

# Carryover Techniques

In Articulation and Phonological Therapy



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Carryover Techniques in Articulation and Phonological Therapy  
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*“Happy would be the lot of the speech-language pathologist  
if he [or she] did not have to worry about carryover.”*

– Elizabeth Bosley, 1981



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## Preface

*Carryover* is the term commonly used to refer to a client's ability to take an individual speech skill he has learned in the therapy room and to apply it broadly in all speaking situations. Many clients accomplish this task quickly and easily, but some do not. As a result, most speech-language pathologists struggle with the issue of carryover with one client or another at some point throughout their career. Direct attention to carryover cannot be neglected with these clients. Charles Van Riper, who is widely considered to be the Father of Articulation Therapy, said that carryover is one of the most important steps in the treatment of articulatory disorders. Carryover signals the completion of the articulation therapy process.

This is a book of ideas to ponder and use. It is not a research report, although research is reported in here. It also is not a cookbook of therapy techniques, although many recipes for treatment are contained herein. This book is intended to help practicing speech-language pathologists think through issues related to carryover so that they can design effective activities for clients in their charge. The contents have been gathered from five sources: (1) Research, (2) Historic textbooks on articulation therapy, (3) Modern textbooks on articulation and phonological therapy, (3) The author's three decades of clinical experience, and (4) Games and activities contributed by over 200 professional speech-language pathologists who responded to a request sent out via the publisher's website.

This book contains ideas, techniques, perspectives, insights, methods, procedures, games, and activities that researchers and practicing speech-language pathologists have found useful in the carryover process. This is a book written by a clinician for clinicians. It is meant to be a helpful aid to speech-language pathologists working with clients who are struggling with carryover. The author also hopes that the research community will use the methods discussed here as a source of ideas for future research projects.

## Contributors

The following professional speech-language pathologists contributed ideas for this book. Hundreds of ideas were submitted and these were chosen because of their originality and pertinence to the topic. Pam Marshalla wishes to express her gratitude to these individuals for taking the time to gather and send their ideas. Contributors are listed with the page numbers on which their ideas appear.

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# Editorial Notes

It is understood that the term *speech-language pathologist* (SLP) is the title of the professional who is the subject of this book. This title will be used primarily. However, other titles are included in quoted material and elsewhere. The reader will discover terms such as *speech teacher*, *speech clinician*, *speech correctionist*, *speech therapist*, *clinician*, or *correctionist*. This has been done to add color to the text and to preserve the historical accuracy of quoted material.

## Gender Designations

It is understood that clinicians and clients are represented by both genders. However, in this text, therapists generally are designated by female pronouns (*she*, *her*, *hers*) and clients generally are represented by male pronouns (*he*, *him*, *his*). Changes to this standard were used as needed. This designation has been applied simply to make the text less verbally cumbersome.

## Traditional Articulation Therapy

We shall use the term *traditional articulation therapy* to refer to the process of articulation therapy outlined by Van Riper beginning with his publication of *Speech Correction: Principles and Methods* (1939).

## English Language

This book is written in English for an English-speaking audience, and it concerns the North American English language. Application of this material to other languages can be expected but not assumed.

## Alterations To Quoted Material

This text includes a variety of quoted material from other textbooks on articulation and phonology. The following editorial guidelines were employed:

- Minor alterations to punctuation were made to make older quotes more readable to today's audience. The original meaning of these statements was maintained.
- Grammatical errors used in quoted material were not corrected.
- Orthographic symbols were used instead of phonetic symbols in quoted material (see next).

## Orthographic Symbols

Standard orthographic symbols have been employed instead of the International Phonetic Alphabet preferred by professional speech-language pathologists. This has been done so that parents, teachers, and other interested parties can read this material. Certain differences between phonemes were obliterated as a result. Specifically, /θ/ and /ð/ were treated as the same sound and symbolized as Th. Also, R is treated as a consonant only. The following orthographic symbol system was employed throughout the text.

### Consonants

P – <i>pie</i>	M – <i>moo</i>	Th – <i>thumb, that</i>
B – <i>boy</i>	N – <i>no</i>	F – <i>fee</i>
T – <i>toy</i>	Ng – <i>sing</i>	V – <i>vase</i>
D – <i>dog</i>		S – <i>see</i>
K – <i>car, key</i>	W – <i>we</i>	Z – <i>zoo</i>
G – <i>go</i>	L – <i>low</i>	Sh – <i>shoe</i>
	Y – <i>yes</i>	Zh – <i>beige</i>
	R – <i>row</i>	Ch – <i>chew</i>
		J – <i>jam</i>
		H – <i>hat</i>

### Vowels

uh – *up*  
ee – *be*  
oo – *too*  
ah – *hot*  
oh – *boat*

# Chapter 1

## What Is Carryover?

*“Carryover might be said ... to be the ‘eating’ which is proof of the therapeutic ‘pudding.’”*

– Margaret Hall Powers, 1971

The word *carryover* is the term commonly used to refer to a client’s ability to take an individual speech skill learned in the therapy room and to apply it broadly to all speaking situations. Articulation therapy is not over until carryover has been established, and carryover is only established when a client’s new speech skill becomes customary in conversational speech. Some clients transfer their newly learned speech skills to conversation almost immediately and without effort. These are easy clients for whom we have to make almost no effort toward teaching carryover. But professional speech-language pathologists also treat clients who do not make this transfer well. These more difficult clients often need to be lead by the hand through all levels of therapy. They need to be carried through the carryover process, so to speak. They also need to be monitored regularly to make sure they are successful.

Carryover of articulation or phonological skills into real life speaking situations can be compared to acting. Reciting lines in a rehearsal hall is not all that actors must do. Eventually an actor must get on stage, or in front of a camera, to perform in front of others. Likewise, clients cannot just learn to articulate new phonemes correctly in the privacy of a therapy room. Eventually they must use their new skills with others out in the rest of their world. This is what we mean by carryover. This book discusses many aspects of carryover in articulation and phonological therapy. It is designed to help practicing speech-language pathologist think through the process in order to make clinical decisions about carryover activities for particular clients.

### A Persistent Concern

Carryover has been a concern of speech-language pathologists since the inception of the profession, and it continues to be a stumbling block to the completion of a speech program for

some clients even today. Consider the following statements about the importance of carryover made over the past 60 years:

- 1947: “[Carryover is] one of the most important steps in the treatment of ... articulatory ... disorders” (Van Riper, 1947, p. 202).
- 1965: “No child is able to watch his speech constantly and always incorporate the right sound into words. This process takes time” (Eisenson and Ogilvie, 1965, p. 247).
- 1971: “It seems necessary in most cases to give specific and serious attention to promoting this carryover in order to ensure that it will take place” (Powers, 1971, p. 899).
- 1987: “Unquestionably the greatest challenge facing clinicians of articulatory and phonological disorders today is the achievement of carryover” (Weiss, Gordon, and Lillywhite, 1987, p. 270).
- 1990: “Carryover is a key to a child’s success in speech and language therapy” (Hazel, 1990, p. 185).
- 1998: “The ultimate goal of phonological intervention is the correct production of speech targets in spontaneous speech” (Ertmer and Ertmer, 1998, p. 67).
- 2004: “Generalization [as an aspect of carryover] is a critical and all-important step in the learning process for all children who receive treatment for phonologic disorders” (Bernthal and Bankson, 2004, p. 275).

### Who’s To Blame?

It is easy to blame the client when carryover is incomplete. Lack of carryover can make a client appear forgetful, immature, stubborn, spacey, unintelligent, or uncooperative. Complaints are made that these clients could complete their articulation programs if they simply tried harder. But trying harder is not necessarily the solution. Students who have difficulty with carryover simply are demonstrating that they need careful guidance in this area, a fact that makes this aspect of therapy no different than any other. Carryover simply is part of therapy. Some clients need very little guidance in carryover and others need to be led by the hand.

### Changes In Time

Carryover approaches change as therapy programs progress over time. At first, carryover is controlled, disciplined, carefully measured, regulated, and kept in check. Over time carryover becomes automatic and it is done without conscious thought, without the need to make a decision, and without intention. The final stages of carryover involve spontaneous speech, or speech that arises from natural impulses rather than from planning or suggestion. Completing the carryover process requires that new speech skills are used habitually, regularly, repetitively, and unconsciously. Ultimately carryover will become unrestrained and uninhibited. This is the standard view of carryover summarized neatly by two of our earliest writers: “Develop the patient’s tentative and uncertain production of the new sound into a firmly rooted speech habit, [and] transform it from a consciously performed into an automatic act” (Borden and Busse, 1925, p. 187).

