APPENDIX A

Reflections on Research:
Phonological Awareness

The phonological awareness substrand in the Language and Literacy domain of The *California Preschool Learning Foundations*, Volume I focuses on four levels of sound *complexity* (words, syllables, onsets and rimes, and phonemes) and three kinds of sound unit *manipulation* (blending, segmenting, and deleting). Although segmenting is not named specifically in foundation **2.1** or **2.2**, children engage in segmenting when they take two-syllable words apart orally or by clapping (**2.1**) and as a first step in all onset deletion manipulations (**2.2**). Completely absent from the list of manipulations in the *California Preschool Learning Foundations Volume 1*, however, are *detecting* and *produc*ing words that begin with the same sound, and detecting and producing words that rhyme.

During the preparation of the Language and Literacy chapter for the *Preschool Curriculum Framework, Volume 1,* a question arose as to whether it was necessary to restrict the suggested strategies only to those matching exactly the manipulations stipulated in the foundations. It was thought that eliminating beginning sound and rhyme detection, and beginning sound and rhyme production might restrict unnecessarily the contexts in which teachers could support children in becoming more aware of onset and rime units of sound. It would be unwise to suggest the use of detection and production strategies, in addition to the strategies suggested by the *Foundations*, if doing so were inconsistent with the research. However, based on a comprehensive review, the writers of the Language and Literacy chapter for the *California Preschool Curriculum Framework* judged that the use of sound detection and production strategies is consistent with the research:

1) when the additional strategies are used as supplements;
2) when the additional strategies are implemented in ways that provide explicit information to children about onset and rime units;
3) when the number of items in detection activities are limited to only two or three items;
4) when words used in beginning sound detection activities have a single consonant onset rather than a beginning sound that is part of a consonant blend (e.g., **b***ack* or **b***all* rather than **bl***ack* or **br***ag*).

This statement includes a discussion of the research base that led to limiting sound unit manipulations in the *California Preschool Learning Foundations, Volume I* to blending and deleting. An understanding of this research base helps to ensure that the supplemental strategies are viewed as such—additions to and not substitutions for the strategies that relate directly to the *California Preschool Learning Foundations, Volume I*. A discussion of the research base also helps to ensure that teachers' use of the supplemental detection and production strategies is closer to the approaches suggested

in the *Preschool Curriculum Framework, Volume 1* than to approaches teachers might have used in the past. Before the discussion of this research, a brief overview is provided of the sound units and manipulations that are found in phonological awareness activities.

A Brief Overview of Sound Units and Their Manipulations

Three main levels of *sound unit* complexity are commonly recognized (syllables, onsets and rimes, and phonemes). Words are also sometimes included as a distinct unit of sound. For example, some word level phonological awareness activities require children to segment sentences into their individual words by clapping.[1,2] Other word level phonological awareness activities involve the manipulation of words comprising compound words (e.g., blending *sun* and *shine* to make *sunshine*; deleting *sun* from *sunshine* to leave just the word *shine*). The two words in most compound words typically have just one syllable. Thus, these word level activities involve the manipulation of syllable size units of sound. In contrast, other syllable level phonological activities involve the manipulation of only parts of words (e.g., children blend the two syllables, *ba* and *be*, to create the word *baby*). Word level sound units are the easiest of all for children to manipulate. Syllables are easier to manipulate than are onset and rime units, and onset and rime units are easier to manipulate than are phonemes.

In addition to levels of sound unit complexity, there are commonly recognized levels of sound unit *manipulation*—levels of what children are asked to do with sound units. These manipulations include blending (synthesizing); detecting (matching); segmenting and deleting (analyzing); and producing (involves segmenting, deleting, and substituting). Blending is easier than segmenting, and segmenting is easier than deleting. Production is harder than any of these, and so may be the difficulty level of detecting such as when more than two or three items are included in a detection activity.

