bortolini & Leonard, 1991; Folkins & Bleile, 1990; Grunwell, 1985; Kent, 1982; Smith, 1981; Weismer, 1984) have begun to study how phonological rule systems interact with speech production processes in young children. In the remainder of this article, I discuss several attempts to relate these two integral components of the phonological system and conclude by offering some guidelines for dealing with the terminology, assessment, and treatment issues raised throughout the article.

A Phonetic Classification System: Grunwell’s Approach

Despite Grunwell’s rigid protocol for phonological treatment, her assessment protocol includes a strong emphasis on speech production aspects. In addition to discussing a traditional phonetic analysis based on segmental analysis of speech, she suggests that speech patterns might be analyzed using a phonetic classification based on the patterns of articulatory movement used in speech production (pp. 72–76). The system she advocates is derived from the physiological principles suggested by Hardcastle (1976, cited in Grunwell, 1985). The system includes articulatory parameters based on place of articulation (e.g., lips, tip of tongue, blade of tongue, etc.). Using this system, Grunwell outlines a dynamic classification of initial and final consonant clusters. For example, /spl/, /sm/, and /sw/ are classified as two organ sequential clusters because they involve movement sequences requiring two autonomous speech organs: tip of the tongue and lips. According to Grunwell (p. 76), the analysis provides a framework for grading the difficulty of producing various sounds and possibly for developing a hierarchy of articulatory complexity.

Considerable clinical benefits might derive from a classification system that captures the dynamic aspects of
speech production. Such a system may help to explain different acquisition patterns that occur for various sound segments and aid clinicians in identifying techniques to facilitate correct speech production. Although it may be difficult to derive these benefits from the specific system Grunwell has proposed, identifying the potential advantages of such a system is a crucial first step in eventually developing or finding the system that best represents the dynamic aspects of speech production.

Different Taxonomies: Folkins and Bleile’s Integrative Perspective

Folkins, a speech scientist, and Bleile, a clinical phonologist, offer an interesting perspective on why it has proven so difficult to relate phonological rule systems to speech production processes (Folkins & Bleile, 1990). One of the major themes of the article is that it is dangerous to build performance phonologies by borrowing units derived from a competence phonology. Phonological patterns such as fronting, stopping, and cluster reduction are competence (representational) units that may have no correlates in speech production. Unfortunately, as Folkins and Bleile discuss, investigators have had little success in identifying correspondences between serially ordered phonological units and speech motor processes. There also has been little success in identifying clearly definable phonetic units at one or more levels of the speech production system. Folkins and Bleile (p. 605) proceed to discuss the advantages of what they call an integrated motor approach. The basic tenet of the approach is that speech motor strategies are organized to produce the speech message as a larger, holistic behavior. A speaker integrates the necessary aspects of speech motor processing without regard to the phonological rules used to generate the message.

Folkins and Bleile (1990) argue that fundamental differences exist in the classification systems employed in phonetic transcription, theories of phonological competence/performance, and speech motor control. These differences make it difficult to relate (in a meaningful manner) the units identified by each system. These differences, however, "provide the keys to further understanding and thus more effective remediation of disorder processes" (p. 608). The message here is that we never can hope to understand phonological disorders or develop more effective remediation procedures if we continue to base our clinical decisions on only one classification system (i.e., phonological processes/rules). No matter how accurate the system is in reflecting phonological competence and performance, it does not reflect speech production processes.

Toward the end of the article, Folkins and Bleile (1990) offer their solution to the terminological problem. They suggest that the term phonomotor disability be used instead of phonological or articulation disability because the term phonomotor makes explicit that both language construction and motor systems are involved in speech disorders. They feel that the cover term usage of phonological disorders might make it difficult to distinguish between disorders of message construction and motor control.

An Empirical Approach: Cross-Linguistic Studies of Speech Errors

Although all clinical phonologists recognize that phonological development and disorders are influenced by a variety of factors (e.g., perceptual, cognitive-linguistic, and speech motor abilities), few investigators have attempted to determine the relative influence of different factors on the types of speech errors children make. A promising avenue of research considers the nature of speech errors made by non-English speaking children. In a recent study, Bortolini and Leonard (1991) examined the influence of the phonetic characteristics of phonemes being acquired and the phonological details of the ambient language on the types of errors made by Italian-speaking phonologically disordered and normally-developing Italian children (age 4:9 to 7:1). They found that children in both groups produced errors that reflected a sensitivity to the phonetic characteristics of Italian phonemes as well as to the types of sounds in Italian that might serve as plausible substitutes. The findings from this study suggest that it is possible to identify the specific factors that influence children’s speech deviations.