### Generalization

The terms *carryover* and *generalization* often are used interchangeably. “[Generalization] is

the principle that learning one behavior in a particular environment often carries over to other similar behaviors, environments, or untrained contexts” (Bernthal and Bankson, 2004, p. 275). This means that the client takes his new articulation or phonological skill and uses it in other linguistic, phonetic, phonological, semantic, syntactic, pragmatic, and situational contents. Generalization is the essence of carryover, and generalization is the thing that easy clients do automatically. Consider the acquisition of any phoneme. At first the phoneme is learned alone or in a syllable. To generalize means to begin to use the phoneme:

- IN ALL TYPES OF WORDS: Nouns, main verbs, secondary verbs, adjectives, adverbs, conjunctions, articles, negatives, and sound expressions (e.g., *wow!*).
- IN ALL WORD POSITIONS: Initial, medial, final, and blends.
- IN WORDS OF ANY LENGTH: Words of one syllable, two syllables, three syllables, and so forth.
- AS BOTH A PHONEME AND A MORPHEME WHERE APPLICABLE: For example, S is also used as a plural morpheme (*cats*); a possessive morpheme (*cat's paw*); a third person regular tense verb marker (*The cat walks.*); the auxiliary form of to be (*The cat's purring.*); and the copula form of to be (*The cat's big.*).
- IN WORDS USED IN ALL MANNER OF SPOKEN LITERATURE: Songs, stories, poems, paragraphs, rhymes, raps, and so forth.
- IN WORDS SPOKEN FOR A VARIETY OF PRAGMATIC PURPOSES: Stating, requesting, asking, answering, accepting, denying, demanding, pleading, refusing, informing, instructing, questioning, and so forth.
- WHEN SPEAKING WORDS TO ALL COMMUNICATION PARTNERS: Parents, siblings, teachers, peers, and so forth.
- WHEN SPEAKING IN ALL LOCATIONS AND SITUATIONS: At home, school, on the playground, in the car, on the bus, at the grocery store, and so forth.

### Overgeneralization: A Clumsy Beginning to Carryover

The process of articulation and phonological therapy often results in *overgeneralization*, or the process of taking generalization too far. A client overgeneralizes when he uses a target speech skill more often and for more purposes than necessary. For example, it is common for young children to overgeneralize stridency. A child who has been saying *Christmas tree* as “Kee-Muh-Tee” may change it to “Shee-Shuh-Shee” once he gains stridency and begins to overgeneralize it.

Most writers in the area of phonology seem to consider overgeneralization a problem that needs remediation. But I consider overgeneralization to be a beneficial skill because it signals a clumsy beginning to the generalization or carryover process. In fact, I actually like and encourage overgeneralization in my therapy because I consider it a stage of development. Overgeneralization reveals that a client is experimenting broadly with the phoneme, feature, or process that has been acquired. Overgeneralization is like a new toy that a child has been given and simply cannot put down. Most children are driven to play with a new toy exclusively for a very concentrated period as they figure out just how many ways there are to use it. They *over-play* with a new toy. After a while, however, they soften this exclusive interest and integrate the new toy into the existing set of old toys.

My clinical experiences have taught me that the over-use of a new speech skill may dominate for a while but, like a new toy, this excessive preoccupation with the new speech skill usually fades with time. Occasionally a client does not outgrow his over-use of his new skill and he must be taught how to stop doing it, although I suspect that this is a rare phenomenon. In more than three decades of therapy where I served literally thousands of clients, I found it necessary to help only a few clients stop overgeneralizing. Most clients seem to stop overgeneralizing when given more time to develop a discriminative use of their new skill.

### Transfer

Carryover also can involve *transfer* of skill from one phoneme to another, a process that can occur automatically or can be taught. For example, if a client can close his lips to say B, we can use B to teach him how to say other phonemes that require lip closure, namely P and M. Essentially we are transferring the lip closing feature from one phoneme to another. This transfer process also has been called *across-sound generalization* and *across-feature generalization*. In general, the easy client usually makes these transfers automatically while the difficult client may not.

### Maintenance

Another aspect of carryover is *maintenance* defined as “the continued use of the target sound in all speaking situations over time” (Weiss, Gordon, and Lillywhite, 1987, p. 277). We are speaking of the time in treatment when the client is expected to maintain his skill level while he is gradually faded away from weekly therapy. The client’s treatment sessions might be reduced from once per week to once per month, to once per three months, to once per six months, and so forth. The purpose of these continuing sessions is to make sure that the client is maintaining top performance without weekly instruction.

Maintenance sessions do not have to be formal treatment lessons. In the modern public school setting, maintenance often is checked simply by seeking out the client and speaking with him informally for a few minutes. This can take place in the hall, in the cafeteria, on the playground, in an assembly, or in any other convenient meeting place in the school. In the private clinic, maintenance sessions can take place in the office, or they can take place via phone, or on-line video phoning, so that travel time can be eliminated. Easy clients maintain their skills and usually can terminate therapy quickly and easily. Difficult clients may need a long period of monitored maintenance.

### Changing Habits

To establish a new speech habit means to break an old one. Breaking an old habit and gaining a new one can be difficult. Have you ever tried to break a habit like smoking, overeating, or twirling your hair? Have you ever tried to gain a new habit like walking every day, paying bills on time, or reading instead of watching television every evening? Changing habits is difficult to do. Humans like to be comfortable, and changing habits makes us uncomfortable for a while. In addition, sometimes we simply forget that we were supposed to be changing habits. For example, have you ever realized in April that you forgot about a New Year’s resolution made in January? Breaking an old habit, and acquiring a new one, takes awareness, memory, willingness, determination, persistence, and conscious control. The speech-language patholo-

gist's job is to figure out how to stimulate these qualities in clients who display poor carryover. The SLP often plays the role of teacher, counselor, coach, and friend to clients struggling in this process. The ability to take control of a changing habit often differentiates an easy client from a difficult one. Easy clients change habits quickly and easily while difficult clients do not. Van Riper perhaps said it best: "New habits must be taught and old ones broken. People differ in their modifiability" (Van Riper, 1949, p. 29).

### Carryover Is Not...

We should say a few words about what carryover is not. Carryover is not extra work tagged on to the end of an articulation or phonological program. Carryover is not something clients should have to figure out on their own. Carryover is not constant drill, although a certain amount of drill can assist in the carryover process. Carryover does not mean to persistently remind a client to speak correctly, and it does not mean to correct a client every time he makes an error. Again, Van Riper: "No one can watch himself all the time, and we all hate to be nagged" (Van Riper, 1949, p. 204).

Perhaps most importantly today, we must state clearly that carryover is not reading out loud. Reading aloud can be employed as a method of carryover as we shall discuss later. But reading out loud is not the final product of carryover. Even our earliest clinicians understood that reading out loud and speaking spontaneously were two completely different processes: "Reading aloud is an essentially different process from repeating words or from spontaneous speech" (Blanton and Blanton, 1919, p. 192).

How are reading aloud and spontaneous speaking different? Reading is slower and more methodical than spontaneous speech. In reading, one is focused on the task of reading the words already written out, while speaking involves newly generated ideas that come directly from the heart and mind. Carryover involves speaking correctly under all spontaneous speaking conditions, while reading is not spontaneous and it only represents one type of speaking. Some clients are perfectly able to use correct articulation while reading out loud, yet cannot maintain correct speech in spontaneous conversation. For these reasons reading can be used as a carryover technique, but it cannot be considered the final product. Most therapists seem to consider reading as a bridge from single words to conversation. The stimulation of carryover probably will involve reading for those clients who can read, but carryover itself involves much more than that.

