Each series will be curated by a Vermont expert on the subject, with editing support from Dorinne Dorfman, Ed. S., Ed. D., and The Reading League Vermont. If you are interested in writing an article, please contact Dr. Dorfman at dorinnedorfman@gmail.com.

The three-part series features:

1. **Phonemic awareness** in September - November 2024, with lead editor Cara Arduengo, MS, CCC-SLP, M. Ed.
2. **Phoneme-grapheme mapping** in December 2024 - March 2025, with lead editor Kathryn Grace, M. Ed, CAGS
3. **Orthography and morphology** in April - September 2025, with lead editor Peggy Price, M. Ed., Fellow/OGA

Curious Question:
Of the thousands of homophones in English, what are some of the more surprising pairs and triples?

Nasal Phonemes and their Quirks

By Bruce Rosow, Ed. D.

Introduction

In this series of articles, our starting point has been to emphasize that phonemic awareness (PA) is a foundational skill in teaching our children to read and spell, to be taught through direct, explicit, and sequential instruction.

When we are asked by parents, colleagues, or students why PA activities are so important, they deserve a clear, simple answer. We use PA activities, such as minimal-pair (one phoneme change) tracking, to help students segment and identify speech sounds (phonemes). In doing this, students create the 'parking spots' to park the letters (or letter units - graphemes).

By first creating parking spots for each phoneme in a spoken word, we work from speech to print, anchoring print in speech. This parking of graphemes in phoneme parking spots, creates the conditions for sight word development, which is the automatic recognition of a specific word.

The Elusive Phoneme

One would think it a simple task to identify and track the phonemes in spoken words. Back in 1998, Adams et al. wrote "The elusive phoneme," to explain why it is not so simple. My colleague, Mike Minsky came up with his own explanation when he told me one day, "Tom Burton stole the butter plate." Mike looked pleased with himself when he said this, as well he should have. He was someone who liked to tease. When we look at the *t*'s in Mike's sentence, the elusive connection of speech to print comes to light. Do you speak the letter *t* (/t/ sound) in Tom like you do with any of the other *t* spellings like in plate?

For that matter, do you speak the *t* /t/ in Tom like the *t* spelling in train? In American English, the *t* in butter sounds like /d/. These variations clue us in to the idea that phoneme-grapheme correspondences are not simple, and in fact can be elusive.

Adams et al. (1998) elaborate how speech sounds can be elusive because of our different dialects, because of predictable changes called allophones (as in what *t* spells in train and *d* in drain), and because features in the production of one phoneme can spill or bump into neighbors as we combine, or co-articulate, phonemes in speech. You can find descriptions and explanations of many of the variations in speech that make phoneme identity elusive in *Speech to Print* (Moats, 2020). These factors make PA instruction not so simple. Today, we investigate the not-so-simple world of nasal phonemes.

Phonetics

Phonetics is the study and classification of individual phonemes. The terms nasal, stop, fricative, affricate, glide or liquid, name the manner, or how a speech sound is spoken in isolation. These labels fill the row headings on the consonant map. Introducing nasals, ask your class to hold their nose and then say the common nasals /n/ or /m/. It is funny when they realize they can't. In addition to its nosy nature, many students and adults do not recognize /ng/ as the third nasal phoneme.

Some think there is a final /g/ in *sing, sang, sung* (there is no /g/). It took me a long time to pronounce /ng/ to model it for students. My colleague, Judith Nero, walking by in the hall, instead of saying hi, said /ng/, and I tried to say it back after thinking *thin* to *thing*.

The manner of production for nasals is to obstruct the air from exiting the mouth, instead channeling air out the nose. The manner, or way a phoneme is spoken is a distinctive feature, distinctive because it distinguishes that phoneme, or groups of phonemes (nasals), from other phonemes. Only nasals send air out the nose. In the back of the throat there is a velar flap that flaps, redirecting the air. I tell students it is like a garage door closing. Nasals are noisy or voiced, sonorant not obstruent, phonemes. In that, they have a lot in common with vowels, acting like semi-vowels as the second syllables in rhythm and button.