Research on Problems in Measuring Onset-Rime Sensitivity with Rhyme Production

In some research studies, virtually all three-year olds performed “at floor” (i.e., could not do the tasks at all) on rhyme detection and production, and many four-year olds also did relatively poorly.[3,4,5,6,7,8] Moreover, in a meta-analysis conducted to determine whether phonological sensitivity at the onset-rime and phoneme levels are distinctly different kinds of phonological sensitivity or just different ways to probe the same basic skill in children of different ages, Anthony and Lonigan encountered problems when they included data from rhyme production tasks in their analyses.[9]

The Anthony and Lonigan meta-analysis was based on four studies, each of which provided data from at least two measures of both rhyme and phoneme sensitivity. Anthony and Lonigan discovered that data from rhyme production measures produced different results in the models they tested than did other measures of rhyme sensitivity. The problem stemmed from “floor effects” on the rhyme production measures. In other

words, many children demonstrated little or no phonological awareness (performed at floor) on the rhyme production tasks, but they performed better on other measures of onset-rime sensitivity. When rhyme production data were excluded from the analyses, leaving only data from rhyme similarity and oddity tasks (i.e., detection tasks), or onset-rime blending, Anthony and Lonigan found a better fit to a model that answered their question.

Why are rhyming word and beginning sound production tasks hard for young children? First, they require a fairly good vocabulary. Second, they depend on a relatively high level of cognitive skill. For example, rhyme *production* requires children to search their memories for words that might rhyme with a target word they are given. The child must hold the target word in mind and focus on its rime unit, while retrieving words from memory. To focus on the rime unit, the child must segment the target word's onset from its rime. The child also must segment each word retrieved into its onset and rime parts, and then compare the retrieved word's rime unit to the target word's rime unit. In a rhyme similarity *detection* task, the tester pronounces the target word and then the tester reads three or four items, only one of which rhymes with the target word. In a rhyme oddity *detection* task, the tester pronounces three or four words and the child must tell which word does *not* rhyme with the others. These detection tasks would be especially challenging for children who have a small vocabulary because, without familiarity with the words in a task, it is hard to remember them. If not remembered, their sound structures cannot be compared.

In summary, if a child does not have an adequate vocabulary or a sufficient level of cognitive skill, the child cannot demonstrate whatever onset-rime sensitivity he or she might actually have in phonological awareness activities that involve detection and production manipulations. It is no wonder that three-year olds cannot perform these mental gymnastics at all or that they present a formidable challenge for many four-year olds, unless the number of items in a detection task is reduced to only two or three from the typical four.[10] [11]

What Does This Research Mean for Instruction?

The challenges inherent in rhyme and beginning sound detection and production tasks have implications not only for assessment but also for instruction. Suppose a teacher asks, "Can you think of words that rhyme with *boat?*" Suppose further that one child in the small group says *coat* and the teacher says, "Yes, you are right: *Boat* and *coat* rhyme." Further suppose that another child says *goat* and the teacher says: "Yes, *goat* also rhymes with *boat*." The other four children in the small group do not seem to know how to play this game (i.e., they do not offer ideas). We can (and should) ask whether there is any instructional benefit to the children who cannot think of words to rhyme with *boat*. A similar pattern of response occurs when the teacher asks children to think of more words that begin with the same sound as the target word provided. A few children respond; the others don't.

What is the likelihood that the non-responding children understood *why* the teacher said that *coat* and *goat* were correct rhyming word matches for the target word, *boat*? What's the likelihood that they *will learn how* to make correct, rhyming word matches from listening to a few other children produce ideas and to the teacher who says only "these are good matches?" The likelihood is probably very low if this is the only support they receive in learning to become aware of onset-rime sound units. The same would be true of a beginning sound production exercise. Children who are not responding would probably gain little in the way of understanding or skill by listening in the teacher's lesson.

To *benefit* from listening in as a rhyme or beginning sound production activity proceeds, a child must be able to segment the onset and rime units in both the target and the child-produced words, compare the words' rime or onset portions, and conclude that they are the same. If the child cannot yet engage in this kind of sound analysis, which is probably a fairly safe assumption when a child does not participate, unless personality or other individual characteristics can clearly account for the child's behavior, it's doubtful that listening to what transpires during a rhyme production activity, *conducted in the way just described*, will help the child build sound analysis skill.