### Ranking Carryover Methods

In 1980, Polson published the results of a research project in which 125 practicing public school speech-language pathologists were asked to rank the order of effectiveness of twelve carryover methods. The order in which therapists found these carryover methods to be effective were ranked as follows, from those they found most effective to those they considered least effective:

1. Self-monitoring (most effective)
2. Practice or drill until performance is automatic
3. Emphasis on a structured behavior modification system
4. Practice with people outside of therapy



5. Working outside the clinic with the therapist
6. Auditory discrimination training
7. Homework assignments
8. Reminders to be used in the outside world
9. Creative drama
10. Integration of the articulation work into the language arts program
11. Client-designed homework assignments
12. Practice under various emotional conditions (least effective)

It is interesting to note that these practicing speech-language pathologists thought that the three most important things to assure carryover were to help the client learn to pay attention to his own speech, to make him practice or drill, and to use a consistent reward and punishment system as the client rehearses his new speech skill. It is also interesting to note that these therapists considered the integration of articulation work into the language arts program — what we would call the *literacy* model today — to be one of the three least effective methods of carryover for articulation.

### No Perfect Technique

Most speech-language pathologists today probably would agree that there is no single correct or best carryover technique. Certainly there are none that have been proven to work in all cases. Carryover techniques are designed for the individual client and are selected with a variety of perspectives in mind:

- The client's chronological age, cognitive status, language level, hearing ability, and motor coordination need consideration.
- The personality, learning style, and interests of the client and the therapist also shape the carryover process.
- The schedule of therapy, size of the group, materials at hand, and employment setting play important roles in the selection of carryover activities.
- Carryover procedures are adjusted according to whether or not parents, caregivers, teachers, siblings, peers, or others participate in the process.
- Carryover techniques are chosen when they prove beneficial to the client at hand. This is the most important factor of them all.

### Lack of Carryover

Carryover can fail for many reasons, each reason as individual as the client who is failing. Often there is a combination of reasons for failure. I am reminded of an e-mail sent to me by a practicing speech-language pathologist whose elementary-age client failed to carryover his newly learned R phoneme. The SLP wrote that he had done quite well in therapy, and that she had gotten him to the point at which he could read word lists with correct R when given cues from the therapist. The client was dismissed from therapy at that point. Re-testing one year later revealed that the client's R was still incorrect. Most experienced therapists would agree that this client's lack of carryover could be due to any one of several important factors. For example:



1. The ability to read word lists correctly does not indicate that the client has control over his new production at any other level. The client will need to work on the more advanced levels of production — phrases, sentences, paragraphs, and conversation.
2. The ability to read words from a list does not suggest that the client has made a routine of his new speech skill. Activities must be employed to make his target habitual.
3. A client's ability to produce correct phonemes in words does not mean he understands why this work is important to his life. The ability to produce a phoneme in a new correct way needs to be important to the client or he may lose it shortly after therapy is terminated.
4. A client's ability to say his target correctly does not mean that he is monitoring himself. Clients must be taught to self-monitor in order to take them through the carryover process.
5. A client's ability to perform well with one person in a therapy room does not mean he is willing and able to perform well with other people in other situations.
6. A client who is relying on cues must be taught not to rely on them. Cues usually have to be faded before a client can be dismissed from regular treatment.
7. A client's carryover program cannot be left to chance. More direct intervention is necessary in many cases.
8. Therapy follow-up must take place sooner than one year so that clients can be reinstated if they are failing.

\*

## Chapter 1 Summary

### What Is Carryover?

- Carryover is the term commonly used to refer to a client's ability to take an individual speech skill learned in the therapy room and to apply it broadly in all speaking situations.
- Carryover can be automatic for some children, but it can be a stumbling block for others.
- Carryover approaches change as therapy progresses over time.
- The terms carryover and generalization often are used interchangeably.
- Carryover can involve the transfer of skill from one phoneme to another.
- Overgeneralization is the process of taking generalization too far. Overgeneralization may be the first sign of carryover. It can serve as a clumsy beginning to the carryover process.
- Carryover also involves maintenance, or the ability to maintain skill level while gradually fading away from weekly therapy.
- Carryover involves habit breaking. Breaking an old habit and acquiring a new one takes awareness, memory, willingness, determination, persistence, and conscious control.
- Carryover is not extra work, constant drill, persistent reminding, relentless correction, or reading aloud.
- Techniques that practicing therapists have judged as being the most effective to the development of carryover skill include self-monitoring, practice, and emphasis on a structured behavior modification system.
- Techniques that practicing therapists judged as being the least effective to the development of carryover skill include integration of articulation work in the language arts program, homework activities of the client's own design, and practice under various emotional conditions.
- There does not seem to be any one correct or best carryover technique. Instead there are many from which to choose and match to individual clients.
- Monitoring carryover needs to be a process of observing conversational speech.
- Lack of carryover can be due to any one of several important factors.

# Chapter 2

## Research Studies on Generalization and Carryover

*“We always have sought to base our decisions and actions on the best possible evidence.”*

– David Sackett, Scott Richardson  
William Rosenberg, and Brian Haynes, 1997

This chapter summarizes research in regard to carryover. A few studies specifically on carryover have been undertaken in modern times. Studies on aspects of generalization are more prevalent than those on carryover itself, and they comprise the bulk of this chapter. Before we review the literature, however, let us say a few words about the *evidence-based practice*, the *practicality of therapy*, and *four practical approaches* to treatment utilized by our predecessors.

### The Evidence-Based Practice

The modern speech-language pathologist recognizes the challenge to place carryover techniques within the scope of the *evidence-based practice* (EBP). The American Speech-Language-Hearing Association (ASHA) has defined the goal of the EBP as follows:

*“The goal of EBP is the integration of clinical expertise, best current evidence, and client values to provide high-quality services reflecting the interests, values, needs, and choices of the individuals we serve”* (ASHA, 2010).

Following ASHA, speech-language pathologists create an evidence-based practice by integrating evidence from three sources: the lab, the clinic, and the client. As a result, some methods of carryover are adapted from the results of formal research (the lab), others come from the therapist’s prior clinical experiences (the clinic), and still others arise from working with the client himself (the client). Practicing speech-language pathologists integrate carryover ideas from these three sources to comply with the demands of the EBP in their clinical work. Follow-

ing ASHA's guideline, the ideas for this book have been gathered from both scientific research and the experiences of practicing therapists.

### The Practicality of Therapy

It is important to recognize the practical nature of the EBP. David Sackett and his colleagues, the physicians who first defined the EBP, said that laboratory evidence, or *external evidence*, by itself does not create an effective therapy program: "External clinical evidence can inform, but can never replace, individual clinical expertise" (Sackett et al, 1997, p. 3-4). Sackett and his colleagues were saying that the evidence that comes from laboratory research is not enough to carry out clinical practice. They were saying that the EBP integrates laboratory evidence together with the evidence one has gained from working directly with patients.

The speech-language pathologist's job is not to replicate research projects. In fact, speech-language pathologists modify and experiment with researched methods in order to discover the value a particular method may hold for a particular client. Therapists purposefully alter researched methods to suit the immediate needs of the client at hand. They also make up their own methods based upon basic scientific knowledge. The speech-language pathologist's work is to discover which methods of treatment prove beneficial to the particular client at hand, and we often select methods regardless of laboratory evidence. If a tried method results in positive changes for a particular client, then it is valuable because it reflects the client's interests, values, needs, choices, and skills. Effective methods are continued while ineffective ones are discontinued. Such is the practical and realistic nature of the evidence-based practice.

*"Making good clinical decisions is not easy. The existence of high-quality research can certainly help inform clinical decisions, but research is just one of several factors that influence clinical decisions. Additional factors are the two other components of EBP — client values and clinical expertise — as well as a clinician's theoretical perspective, service delivery considerations, the opinion of experts, and experimental validation with individual clients" (Kamhi, 2006, p. 277).*

### Four Classic Concepts

Throughout the history of therapeutic enterprises, theoreticians and therapists alike have discussed four concepts that seem to have gone out of favor recently in our zeal to provide evidence for everything done in therapy. These are the *working theory*, the process of *trial-and-error*, the use of *common sense*, and a teacher's *natural teaching ability*. These ideas used to be cornerstones of all educational and therapeutic discussions, and they were written about in virtually all textbooks on traditional articulation therapy. But they are disappearing from modern evidence-driven texts. We shall discuss each briefly because these ideas are still relevant in today's evidence-based practice.