A second distinctive feature is place, as in front, middle or back of the mouth where the air is blocked. Place fills the column headings in the consonant chart, front to back. With consonants, somewhere along the way air gets blocked. Vowels are open, meaning the air is shaped, not blocked. This makes consonants somewhat easier to work with; there is more feedback from feeling the blocked air.

Say each nasal sound. Feel in your mouth where and how the air is blocked. Fill in the table matching each nasal with position meaning where the air is blocked:

Nasal Phoneme	Where	Blocked How
/m/	front	lips
/n/	middle	tongue behind top teeth
/ng/	back	back of tongue/ throat

Notice where (columns) and how (rows) the three nasal phonemes fit in the consonant chart.

	Lips	Lips/ Teeth	Between Teeth	Behind Teeth	Roof of Mouth	Back of Throat	Glottis
Stops	/p/ /b/			/t/ /d/		/k/ /g/	
Nasals	/m/			/n/		/ng/	
Fricatives		/f/ /v/	/th/ /th/	/s/ /z/	/sh/ /zh/		/h/
Affricates					/ch/ /j/		
Glides					/y/	/wh/ /w/	
Liquids				/l/ /r/			

Nasal Identity Instruction

Some students confuse one nasal for another, in part because all three nasals divert air through the nose. One way to diagnose this issue is through spelling error analysis (error given first):

- haner / hanger
- alon / along
- disoment / dissonant

You can help students clean up nasal identity confusion by having them identify where and how the air is being blocked (as noted in the table). Use minimal pair sets or chains (***dim, din, win, wing or rat, ram, ran, rang, rank***), or PA manipulation such as substitution (***strum*** /m/ to /ng/; ***clam*** /m/ to /n/, ***skin*** /n/ to /m/, ***stun*** /n/ to /ng/, ***sling*** /ng/ to /m/, ***wing*** /ng/ to /n/) can help.

Phonology and Co-Articulation

The study of individual speech sounds and their features is the study of phonetics. The study of how phonemes interact in speech is the study of phonology. Because we do not speak one phoneme at a time, phonetics can get us only so far. Let's investigate how coarticulation works.

The homo-organic nasalization rule provides an illustration of coarticulation and is a phonological pattern. Teach yourself, and then impress your friends, family, and dog with your knowledge of this rule. Simply fill out this chart, about 5 words per column, with words containing a consonant phoneme after the nasal, even if that consonant begins the following syllable.

A model example is given for each nasal. When you are done, compare your answers with the consonant chart.

Consonant after /m/	**pump** slumber amber amp
Consonant after /n/	**bend** bent sand spent pinch singe
Consonant after /ng/	**bank** **anchor** anger drink bunk bungle anxious

So what? You find consonants from a similar position attract each other as neighbors. The front consonants /p/ and /b/ follow the front nasal /m/, the middle consonants /t/, /d/ and even /ch/ and /j/ follow the mid-nasal /n/, while back consonants /k/ and /g/ come after the back nasal /ng/. Speech came before print. In speech, phonemes flock together like birds of a feather. We evolved able to co-articulate with the greatest of ease.

Nasalization and Spreading Features

Coarticulation is not just about what comes after. To produce a nasal, there is that pokey garage door that flaps to shut off the oral cavity. This gesture takes a bit of time, time to gossip with neighbors. When a vowel comes before a nasal, this door begins closing in anticipation of the nasal. The vowel and the nasal thus share this feature; both are nasalized. Nasalized vowels are tricky. Try saying out loud this second Minsky-ism: *Carl can can peaches*. If you say can the same way twice, you sound like a robot. Which can is more nasalized? (the second one) One takeaway is how the feature of nasalization amalgamates/glues the vowel to the nasal. The spoken vowel may sound altered, losing its ideal or crisp identity.