The same process is required for a child to understand a rhyme oddity or similarity detection task.[12] Perhaps, over time, after having listened to multiple examples of target words and words that match with them (i.e., rhyme with or begin with the same sound), a child will begin to figure out what is going on. That is, a child might, through the power of insight, figure out which parts in the matching words in each task are the ones that sound the same. Good instruction, however, should reduce the need for individual children to depend on their insight to learn what we can teach them more easily and in a shorter period of time. Relying on the child's insight to produce the learning of interest also assumes that a child who does not yet understand *will continue to attend closely* to a task for a long period of time (i.e., across weeks and even months), even though the child does not understand what is going on. This is asking a lot of young children—too much. Thus, using many strategies that focus primarily on blending, segmenting, and deleting manipulations with onset rime units rather than using many strategies that focus primarily on detection and production makes very good sense and is consistent with the research.

A question can be asked, though, about whether a teacher's onset-rime options must be restricted only to strategies that use blending, segmenting and deleting. To answer this question, several other questions must be considered:

1) What might be the likely effect of children's experiences in the blending, segmenting and deleting of onset and rime units on children's ability to engage in detection and production tasks?
2) Must options for levels of task complexity used in instruction be limited to the levels typically used in research studies or for individual child assessments that are used in program evaluation?

3) Does the possibility for teacher scaffolding in instructional strategies matter in determining whether detection or production strategies are of benefit to children's learning? (Scaffolding cannot be provided in an assessment situation, because the idea is to find out what the child knows or can do. Scaffolding *can and should be* provided in activities used for instruction, because the idea in these contexts is to support the child in figuring out and learning what to do.)

Blending, Segmenting, and Deleting Experiences Should Affect Children's Skill in Detection and Production

Strategies that involve preschoolers in blending, segmenting, and deleting onset and rime units should help them acquire some of the very skills that are needed to understand beginning sound and rhyming word detection and production activities. The load on processing skills of the kind that were described in the earlier discussion of sound detection and production tasks is reduced when any part of the processing becomes more automatic. Thus, as children become more skilled at segmenting onset and rime units of words, through strategies that focus directly on teaching children to notice and manipulate these units, the processing demands of the detection and production tasks (in which onset and rime segmentation *is required*) should also become a bit easier.

Preschool programs also provide strong support to help children develop vocabulary. In time, perhaps by early in the spring of the preschool year (for four-year olds), increases in children's vocabularies should also be at least approaching the level needed to engage in rhyming word and beginning sound detection and production. An increase in vocabulary not only provides more words in memory from which a child can draw, but also shifts where the child's attention can be focused in the task. If a child must spend less time on retrieving words from memory, the child can spend more time on making the necessary comparisons between the sound units in the words.

As stated in the introduction of this document, a curriculum framework provides general principles and strategies for planning and implementing curriculum. The framework is written to apply to a variety of curricula. In contrast, a specific curriculum often defines a sequence of strategies for teachers to follow. To support children's developing phonological awareness, it is useful for teachers to plan a sequence of instructional activities within their specific curriculum. Although the *development of* phonological awareness skills in children occurs in an overlapping manner rather than in a stage-like sequence (i.e., a child acquires beginning awareness of smaller linguistic units before having mastered awareness and manipulations of larger linguistic units), the sequencing of instructional tasks still needs to take into account the level of cognitive processing (i.e., the kind of manipulation) required. Segmenting a sound unit from the beginning of a word (e.g., a word in a compound word, a syllable in a word, or a single consonant onset from the rime of a syllable) is harder than blending two words, two syllables, or onset and rime units. Deleting is harder than segmenting, assuming the size of the sound unit remains constant. Production tasks are typically the most difficult manipulation. For example, one approach to rhyming word production involves the

maintenance of the rime unit while segmenting, deleting and then replacing the onset. That is, a child first creates a word by segmenting and then deleting the onset in the target word and then adding a new onset. The child then compares the word created with items in the child's vocabulary to see whether it is a word. If the child realizes that sound play games do not require real words, the child does not search the vocabulary store to see whether a real word has been created. Nevertheless, sound segmentation and deletion are required before the child adds a new onset each time to the stable rime unit. A child without these skills is not likely to participate in either rhyming word production activities or beginning sound production activities. It is essential for teachers to understand where to position these higher-level activities within the preschool year and how to scaffold the tasks when first using them.