#### *Working Theories*

A *working theory* is a hypothesis, a premise, a presumption, or a guess about a treatment approach that one can assume is true until it is proven otherwise. For example, most practicing therapists recognize that success in articulation therapy is more assured if clients periodically

watch themselves perform in a mirror. This idea has been discussed time and again in textbooks on articulation therapy. However, we have no direct proof of the effectiveness of mirrors because no one has bothered to study this simple idea in populations of children with articulation error. Using a mirror for speech training is a working theory that can continue to be used until formal research disproves it. Working theories form the basis of many carryover procedures used by practicing speech-language pathologists. We have included therapy ideas based on working theories all throughout this book. Working theories build one's clinical experiences in the evidence-based practice.

### *Trial-and-Error*

Old-time writers of articulation therapy virtually always discussed *trial-and-error* in therapy. Trial-and-error is a process that unfolds in three stages: (1) A therapist tries a method to see if it works with a particular client, (2) The therapist continues to use the method if it proves effective with that client, and (3) The therapist discontinues or changes the method if it proves ineffective with that client. This is what therapists do every single day. Thus, even if there are piles of evidence indicating that a certain method is effective with a group of research subjects, each SLP still has to determine if that method is effective for the individual client at hand. We use trial-and-error to do this. We also use trial-and-error to see if a method that proved effective the last time we worked with our client still helps him today. Methods that trial-and-error prove to be ineffective are altered, abandoned, or held in reserve for another time. Trial-and-error is the process that builds one's clinical expertise in an evidence-based practice. Trial-and-error is the process clinicians use to discover the needs, desires, values, and preferences of individual clients.

### *Common Sense*

The practicing speech-language pathologist often has nothing but *common sense* upon which to make therapeutic decisions. Common sense is the natural intelligence that develops through observation of everyday life experiences. Common sense must be employed when therapists discover that there is simply no evidence in regard to a particular topic, and when they have never seen a particular problem before. For example, common sense dictates that children will carryover new articulation skills better if they don't spend all their free time engaged in on-line social networking. Our common sense tells us this must be true, because if a client is on-line during all of his unstructured time, then he is affording himself no opportunities to practice his new speech skill with others. Common sense dictates that the client needs to walk away from the computer on occasion to interact with others. Do we have any proof that decreasing time on the computer enhances carryover? No. This simply is common sense at work. There are numerous processes of remediation that therapists just *know*, and many of these come from common sense. Common sense is not a trivial matter, and it should not be dismissed in our fervor for laboratory evidence. Common sense should rule at all times during the treatment process. Many ideas presented in this book arose from simple common sense. Common sense is fundamental to the development of the clinical expertise demanded of the evidence-based practice.

### *Natural Teaching Ability*

Traditional therapists often wrote about the need to use one's *natural teaching ability* to be an

effective clinician. The natural teaching ability is the talent, aptitude, flair, faculty, endowment, or gift one brings to the therapeutic process. Most speech-language pathologists have a natural teaching ability. In fact, it probably was that very ability that drove most of us into the field in the first place. Unfortunately, the idea of giftedness seems out of step with the new evidence-based thrust, but one's natural teaching ability cannot be ignored in the therapeutic setting. It is part of our clinical expertise. Our natural teaching ability allows us to face a difficult client, for whom we have no idea what to do, and to figure out what to do right on the spot. Our affinity for teaching allows us to observe carefully and to design useful teaching activities that no one has thought of before. We are teachers of speech correction. Those of us with the gift of teaching often can figure out what needs to be done to get ideas across to students quite easily, regardless of whether there is any research that has proven that the idea will work. Just like common sense, one's natural teaching ability is not a trivial matter. One's natural teaching ability must rule the day when there is very little evidence, and this is the case in regard to carryover.

*“The skilled practitioner is resourceful in adapting methods to needs ... there is no substitute for creative imagination in planning teaching activities of any kind” (Carrell, 1968, p. 92–102).*

## Research Findings

The rest of this chapter is devoted to a review of the literature relevant to carryover and generalization in articulation and phonological therapy. I always have found the process of reading through a review of pertinent research to be a laborious process, so I have taken the liberty of presenting this material in a different way for easier access. Studies are arranged by topics, topic areas have been arranged alphabetically, and the studies within each topic are presented as bulleted items arranged chronologically so the reader can see the evolution of ideas over time. A simple one-line description summarizes each study's findings in regard to carryover. It is recognized that each of these studies demonstrated far more than the tidbits offered here. I have attempted to focus only on the one or two pieces of information per article that have the most relevance to our topic. Readers are referred to the original articles to gain a better perspective of each project's scope of study.

### *Across-Language Generalization*

At least two studies have indicated that generalization of a phoneme can occur from one language to another.

- McNutt (1994) ascertained that training correct S in English can generalize to a correct production of S in French.
- Ray (2002) demonstrated that generalization can occur across three languages when a cognitive-linguistic approach and minimal pairs are used.

### *Behavior Modification and Carryover*

Some investigators have been interested in the relationship between behavior modification, speech contracts, dismissal criteria, and reward systems in the carryover process.

- Winitz and Bellerose (1963) suggested that phoneme generalization can be maintained with reinforcement.
- Wing and Heimgartner (1973) demonstrated that five levels of treatment could be effective in the carryover process: (1) oral reading, (2) oral reading and oral discussion, (3) structured conversation within a time span and with a pre-selected topic, (4) unstructured conversation with an increased time span, and (5) unstructured conversation within an extended time span.
- Diedrich and Bangert (1976) studied clients who were dismissed from therapy after having achieved 75% correct criteria for production of S and R in word lists and in conversation. They found that these clients retained articulation skill as well as clients who were kept in therapy longer.
- Polson (1980) studied the opinions of professional speech-language pathologists in regard to carryover. Consistent behavior modification was ranked as the third most important element of twelve carryover methods.
- Tabor and Hambrecht (1997) found an increase in S productions by students who signed contracts and received rewards for meeting their contract standards. However, clients reverted to previous poor levels of performance when contracts were finished. The authors suggested that contracts should involve a longer time period and that rewards should be more valuable to the client (they used rewards costing under \$2.00).

#### *Distinctive Features and Generalization*

A number of studies have indicated that training a distinctive feature in one phoneme can stimulate production of another phoneme that utilizes the same feature.

- Winitz and Bellerose (1963) demonstrated that the similarity of phonetic features effects phoneme generalization in positive ways.
- McReynolds and Bennett (1972) revealed that subjects could generalize phonological features [+strident], [+voice], and [+continuant] to many phonemes when only one phoneme was taught.
- Costello and Onstein (1976) found that distinctive features could generalize from one phoneme to another.
- Rosenwinkel (1976) demonstrated that generalization of [+strident] to other phonemes occurred when S was targeted.
- Weiner (1981) reported that final fricatives could be stimulated by training word-final stops when minimal pairs were used.
- Dunn and Till (1982) determined that distinctive features can transfer from one phoneme to another.
- Dinnsen and Elbert (1984) demonstrated that therapy focused on training sounds for which the client had the least amount of phonological knowledge resulted in the widest generalization.
- Powell and Elbert (1984) revealed that children can generalize phonological targets.
- Monahan (1986) revealed that common phonological patterns can generalize from trained to untrained words in children with multiple misarticulations.
- Zagar and Locke (1986) demonstrated that manner and voice features generalized more easily to untrained words than did the place feature. The authors speculated that per-



haps there are children who are *manner-cued* and those that are *place-cued*.

- Dinnsen, Chin, Elbert, and Powell (1990) revealed that generalization to phonetically less complex sounds could occur when phonetically more complex sounds were taught.
- Williams (1991) indicated that speech is improved when a new class of phonemes enters the phonological system, even though the full set of phonemes within that class is not completely organized and errors still occur.

#### *Imitation Versus Spontaneous Productions in Generalization*

Two studies have investigated the generalization that occurs on imitation tasks versus spontaneous speech tasks.

- Wright, Shelton and Arndt (1969) disclosed that subjects generalized better when imitative tasks were used.
- Diedrich and Bangert (1980) suggested that generalization in older school-age children occurred equally well on imitative and spontaneous tasks.

#### *Limitations of Generalization*

Some studies have indicated that generalization may not occur in some populations.

- Sommers et al (1970) demonstrated that children with cognitive skills in the educable range were unable to carry correct phoneme productions over to novel situations. They suggested that these children might need special focus and an on-going effort directed toward carryover.
- Raymore and McLean (1972) found that word-position generalization may not occur in children with mental retardation.
- Rockman and Elbert (1982) revealed that word-position generalization may not occur in children with severely restricted phonetic inventories.
- Zagar and Locke (1986) suggested that limitations in cognitive skill affect children's ability to generalize phonetic features.