Instrumental Feedback Systems

In recent years, several clinically-oriented researchers have shown that speech production instrumentation and computer systems can be used to facilitate accurate speech production by providing various kinds of feedback to the speakers. In a recent review, Kewley-Port, Watson, Elbert, Maki, and Reed (1991) noted that most speech training aids have based feedback on one or two acoustic parameters of speech or on the output of sensors that measure the position or motion of the articulators. The acoustic or articulatory information is transformed into visual displays. Kewley-Port et al. described a computer-based system that provides a multidimensional evaluation of speech, simultaneously considering acoustic as well as physiological aspects of speech. The feedback provided is evaluative and reflects the quality of whole words. The system has been used with hearing-impaired and phonologically-disordered children.

Other promising instrumental feedback systems include the IBM SpeechViewer, which provides several games for matching target speech productions (Minghetti et al., 1991), dynamic palatometry, which provides visual feedback of linguopalatal contact during consonant and vowel production (e.g., MorganBarry, 1989), and ultrasound, which provides visual feedback of tongue position and tongue shape (Ridley, Sonies, Hamlet, & Cohen,
1990). The high cost of these feedback systems prevent them from becoming common speech treatment aids. However, clinicians should be aware of the potential benefit of these systems for children who prove resistant to traditional treatment procedures. These systems often can be found in university-affiliated speech clinics and hospitals.

SUMMARY

By way of summary, I offer the following selected guidelines for dealing with the terminological, assessment, and treatment issues raised in this paper.

Terminology

1. Use the term phonological with colleagues and in professional correspondences whenever possible. Other terms (e.g., speech/articulation disorder) may have to be used if mandated by federal, state, or local service delivery guidelines.
2. Use familiar terms and descriptive phrases (e.g., “speech problem/delay,” “articulation problem/delay,” “has difficulty producing speech sounds”) when talking with parents, teachers, and other nonprofessionals. Some of these individuals may be interested in an explanation of our professional use of phonologically-based terms.
3. Do not use newly proposed terms such as phonomotor; no one will understand what you are talking about, including many professionals in the field.

Assessment

1. Perform a comprehensive phonological assessment on children with moderate-to-severe phonological disorders who exhibit “interesting” or unique phonological patterns.
2. Perform less comprehensive phonological assessments on children with mild-to-moderate phonological problems who exhibit common phonological patterns (e.g., fronting, stopping, cluster reduction, etc.). A phonetic analysis and some form of substitution/phonological process analysis should suffice. Choose a system that contains a limited number of phonological processes/patterns and is easy to administer and score, such as the Goldman-Fristoe Test of Articulation (Goldman & Fristoe, 1966) or the Khan-Lewis Phonological Analysis (Khan & Lewis, 1986).
3. Make some attempt to identify the level at which each particular speech deviation is occurring: perceptual, cognitive-linguistic (organizational), and speech production (articulatory).
4. Assess children’s production of sounds in different phonetic contexts, regardless of the severity of the problem.
5. Assess intelligibility in conversational speech.
6. Evaluate other areas of development that are related to phonological development, such as cognitive, linguistic, and social abilities.

Treatment

1. Use treatment procedures/techniques that directly address the factor(s) contributing to the particular speech sound problem. For example, if the problem is conceptually motivated, classification tasks (sorting objects or picture cards according to initial sounds) would be appropriate. If the problem is motivated by speech production limitations, traditional articulation approaches should be used. These approaches might involve nonsense words in drill activities, as well as familiar words in communication-based activities (see Hoffman et al., 1989).
2. Make inquiries about the availability of feedback instrumentation for use with children who do not respond well to traditional treatment techniques.
3. Whenever possible, target sounds/patterns that have the most impact on intelligibility. Developmental and speech production limitations might preclude having an immediate impact on intelligibility.
4. Use real letters as well as other visual and tactile cues to talk about individual speech sounds. Children as young as 2 years begin to recognize letters (van Kleeck, 1990). Picture cards should include the written version of the object depicted.
5. Use activities that facilitate phonological awareness (Catts, 1991). Phonological awareness involves the knowledge that words consist of syllable and phonemic units. Some children with phonological disorders need to become aware of the individual sounds in words in order to develop adult-like phonological systems.

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