Here are spelling samples that illustrate this issue (error given first):
- slinder/slender
- daning/dining
- sponk/spunk
- skenny/skinny

Because these vowels share the feature of nasalization, it can be hard to tell a clear boundary where the vowel ends and the nasal begins, making them hard to segment.

In addition, the consonant following the nasal shares the feature of place (where the air is blocked, evidenced by the homo-organic nasalization rule), interweaving their production and identities. This sharing of features creates problems for students who struggle with phoneme segmenting and minimal pair chain tracking. One common error, demonstrated in spelling samples, is nasal omission after a vowel before a voiceless stop (/p/, /t/, /k/).

For example (error given first):
- sik/sink
- jup/jump
- sraj/strange
- siple/simple
- hotid/haunted
- unbleded/unblended
- trasplant/transplant
- basemet/basement

Instructional Implications

What is a teacher to do? One common teaching approach to the difficulty of segmenting vowel-nasal-consonant clusters is to call them, as Barbara Wilson does, welded sounds. In the Wilson System welded sounds are treated as combined units (an, am, ing, ong unk, ank, ink) acknowledging that the phonemes are interwoven and difficult to segment. For many students, using welded sounds works. Go welders!

However, in my own practice, I stick to identifying all the parking spots, especially when the identity can be muddy. I live in Vermont. Mud doesn't bother us here. This brings us to the last lick.

As we have seen, tracking phonemes to create the parking spots to park the letters can be elusive. The not so simple truth is that phoneme identity, as in phonetics, is an abstraction, a way of categorizing speech sounds in isolation. Think of apples. There are many kinds but we call them all apples. The category of apples is an abstract label for a variety of types that share distinctive features. Phonemes do not always exist in speech in one pure form, like the /t/ in *Tom*. When phonemes are co-articulated they are influenced by neighbors, creating variants.

If we want to transcribe speech at a closer, more specific level, we can add features that are observable but are not distinctive, features that do not change the phoneme identity. For example, the /t/ in *Tom* is a plosive whereas the /t/ in *plot* is not. We call the Tom /t/ aspirated, and the other /t/ unaspirated. Including more detail does get us closer to the surface reality of speech. However, the push of air, or lack of this push of air, does not change the abstract identity of the phoneme, /t/, our beloved unvoiced, alveolar stop. We identify the vowels in can can as short/lax /ă/ even though they are spoken differently.

More detail gets us closer to the surface reality of speech; in this case, short/lax /ă/ is more nasalized in the second *can*. But at the abstract, phonetic level, we categorize both as short/lax /ă/'s.

Returning to nasals, shared features in place of articulation, and spreading features in the nasalization of a preceding vowel, muddies distinct boundaries between phonemes, and the identity of particular phonemes. Skilled teachers are aware of the possible variations between the surface, spoken form of a phoneme, and the deeper, ideal identity of that phoneme. This allows teachers to anticipate confusions, and respond to the response when these issues come up as they frequently do. For example, we can point out to students the difference between the nasalized vowel and its more ideal form by deleting the nasal (*slant* without (w/o) /n/, *stunk* w/o /ng/, *sank* w/o /ng/). Using minimal pair chains (*sun, sum, sung, sunk*) and sets for manipulation, including substitution (*bent* /t/ to /d/, *tend* /d/ to /t/, *limp* /ĭ/ to /ă/) and deletion (*blimp* w/o/ /m/, *chomp* w/o /m/, *spend* w/o /n/, *clunk* w/o /ng), can be effective in establishing the phoneme sequence that involves nasals, when the surface features muddy the waters.

Note, we are not just 'doing' PA. We are targeting specific issues in the prompts we select. Our goal is helping students attune to the abstract identity of phonemes, in sequence, so they can build the parking spots to park the letters.

Meet the Writers and Editors

Bruce Rosow, Ed. D.