#### *Number of Exemplars and Generalization*

Several investigators have studied the relationship between the number of words trained and generalization.

- Costello and Bosler (1976) found that more generalization to new environments occurred when more word varieties were trained.
- Elbert and McReynolds (1978) established that generalization can occur with only a small number of exemplars.
- Monahan (1986) showed that generalization of phonological processes can occur with a minimal number of training stimuli.
- Elbert, Powell, and Swartzlander (1991) demonstrated that only a small number of minimal pairs could promote generalization, although their subjects showed wide variability in this skill.



### *Parents, Peers, Teachers, Aids and Carryover*

Several studies have revealed that progress in articulation and phonological skills can be made when parents, peers, teachers, or teacher aids are involved in the training process.

- Sommers et al (1959) suggested that more rapid improvement in articulation may occur when parents are involved.
- Marquardt (1959) described a successful carryover program called *Speech Pals* in which other children were being used to encourage carryover. The Speech Pals attended therapy with the client, and then they listened to him read aloud in the classroom every day.
- Sommers (1962) demonstrated that subjects whose mothers were trained to assist in the correction of misarticulations made significantly greater improvement than subjects whose mothers were not trained.
- Engel et al (1966) suggested that college roommates, fraternity and sorority members, and siblings could help in the carryover process.
- Mowrer, Baker, and Schultz (1968) demonstrated positive results in articulation therapy when parents were involved in treatment.
- Carrier (1970) found that children whose parents were involved in treatment scored higher post-treatment than those with minimal parent involvement.
- Bankson and Byrne (1972) found that conversational proficiency in the home reflected that found in the clinic.
- Wing and Heimgartner (1973) reported that parents could be used effectively in their carryover program.
- Engel and Groth (1976) demonstrated that teacher aids can be helpful in the carryover process.
- Hazel (1990) suggested that a peer homework monitoring system could be effective in the carryover process.

### *Phoneme Selection and Generalization*

Investigators have studied the relationship between phonemes that were taught and those that were not taught.

- Elbert, Shelton and Arndt (1967) disclosed that training one phoneme could generalize to another.
- Leonard and Webb (1971) found a significant carryover of correct production from trained to untrained words, although performance on the actual practice words was higher.
- Elbert, Dinneson, and Powell (1984) revealed that training fricatives enhances the learning of stop consonants.
- Young (1987) found that weak syllables and consonant clusters could generalize from trained to untrained words.
- Gierut, Morrisette, Hughes, and Rowland (1996) found that clients could acquire early-developing sounds when later-developing sounds were taught, but that the reverse was not true.

### *Phonological Knowledge and Generalization*

Several studies have indicated that general phonological knowledge can affect generalization.

- Dinnsen and Elbert (1984) found that productive phonologic knowledge influences generalization.
- Elbert and Gierut (1986) also found that productive phonologic knowledge influences generalization.
- Gierut, Elbert and Dinnsen (1987) demonstrated that greater generalization occurs when children have more information about phonemes.
- Gierut (1989) also found that productive phonologic knowledge influences generalization when word-initial position consonants were trained.

### *Practice and Generalization*

Investigators have been interested in the relationship between the amount and type of practice necessary for generalization and carryover to occur.

- Bankson and Byrne (1972) found that overpractice can be somewhat effective as a method of carryover.
- Bankson and Byrne (1972) showed that motor-based treatment approaches can facilitate generalization of phonemes to conversation.
- Bankson and Byrne (1972) found that a target sound carried over to conversational speech at home and in the clinic after rapid word list training.
- Elbert and McReynolds (1978) found that the amount of training was an important variable in generalization.
- Diedrich and Byrne (1980) found that 50% of their study subjects generalized /s/ and /z/ immediately, suggesting that clinicians may want to start carryover programming early in treatment.
- Polson (1980) found that practice was judged by professional speech-language pathologists to be the second most important of twelve elements for successful carryover.
- Gierut, Elbert, and Dinnsen (1987) found that the greatest amount of generalization occurs when practice is included in therapy.
- Elbert, Dinnsen, Swartzlander, and Chin (1990) found that many children do generalize correct sound production to conversational speech without direct treatment on conversational speech.
- Powell, Elbert, and Dinnsen (1991) reported that learning a target sound can occur even when we try to teach another phoneme for which the client is not stimulable.
- Kamhi (2000) found that practice and functional communication work together. They do not need to be viewed as antagonists in carryover: "Instead, practice should be viewed as an effective way to facilitate productive use of speech and language forms in meaningful communicative situations" (p. 185).

### *Self-Monitoring and Carryover*

Many studies have indicated that self-monitoring techniques can facilitate situational carry-

over.

- Diedrich (1971) revealed that charting progress was an effective tool in self-monitoring during the carryover process.
- Engel and Groth (1976) demonstrated that hand-raising can be an effective tool in self-monitoring during the carryover process.
- Ruscello and Shelton (1979) found that children generalize better when they use three processes—when they mentally plan out their articulatory movements, then produce targets, and then assess their own productions. Children who produced targets without mental planning and self-evaluation performed less well.
- Polson (1980) discovered that auditory self-monitoring was judged by professional speech-language pathologists to be the most important of twelve elements for successful carryover.
- Koegel, Koegel, and Ingham (1986) also demonstrated that hand-raising can be an effective tool in self-monitoring during the carryover process.
- Shriberg and Kwiatkowski (1987) ascertained that self-monitoring was more important than auditory bombardment, auditory discrimination, and minimal contrast training in facilitating carryover to spontaneous speech.
- Koegel, Koegel, Van Voy, and Ingham (1988) reported that children taught how to monitor their conversational speech outside of the therapy room carryover S and Z better than when they are taught to monitor in the clinic.
- Shriberg and Kwiatkowski (1990) indicated that awareness of speech sounds is best trained by working on the sounds themselves in production activities.
- Gray and Shelton (1992) tried to replicate Koegel et al (1988), but they achieved different results. They reported that the ability to self-monitor accurately within the clinic did *not* appear to affect carryover positively. The authors attributed their poorer results in carryover to the following: Too many therapy conditions, too many different therapists per client, too few self-monitoring requirements, a shorter period of treatment, and tasks that were more complex.

### *Setting and Generalization*

Two studies have looked at the relationship between the training setting and generalization.

- Costello and Bosler (1976) demonstrated that situational generalization can be facilitated, although no one setting in their study enhanced carryover more than another. They also found that the physical dimensions of the room did not influence articulation performance in their carryover process.
- Irwin, Weston, Griffith, and Rocconi (1976) demonstrated that the paired stimuli approach can be an effective tool in generalizing phonemes trained in the therapy room to other non-experimental settings.

### *Syllables, Nonsense Material, Error Productions, and Generalization*

Several studies have investigated whether training on nonsense syllables can generalize to real words.

- Powell and McReynolds (1969) found that practice of nonsense words can generalize to real words.
- Leonard and Webb (1971) found that training a client to listen to correct productions as well as error productions facilitated correct phoneme production and carryover of the target.
- Costello and Onstine (1976) showed that practice of nonsense words generalized to real words.
- Elbert and McReynolds (1978) found that several different syllable shapes have an equal effect on generalization. They studied CV, VC, CCV, and CVCC, and a variety of vowels.
- Gierut, Morrisette, and Ziemer (2010) demonstrated that nonwords induced greater, more rapid system-wide generalization as a function of treatment than did real words in children with phonological impairment. Children who were exposed to nonwords maintained their high levels of performance even after treatment was withdrawn.

### *Word-Position and Generalization*

Many studies have revealed that generalization can occur from one word position to another.

- Powell and McReynolds (1969) reported that generalization can occur across word positions.
- Zehel, Shelton, Arndt, Wright, and Elbert (1972) demonstrated that generalization can occur across word positions when S is trained.
- Elbert and McReynolds (1975) demonstrated that generalization can occur across word positions although success can vary between clients.
- Ruscello (1975) determined that better generalization of phonemes occurred when three positions were trained — initial, medial, and final. Less generalization occurred when only one position was trained, although some clients were able to make word position generalizations when only one position was trained.
- Olswang and Bain (1985) established that generalization of S from one word position to another could occur. They also found that L did not generalize from initial to final position.
- Weaver-Spurlock and Brasseur (1988) indicated that S can generalize from one word position to another.
- Wolfe, Blocker, and Prater (1988) suggested that generalization may be more effective when inflection is added to targets.
- Miccio and Ingrisano (2000) demonstrated in a case study that fricatives taught in the initial position can generalize to words with the target in other positions, and they can generalize to connected speech.