Detection manipulations (i.e., matching) of rhyming words and beginning sounds can also be quite difficult for preschoolers if too many items are used in activities. For example, it is relatively easy for children to detect whether the two words provided in a task rhyme or do not rhyme, or do or do not begin with the same sound. On the other hand, if preschoolers are given a rhyme detection task with a target word and three additional words, only one of which rhymes with the target or begins with the same sound, they often flounder.[13] [14]

Instructional Options for Reducing Task Difficulty

In most research studies of detection of rhyme or beginning sound, tasks presented to children have included four items. For example, in rhyme similarity detection tasks, there is a target word and three words to compare with it, with only one of these matching. In rhyme oddity tasks, four items are presented, with one of the four "the odd one out" (i.e., not rhyming with the others). These tasks are much easier when three items are used instead of four. In fact, in one study,[15] researchers reduced the number of items to three from four. This change made the task suitable for the four-year olds in the study. Five-year olds in the study continued to get four items. Interestingly, the average scores of the four-year olds on this task were a bit higher than the average scores for the five-year olds in the study, even on task items that focused on middle and ending sounds, not just on beginning sounds. What a difference a little simplification in a task makes when it reduces the memory and processing demands! Of course, we can reduce the number of items even more in an instructional context, such as by providing judgment tasks that have just two items (e.g., "Do *bat* and *cat* rhyme?"). In one successful intervention study with four-year olds, two-item judgment tasks were used for rhyme detection tasks.[16]

We Scaffold in Instruction. We Do Not Scaffold in Assessment. Does This Difference Matter?

Let's return to the classroom example considered earlier in which the teacher asked, "Can you think of words that rhyme with *boat?*" One child in the small group answered *coat* and the teacher said, "Yes, you are right: *Boat* and *coat* rhyme." Then, another

child said *goat* and the teacher said: “Yes, *goat* also rhymes with *boat*.” The other four children in the small group did not offer ideas.

The teacher in this example did not offer any scaffolding. Scaffolding involves the performance of some task elements by the teacher when a child is just beginning to learn how to do something. Over time, as the child is able to do more parts of the task independently, the teacher removes some of the scaffolding, and then all.

The examples in the detection and production strategies that have been added to the curriculum framework have the teacher isolating the beginning sound (i.e., the onset) or the rime unit that is shared across words (e.g., when looking at an alphabet book and identifying the names of pictures on a page [p. 44] or when talking about some of the words in a song [p. 36], such as “Down By The Bay”) or the teacher uses a combination of strategies (e.g., the teacher asks for the children’s *judgments* about two spoken words the teacher offers). For example, the teacher does not say, “That’s right, *care* sounds like *bear* and *hair*,” and leave it at that. Instead, the teacher is very explicit (e.g., “*Care*. Yes, the last part of *care* is /air/, just like the last parts of *b-ear* and *h-air*.” [p. 37]).

In some examples, the teacher provides onset and rime segments for the children to blend that will produce a rhyming word for a new verse in a song, and the teacher also segments into onset and rime units any whole words from a song that children have recalled (e.g., the one that rhymes with another word in the song the teacher has stated). In these cases, the teacher is embedding blending and segmenting manipulations in a rhyming word context, while not relying on the children to produce rhyming words by themselves. In the rare case of a child producing a rhyming word, the teacher does not simply accept it, but makes explicit why it “works” using a demonstration in which the word’s rime unit is separated from its onset and compared to other words that have the same rime unit (p. 37).

What is Lost When Rhyme and Beginning Sound Production Strategies Are Not Provided to Children?