Dr. Rosow has been an educator for 39 years. He has worked with students from pre-kindergarten through graduate school. Dr. Rosow began his career as an intermediate grade classroom teacher at Guilford Elementary School. Starting in 1991, he began training in structured literacy instruction, studying with Dr. Louisa Moats at the Greenwood Institute. In 2008, Dr. Rosow completed his doctoral studies in educational psychology at American International College.
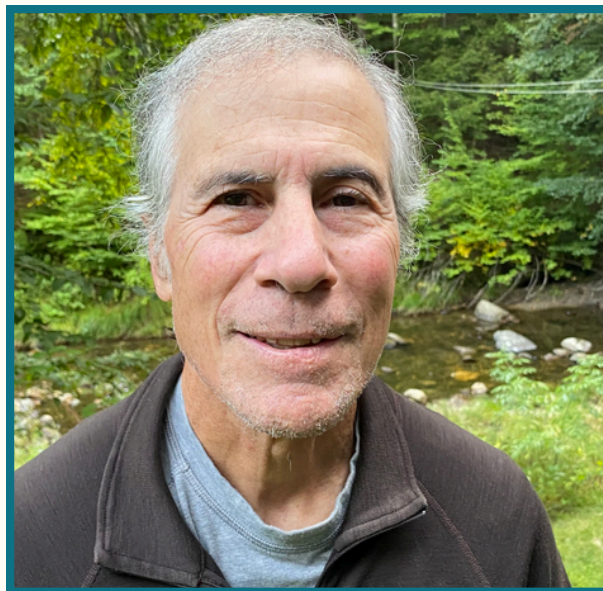
For close to a decade, Dr. Rosow served as the Academic Dean of the Greenwood School. He then returned to public education, working in the Windham Central Supervisory Union, where he created and ran the Language Lab providing remedial instruction to struggling middle and high school readers. For almost two decades, Dr. Rosow also taught in the Language and Literacy Program at The Reading Institute with Simmons College and Bay Path University. Dr. Rosow and Dr. Moats wrote the first edition of *Spellography* (Sopris West, 2003) and recently completed revising the program (95% Group, 2024). Dr. Rosow also co-authored the *Speech to Print Workbook, 3rd Edition* with Dr. Moats (Brookes, 2020). Dr. Rosow continues to tutor students, to write curriculum, to train teachers, and to advocate for students with learning differences.

Cara Arduengo, M.S., CCC-SLP, M.Ed.

Cara loves collaborating with teachers in Vermont public schools. After earning her Bachelor of Arts at Middlebury College, she attended the Upper Valley Educators Institute and New England College and taught 7-12 English Language Arts. She graduated from the Massachusetts General Hospital - Institute of Health Professions where she pursued a certificate of advanced study in reading, recognized by the International Dyslexia Association. Her passion at work is analyzing the components and connections of written language. She is a speech-language pathologist (SLP) at The New School of Montpelier. Previously she worked at Barre Town Middle School and Milton Middle School. Cara also likes to tie in her other experiences as a tutor, violin teacher, and outdoor educator.

Dorinne Dorfman, Ed.S., Ed.D., OG/A

Dorinne has served as a teacher and principal for nearly 30 years in Vermont's schools. After completing her undergraduate studies at Goddard College, she earned her Master's and Doctorate in Educational Leadership at the University of Vermont. As a postdoctoral Fulbright Scholar, she taught at the Technical University of Berlin and conducted research on democratic education in Germany. Since completing an Education Specialist Degree in Reading and Literacy Instruction at Bay Path University, Dr. Dorfman teaches evidence-based literacy to struggling readers at Barre Town Middle School.

Answer to this issue's Curious Question: Of the thousands of homophones in English, what are some of the more surprising pairs and triples?

air/heir, altar/alter   attendants/attendance   chance/chants   chews/choose   guessed/guest   lightening/lightning   cite/sight/site   idle/idol/idyll   oar/or/ore   peak/peek/pique   rain/rein/reign   road/rode/rowed

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