### *Additional Sources*

The following references are good additional sources on research related to carryover and generalization:

- TEXTBOOK: The text, *Articulation and Phonological Disorders* by Bernthal and Bankson (2004), contains an excellent discussion of research in the areas of generalization and carryover in articulation and phonological therapy. (See pp. 275-289).
- TUTORIAL: An article entitled “Constructivist strategies in phonological intervention: Facilitating self-regulation for carryover” by Ertmer and Ertmer (1998), is a good modern-day journal tutorial on carryover. They review the literature and discuss carryover in light of learning theories, selecting phonological strategies, self-regulation, constructivism, increasing motivation, and so forth.
- CASE STUDY: An article entitled “Planning for phonological generalization: An approach to treatment target selection” by Powell (1991) is a clinical focus article in which the authors present their process of planning phoneme generalization for one five-year-old child with multiple misarticulations and high unintelligibility. Phoneme selection, planning procedures, and their effect on generalization, are described.
- TEXTBOOK: The text, *Clinical Management of Articulatory and Phonological Disorders* by Curtis Weiss, Mary Gordon, and Herald Lillywhite (1987), contains an excellent chapter on carryover.

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## Chapter 2 Summary

### Research Studies on Generalization and Carryover

- Carryover techniques must be placed within the parameters of an evidence-based practice (EBP).
- Evidence for the EBP comes from three sources: laboratory results, clinical expertise, and client preferences. These three sources are integrated to create an effective evidence-based practice.
- Without evidence or prior clinical experience, speech-language pathologists rely on working theories, trial-and-error, common sense, and their natural teaching ability to make clinical decisions about carryover.
- Most evidence on carryover actually concerns the topic of generalization. Virtually all of it reveals that each method works with certain clients.
- The little laboratory evidence we do have on carryover reveals that each method of carryover works for some clients some of the time.
- Generalization may be related to age and can occur from one language to another.
- Training a phoneme that contains a particular feature can stimulate production of another phoneme that also contains that feature.
- Both imitation and spontaneous speaking tasks can foster generalization.
- Phonemes can generalize to words when nonsense syllables are trained.
- A small number of words can be used to stimulate generalization of a phoneme to many words.
- Generalization can occur when parents and peers are involved in treatment.
- Generalization occurs equally when various syllable shapes are utilized.
- Generalization is promoted when clients have more general phonological knowledge.
- Self-monitoring techniques can facilitate situational generalization for carryover.
- Situational generalization can be facilitated with motor-based treatment approaches.
- Rapid production of word lists can facilitate generalization.
- Generalization can occur from one word position to another.
- Word-position generalization may not occur in clients with mental retardation.
- Word-position generalization may not occur in clients with severely restricted phonetic inventories.

# Chapter 3

## Managing the Carryover Process

*“If the individual can engage in talking, and can think more of the subject than of the manner of his speaking, and yet have the manner correct, he has established control. Practice toward this end should be part of the training program and should be started as soon as possible.”*

– Mildred Berry and Jon Eisenson, 1956

This chapter begins our discussion of the methods and procedures of carryover. In this chapter we present broad ideas about managing the general process of carryover. We shall discuss balancing work and play, when to begin carryover, frequency of therapy, following the traditional plan of articulation therapy, functional work, speech contracts, parents, exercising patience, and many other practical ideas that work together in the management of the carryover process.

### Balance

Carryover may be in jeopardy when work and play are not balanced in articulation therapy. Too much practice on words alone will not create an effective carryover routine. Likewise too much game playing will not assure the consistent performance needed for carryover. Speech-language pathologists balance work and play so that there is a natural give-and-take between rehearsal and relaxation, between practicing and playing, and between focused attention and distractions. Managing carryover means that some sessions are very drill-like and void of games, while other sessions are completely playful. Most sessions artfully combine the two. A balance of work and play is an excellent environment for stimulating carryover because it assures that the client is integrating practice and functional performance. Work and play are integrated to stimulate carryover.

### Beginning Carryover Activities

When should carryover procedures begin? This is a controversial point and various beginning points have been suggested throughout the decades as a result:



- Some therapists have suggested that carryover begin after the client has mastered the new phoneme in words. For example: “When the child incorporates the sound into words easily, he is ready to begin the transfer to his everyday speech” (Eisenson and Ogilvie, 1965, p. 247).
- Some therapists have advocated that carryover begin once a client can say his new phoneme correctly. For example: “Carryover can begin as soon as the child has gained voluntary control of his sound and is able to produce it correctly at will” (Powers, 1971, p. 899).
- Some therapists have written that carryover should begin as soon as the client begins to self-monitor. For example: “When [a client] begins to listen to himself and hear that his production is different, carryover preparation has begun” (Bosley, 1981, p. 110).
- Some therapists have advocated that carryover procedures begin as soon as therapy starts. For example: “Actually the carryover process begins at the initiation of treatment” (Weiss, Gordon, and Lillywhite, 1987, p. 279).

My years of clinical experience have taught me that the last idea in this list is the best. It is my opinion that carryover should be built into the very fabric of a therapy program beginning with the first session. This view is based on my own three decades of practice.

For example, consider the client in therapy to remediate his deviant R phoneme. The first day of therapy may teach the client only one thing — that he is enrolled in therapy to learn to say R. To begin carryover immediately means that this first meager message must be carried into the broader aspects of his life. How? This is where the art of therapy comes into play. Perhaps the client will be guided to write an R in the middle of a paper, and then to draw a *rabbit*, a *robot*, and a *radio* around it. The page may be taken home and fastened to the refrigerator for the family to marvel over and for him to explain. The client naturally will say his R sounds incorrectly as he explains the picture to his family, but he will be connecting his speech work into his life. He will say, “This is what I am going to learn.”

## Cognition

Cognitive skill plays an important role in the carryover process. In fact, I have been known to say that low cognitive skill is our greatest deterrent to articulation improvement and carryover skill. As mentioned in our chapter on research studies, a few studies have demonstrated that children with lower cognitive skills do not generalize the way average children do. In the public schools in the 20th century, children were classified by cognitive level, and it was a commonly accepted notion that children who were below average did not generalize well. Generalization itself was considered the very skill that divided average learners from those that were below average. If it is still true that children on the lower end of the cognitive range do not generalize well, then we should expect that carryover would not be as successful with those children.

My experience has taught me that children with lower cognitive skills must be taught very specific skills under very specific circumstances. For example, take the situation of a seven-year-old student, who functions cognitively more like a two-year-old, and who is learning to produce B in words. This child may not generalize the B he learns on the word *bye-bye* to other words like *ball*, *baby*, or *big*. The child may have to be taught to say B on each word as it emerges individually.



In prior decades, speech-language pathologists turned to school psychologists for information about their clients' cognitive levels, but this information is not always available anymore. Today the SLP often must make his or her own general analysis of a client's cognitive level during the course of articulation treatment. I use the following areas to make a general determination of a client's cognitive status:

- Ability to follow directions
- Ability to answer questions
- Level of play skills
- Conversational speech skills
- Interests, likes, dislikes, and hobbies
- Receptive language testing scores
- Receptive reading level
- Any other formal test results that may be available

### Contracts

It was popular in the 1970's for speech-language pathologists to make speech contracts with adolescents who were considered for articulation therapy. The client could attend treatment only if he signed a contract that he was willing to do the work all the way through to carry-over. Teens made their own decisions about whether to continue therapy based on whether or not they were holding up their end of the contract. The thinking was that it does no good for a parent or therapist to make this decision for a teen or pre-teen. The child has to make this commitment himself. Contracts are an excellent addition to therapy when the carryover process is dragging.