It is fun and empowering to notice the rhyming words in a song or a poem, and it is even more fun to play with this kind of language and *create* it. By using these traditional rhyme activities as opportunities to embed detection and production opportunities, children are also given opportunities to “run with it” by producing words that rhyme with others or begin with the same sound. Admittedly, the ultimate goal of phonological awareness activities is to help children develop the skills they will need in learning to read and spell. It seems a shame, though, not to provide an intermediate level activity to which children might apply their budding phonological skill. The practice of engaging children in beginning rhyming word production activities *without scaffolding*, such as has been typical in traditional rhyme activities in preschool classrooms, assumes that the children already possess basic sound unit manipulation skills (i.e., blending, segmenting, and deleting skills described in language and literacy foundations 2.1 and 2.2). In fact, many four-year old children in a typical classroom may be unable to manipulate sound units within words independently (without adult assistance) for much

of the preschool year. If, however, careful scaffolding of traditional rhyme activities is provided *for the majority of the preschool year*, and if these activities supplement a major focus on the use of other sound unit manipulations (i.e., blending, segmenting, and deleting), such experiences surely would position many children for independent engagement in more traditionally presented rhyme activities (without scaffolding) later in the preschool year.

Preschoolers also typically engage in singing songs and saying poems that contain rhyming words and words that begin with the same sound (i.e., songs and poems with alliteration). Focusing more intentionally on rhyming words and words that begin with the same sound by using words found in a familiar poem or song is potentially useful in nudging children toward applying the skills that they develop from more isolated blending and segmenting instructional activities to these other, more naturalistic contexts. Moreover, children tend to become more alert to the language used in songs and poems, if these contexts are used to provide some of the phonological awareness instruction for the class. Greater alertness to words in the songs that children sing and to the poems that children say might, in turn, contribute to the development of children's sound awareness.

If, on the other hand, teachers do nothing intentionally to link contexts that provide explicit instruction in phonological awareness with contexts in which children hear language with the relevant sound units actually used, children might gain less from singing songs and saying poems than they otherwise could. Although wise teachers do not rely too much or even primarily on children's own insights to produce some kinds of learning, they also stack the deck to nudge children into thinking about their experiences, including the language in the songs they sing or poems they say, for they know that learning to think is important and that children need various kinds of opportunities in which to engage in thinking.

Using children's names in a beginning sound strategy, for example, in transition activities, might help children to learn more about their names and to use their names as a model for learning more about words in general. Of course, blending, segmenting, and deletion tasks can be used with children's names in transitions and also in other instructional contexts. Using beginning sound detection with children's names ("If your name starts with /s/, you may go wash your hands") *simply adds to* the teacher's repertoire. Saying the children's names with another sound substituted for their first sounds, as might be done after singing *Willoughby-Wallaby-Woo,* also adds to the teacher's repertoire. The more ideas a teacher has for using children's names, the more children are likely to learn about the sounds and letters in their names, and to link the two.

Summary

The addition of detection and production strategy contexts to the phonological awareness strategies that align exactly with the phonological awareness foundations

has been done in ways that are consistent with the foundations. The additional strategies are supplemental to other strategies, and their instructional design differs from the design of detection and production activities commonly used by preschool teachers in the past.

Processes of teacher change must also be taken into account by curriculum frameworks in ways that they need not be taken into account by a set of learning foundations. The information in Volume I of both the *California Preschool Learning Foundations* and the *California Preschool Curriculum Framework* is likely somewhat new to many preschool teachers. When asked to change teaching practices, it is useful for teachers to know in what ways, if any, their past practices relate to newly recommended practices. By including some strategies in the chapter that are similar to teachers' past practices, but by *altering these in ways that are more aligned* with current research, teachers can better understand how past and newly recommended strategies are similar and also different. In this way, teachers can be helped to adopt new strategies, even while retaining, with adaptations, some of the strategies they have used in the past. This makes the change process more comfortable and thus more likely to occur, which is not an inconsequential consideration at a time when so much is being asked of preschool teachers.

Endnotes

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