Many therapists who submitted ideas for this book explained that they still use contracts today. In some situations, however, the old-fashioned speech contract seems to have been replaced by the Individualized Educational Plan (IEP). But the IEP is a contract with a parent and not a student. Speech contracts are made with the students themselves. A contract gives a client the opportunity to stay in therapy or to opt out. Some clients do quit, but simply knowing that quitting is an option is enough to keep many clients invested in the process. Clients who do not sign the contract, or who simply don't want to be there, are dismissed. No grudge is held in this regard. Clients are let go with the knowledge that they can change their minds at any time. They are told that the therapist will check in on them at a certain point to see if they are ready to begin the process. I have used contracts with children in both formal and informal ways. In many cases I simply ask, "Do you want to do this now?"

### Controlling the Phonetic Environment

Traditional writers taught that we should control the phonetic environment of practice material in order to assure completion of an articulation therapy program. For example, consider S in the words *miss* and *mitts*. A client who can say one of these words correctly cannot necessarily say the other one correctly because the phonetic environments are different. Phoneme S occurs after T in *mitts*, but it occurs after a vowel in *miss*. Some clients cannot generalize speech motor skills this easily, and this makes carryover a problem. The traditional plan of articulation therapy is designed to usher our clients into carryover by carefully controlling the phonetic

environment. For example, notice that only words that end in TS are used throughout the following increasingly difficult levels of treatment. Notice that the levels of therapy progress from simple to complex. Also note that there are no other target phonemes in these samples. The target is TS in the final position:

- WORD LEVEL: *Mitts*
- SIMPLE PHRASE LEVEL: *Two mitts*
- LONGER PHRASE LEVEL: *Two mitts and two hats*
- SIMPLE SENTENCE LEVEL: *Lenny got two green mitts.*
- LONGER SENTENCE LEVEL: *Lenny got two green mitts and two brown hats.*
- MORE COMPLEX SENTENCE LEVEL: *I think Lenny got two green mitts and two brown hats on Friday afternoon.*
- PARAGRAPH LEVEL: *My brother Lenny got mitts and hats on Friday afternoon. I went with him. It's the truth. Hats and mitts. He got both. He got green mitts and brown hats. I think he got two bats too! What's up with that? It's not fair. I thought he only could get the mitts, but mom let him get the mitts and the hats and the bats! I wanted new hats and mitts and bats too. That's only fair. Right?*
- STRUCTURED CONVERSATION LEVEL: Talk about one word from the paragraph above. Ignore all other S words as you talk.
- UNSTRUCTURED CONVERSATION LEVEL: Talk about anything. Ignore all S words that do not occur in the TS combination at the ends of words.

When therapists control the phonetic environment this tightly as in the traditional plan, we can take a client's production of his target from words to phrases, sentences, paragraphs, and conversation all within the same session. This is because we eliminate the need for generalization. We focus on one type of phonetic environment and we carry him through to conversation with it alone. This sweeps a client toward conversation very nicely quite early in therapy. Careful control of the phonetic environment is a very functional way to stimulate for carryover.

### Frequency of Therapy

The frequency of therapy often plays into the carryover process. In general, most would agree that therapy that is spread out too thin is not good for speech learning and carryover. How frequently an individual client should attend therapy in order to promote carryover is a subject of considerable debate. Many today would argue that more frequent shorter therapy sessions are preferable, and this is a method that many old-timers advocated as well. The process of using more frequent and shorter sessions works well in the public school setting. But this idea is not practical in the private practice. For example, a private practitioner could not ask a parent to drive 45 minutes to and from therapy three days per week in order for their child to attend for five minutes each time. In general, clinicians must evaluate the ongoing needs of their individual clients and their unique therapy settings to determine how often therapy should take place for their clients to be successful in carryover. Periodic monitoring of carryover will allow one to measure whether therapy is taking place often enough for the individual client.

## Functionality

It is generally agreed today that the more functional the articulation work is, the more assurance one has that new articulation skills will transfer outside of the therapy room. But there is a misconception today that old-time speech correctionists only worked on drill. This simply is not true. To read the old literature is to discover that speech-language pathologists have always understood the need to work functionally for carryover of newly learned speech skills. Consider these early admonitions to work functionally:

- *1912*: Scripture wrote one of America's earliest articulation therapy textbooks. The book contains three parts, and the entire third part is devoted to functional work, or what he called *exercises*. The text includes admonitions to work on speech using song, stories, talks, lectures, demonstrations, telephone calls, job interviews, store purchases, spelling activities, reading aloud, making introductions, and so forth (Scripture, 1912, p. 194-223).
- *1947*: Van Riper's earliest books also contain advice about working functionally. He wrote, "Practice of words in word lists will produce little transfer to real speech situations unless those words are taken out of their series and made part of the actual communicative function" (Van Riper, 1947, p. 207). "Motivation, maturation, discrimination, and application to life situations are indispensable adjuncts of any therapy" (Van Riper, 1954, p. 261).

As these quotes reveal, functional training always has been a part of our work. The old-timers taught that speech skills first are taught in a more isolated and structured environment, and then the work is taken into gradually more unstructured environments to promote carryover.

Unfortunately, beginning in the 1980's, some professional speech-language pathologists came to believe that articulation therapy only was valuable if it was perpetually tied to the narrative — "Articulation serves the overall process of verbal communication, and its rehearsal should always be related to communicative tasks" (Hoffman, Schuckers, and Daniloff, 1989, p. 256). Related to this was a new belief that the only way to make speech work functional was to work in the classroom. Astonishingly, some public schools today have gone so far as to ban speech-language pathologists from pulling children out of their classrooms to work on speech individually or in small groups because it is believed that training in a separate speech room is not functional. Traditional therapists disagreed with this notion. They believed that it was not the setting or the size of the group that makes our work functional — it is the process. Functional work can take place anywhere and with anyone.

If you have been caught in the *functional-therapy-can-only-take-place-in-the-classroom* routine, then step outside of the profession for a moment to think about how this idea might apply to another learning area. Consider the act of learning to tie shoelaces. Is it only functional if the child learns to tie his shoes when he's getting ready to go somewhere? Isn't it functional when a child goes alone into his bedroom to practice tying his shoes? And isn't it also functional if someone else comes into the room to give him a few pointers? I hope the reader can see that all these activities are functional for the child, they all serve their purpose, and they all carry the child toward complete functional use of the skill in everyday life.

Perhaps we could use the phrase *aspects of functionality* to refer to these divisions of functional learning. Articulation therapy entails various aspects of functionality that carry the client

toward carryover. Our job is to make sure that what happens in the therapy room is valuable, and this occurs when articulation is learned through these aspects of functionality. Sometimes we drill on individual phonemes in isolation, and other times we work on syllables, words, phrases, sentences, reading, and conversation. Speech-language pathologists of the 21st century recognize that all levels of treatment are valuable for the client, and that it is the therapist's job to assure that all aspects of functionality are being addressed so that carryover can be achieved.

### Parents, Caregivers, Teachers, and Aids

Parents, caregivers, teachers, and teacher aids can help in the carryover process, but it is a mistake to assume that they always can help. Having others involved may be the ideal, but parents and others vary in their parenting skills and teaching ability. We cannot expect all parents and significant others to be equally helpful in speech correction. The modern therapist understands that some of these people are helpful right away, some can be taught to be helpful over time, and others simply should be kept out of the process all together. Such is the nature of working with real people. Adjustments to the carryover process are made accordingly.

*“The speech-language pathologist must first make a judgment about whether a parent will work positively with the client before embarking on a training program with the parent”* (Weiss, Gordon, and Lillywhite, 1987, p. 290).

It also is a mistake to assume that parents always need to be involved since some research has demonstrated that children often show equal progress at home and clinic. When parents can be involved in carryover, I like to give them simple and very concrete things to do during the course of everyday living. Parents are very busy people these days, and adding more homework to their evening routine often is impossible. I find that using key words works best. I also like to teach parents how to play with sounds and words with their children. Many ideas for involving parents are offered throughout this book especially in our last chapter on games and activities.

Bernthal and Bankson (2004) recommended that parents provide good auditory models, that they have their children practice words they already can pronounce correctly, and that they learn how to reinforce their child's correct productions. They also said that if parents are to be involved, they must be trained to judge accuracy of sound, they must be taught to carry out the procedures of the program, and they should be provided with written instructions. Hodson and Paden (1983) used parents to engage in auditory bombardment at home. The client plays quietly while a parent reads a word list containing the week's phonological target: “He only listens; he must not repeat the words” (Hodson and Paden, 1983, p. 66).

### Peers / Speech Pals

Many therapists who submitted ideas for this book discussed ideas about using peers in therapy. The oldest reference we have for this seems to be a program called *Speech Pals* described by Erleen Marquardt (1959). Based on the theory that children learn better from their peers, and that other children are pace-setters, Marquardt's program had children of the same age or older assigned to speech students in the carryover phase. She gave suggestions about the type

of students that make good Speech Pals. She said to select a child with good speech, and one who is bright, a natural leader, popular, and who can arrange their schedule to attend speech classes with their assigned speech student one time per week. Marquardt said, “It is necessary to make sure the Speech Pal has a disposition that will fit him for this type of helpfulness” (p. 156). Marquardt’s Speech Pals were assigned to the speech student for the full school year. Their job was to attend class with the speech student one time per week, to learn about the speech process from the therapist during the session, and to listen to the speech student read out loud with good speech for a few minutes every day outside of therapy.

Modern speech-language pathologists continue to use modifications of the old Speech Pals program. Some of these pals today do actual teaching. Others simply serve as reminders to the speech student. Some Speech Pals use hand signals to cue their buddy to use correct speech in class.

Marquardt discussed several positive results of the Speech Pals program. She wrote that it benefits the client by attaching him to the popular crowd, and it benefits the Speech Pal who learns to use his or her natural teaching abilities. She also said that the program helps the school by desegregating the speech-impaired, it helps the community by bringing speech handicaps out into the open, and it assists special education in particular because it helps interpret the meaning of special education to the public. Marquardt said that her Speech Pals program was so popular, the therapists involved were met with this greeting every fall: “May I be a Speech Pal this year?” Speech Pals do not always have to be children with perfect speech of course. Fellow speech students can be used to help one another too.

## Patience

A critical aspect of the carryover process is patience. We must remember that some of our clients are learning something that is very hard for them, and that it is easier for them to do it the old way. Charles Van Riper warned that we should not rush the carryover process:

*“Most speech correctionists have to train themselves to resist this urge to hurry. When the child has been taught to make the new sound, the utmost patience and restraint are needed ... A lisper who has said ‘yeth’ for ‘yes’ several thousand times cannot be expected to say the latter as soon as he has learned to make the S sound in isolation”* (Van Riper, 1954, p. 248).

I remind myself of this need for patience by periodically engaging in a simply activity: I write my name with my non-dominant hand, and I make myself do this several times in one day. It’s fun for a while, but then the drudgery sinks in. Do I have to do it like this? Can’t I just do it my old way? The activity gets frustrating and even boring after a while, but it reminds me to be patient with my clients. It prompts me to give my clients time to mess up and time to get used to the process. It encourages me to slow down and let the carryover process continue at a pace of its own.

## Review and Reflection

Many therapists stimulate carryover by reviewing work at the beginning and end of each session. Review and reflection is the process of talking about remediation and change. Review



and reflection forces a client to think through what he has been learning and bring to mind the reasons he is attending therapy. These activities tie up loose ends and solidify the client's knowledge of the material. Review and reflection help the learner organize concepts and bring together the big picture for carryover. These are the conceptual exercises that teachers have done throughout time immemorial. The ability to think through one's work has been called *metacognitive skill* or *metacognitive knowledge*:

*“Self-regulation for carryover is facilitated by students' development and the use of reflective thinking before, during, and after performances ... Without reflection, learners may fail to transfer metacognitive knowledge and strategies for improvement to new situations and tasks”* (Ertmer and Ertmer, 1998, p. 74).

Creating an old-fashioned speech binder that contains papers of the client's on-going work makes for an excellent speech review and reflection mechanism. This and other ideas for reflection are presented in our final chapter.

### Measuring Success

How do we know when the carryover process has been successful? It has been recommended that carryover is complete only when the client can use his new speech skill in conversation both inside and outside of the therapy room. To measure success, Winitz (1975) recommended that carryover be assessed on a weekly or biweekly basis during 5-10 minutes of spontaneous speech both inside and outside of the therapy room. Therapists debate about the amount of success necessary to prove carryover has been achieved. The following three ideas have been prominent:

- **EMERGING SKILL:** The first view is that carryover will succeed when a new speech skill begins to emerge in spontaneous speech. In my experience, this measure can be sufficient only when very young children are first acquiring new phonemes. Once a typically developing small child begins to use a new phoneme spontaneously, carryover can be assumed in most cases. However this meager measure probably will be insufficient for older children with specific articulation deficits.
- **PERCENTAGE CORRECT:** The second view is that carryover is complete only when a client uses the new speech skill correctly to some predetermined percentage of correctness in conversation. No criterion has been established for this percentage, however, and it differs from one therapist to another. Should the criteria be 25%, 50%, or 75%? The word *consistently* has been employed to describe this: “The maintenance phase may be considered complete once the client can consistently use target behaviors in spontaneous speech” (Bernthal and Bankson, 2004, p. 286). I have always used 75-90% correct in spontaneous speech as my criteria of success.
- **NEARLY 100% CORRECT:** The third view is that carryover is complete only when a client uses his new speech skill correctly virtually all the time in conversation. Bosley wrote, “I was taught that the client was not through with speech training until he was carrying-over the new phonemes into conversational speech of all kinds nearly 100 percent of the time” (Bosley, 1981, p. 123). Most would agree that the goal of 100 percent of the

time is not measurable. Therefore we are talking about nearly 100% of the time in a sample of spontaneous speech.

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## Chapter 3 Summary

### Managing the Carryover Process

- Carryover may be in jeopardy when work and play are not balanced in articulation therapy.
- Various points have been suggested for carryover to begin: phoneme, syllable, word, phrase, sentence, and conversation.
- The present author believes that stimulation of carryover should coincide with the beginning of therapy.
- Children with lower cognitive skills do not generalize well and carryover may not ensue. These children may need to be taught very specific speech skills under very specific circumstances.
- A speech contract gives a client the opportunity to opt out of therapy. Simply knowing that quitting is an option is enough to keep many clients invested in the process all the way through carryover.
- Therapists must evaluate the ongoing needs of individual clients to determine how often therapy should take place for carryover to be successful for each individual client.
- It has long been agreed that the more functional the articulation work is, the more assurance one has that carryover will succeed.
- Parents, caregivers, and peers can help in the carryover process, but it is a mistake to assume that they always can help.
- Sometimes the best way to manage the carryover process is to be patient.
- Many therapists review work at the beginning and end of each session in order to stimulate carryover.
- It has been recommended that carryover is complete only when the client can use his new speech skill in conversation both inside and outside of the therapy room.
- Therapists debate about the amount of success necessary to prove carryover has been achieved.



# Chapter 4

## Self-Monitoring for Carryover

*“A consciousness of personal speech habits is mandatory in any improvement program.”*

– Johnnye Akin, 1958

A client’s self-evaluation of his own performance is critical to carryover because this is the way new skills are monitored in all speaking situations. As we discovered in our first chapter, professional speech-language pathologists ranked self-monitoring as the most important aspect of a successful carryover program. Most of the activities in this book will help build self-monitoring of speech skills. However, this chapter focuses on ideas designed specifically for developing this skill. We discuss self-monitoring, auditory self-discrimination, conscious awareness, checking devices, correcting the therapist, daydreaming, exaggeration, and other methods.

### Monitoring Oneself

Self-monitoring, or monitoring oneself, has been discussed widely in books on traditional articulation therapy, and is regularly mentioned as an essential component of carryover. Self-monitoring also been called *auditory self-monitoring* and *auditory self-evaluation*. Van Riper and Irwin called this the skill of *self-hearing* and *simultaneous auditory feedback*. They wrote, “[Clients] must learn to listen to themselves during the act of speaking” (Van Riper and Irwin, 1958, p. 127). Virtually all the writers of traditional articulation therapy in the mid-20th century discussed self-monitoring as a necessary and hugely important aspect of carryover. As noted in the first chapter, auditory self-monitoring was judged by speech-language pathologists in one study to be the most important element of successful carryover (Polson, 1980).

Auditory self-monitoring should be taught from early in therapy, but the process changes somewhat when we begin to use it solely for the purpose of stimulating carryover. We are referring here to the client who has full control over his new productions as long as he is thinking