How the Phonology of Speech Is Foundational for Instant Word Recognition

by David A. Kilpatrick

For those of us blessed with proficient reading abilities, word-level reading is smooth and effortless and only presents difficulties in unusual circumstances. We often take these fluid skills for granted. Yet how is it that we can move so effortlessly through text, barely giving much conscious thought to the individual words, yet taking in the flow of meaning as we go along?

The most obvious answer is that we have *word-reading fluency*. Fair enough, but how does one become fluent? It may seem a bit surprising that there is good reason to believe that phoneme-level processing skills are at the root of word-level reading fluency. Before dismissing such a nonintuitive notion (i.e., "How does an *auditory* skill influence *visual* word recognition?"), consider the fact that individuals with dyslexia, and individuals who are deaf, lack word reading fluency. Both of these groups of individuals struggle with the phonemic properties of spoken language (for information about *phonemes*, see "What Are Phonemes"). To understand the connection between phonemic processing skills and word-level reading fluency, let's consider a little known but research-supported perspective on fluency.

What Are Phonemes?

Phonemes are the smallest detectable sound units in spoken language. They allow us to distinguish one syllable (or word) from another. For example, we can distinguish the spoken words *sat* from *sad* because they differ by a single phoneme, even though two of their phonemes (/s/ & /a/) are the same. *Box* and *see* are easy to tell apart because they share no phonemes. In alphabetic writing systems, letters are designed to represent individual phonemes. English, due to its long, rich history and many words borrowed from other languages, has the most deviations from this letter-phoneme idea behind alphabetic writing. For example, many two-letter groups represent a single phoneme (*ch*, *sh*, *th*, *ee*, *oa*), or even more than two letters (*igh*, *ough*). As a result, the spoken words *ax*, *cat*, *thin*, *sheep*, and *thought* all have three phonemes, but their written forms have between two and seven letters (notice that *ax* has three phonemes because the letter *x* at the end of syllables represents two phonemes, /k/ /s/). With this said, phonemes in spoken language are routinely represented in writing by a single letter.

The Nature of Word-Reading Fluency

The National Reading Panel (NICHD, 2000) devoted an entire section of its research review to fluency. They defined fluency as reading with speed, accuracy, and proper expression (prosody), and they indicated that fluency was important because it freed up cognitive resources to focus on comprehension. However, they did not discuss the nature of the skills that underlie word-reading fluency or how someone becomes fluent. They also did not say too much about why some children are dysfluent.

Not long after the National Reading Panel review came out, series of papers were published by Joseph Torgesen and colleagues (Torgesen; 2004, Torgesen & Hudson, 2006; Torgesen, Rashotte, Alexander, 2001; Torgesen, Rashotte, Alexander, Alexander, & MacPhee, 2003), that provide important insights into the nature and "causes" of reading fluency. They described word-reading fluency as primarily—but not exclusively—a byproduct of the size of the databank of familiar words that readers have stored in long-term memory. This databank of familiar written words is referred to as a *sight word vocabulary* or an *orthographic lexicon*. Words in the orthographic lexicon are instantly and effortlessly recognized as familiar because they have been previously encountered and are now well established in memory. "It is the necessity of slowing down to phonemically decode or guess at words that is the most critical factor in limiting the reading fluency of children with severe reading difficulties," said Torgesen and colleagues. "The most important key to fluent reading of any text is the ability to automatically recognize almost all of the words in the text" (Torgesen et al., 2003, p. 293). Thus, a reader with a large sight vocabulary moves quickly and accurately through text while a reader with a limited sight vocabulary does not.

You may be asking, "what about rapid automatized naming (RAN) and reading experience, aren't they associated with reading fluency?" You would be correct (Torgesen & Hudson, 2006). However, RAN and reading experience are also associated with the size of the orthographic lexicon. So, we cannot separate these out and speak of them in a simple, additive manner. Educators cannot directly influence RAN, nor can they ultimately control the amount of reading experience a student has. But, there are ways to build word-reading skills and reading fluency. Before discussing that, let's explore the validity of the notion of fluency proposed by Torgesen and colleagues.

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Abbreviation

RAN: Rapid automatized naming

Research That Provides Insight into Word-Reading Fluency

Research support exists for the idea that reading fluency is largely the result of the size of the sight vocabulary. First, studies show that the speed with which students can read words from a list (i.e., without context) correlates very strongly with the speed of their paragraph reading fluency (Jenkins et al., 2003; Kim et al., 2012; Torgesen, Rashotte, & Alexander, 2001). Timed word list reading appears to function as "a direct measure of both the size of a child's sight word vocabulary and the speed with which individual words can be recognized" (Torgesen & Hudson, 2006). This statement is based on the assumption that children with a large orthographic lexicon can read many words from a list under timed conditions while children with a limited orthographic lexicon will read fewer words during that same time limit. The fact that timed list reading correlates so strongly with paragraph reading fluency supports the view that reading fluency is a byproduct of the size of the sight vocabulary.

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Second, Torgesen and Hudson (2006) note that among older students in intervention studies conducted by Torgesen and colleagues, such students may be fluent on a second-grade level passage, but dysfluent on a fifth-grade level passage. Consider the implication of this. If fluency were its own reading-related subskill—independent of the size of the sight vocabulary—those older students should also be dysfluent reading the second-grade passage (e.g., if fluency had to do with the speed of the activation of known words). Those older students would be more familiar with all or most of the high-frequency words in a second-grade passage than they would with the many lower-frequency words in the fifth-grade passage. Thus, the size of their existing databank of familiar words appears to best explain the fluency disparity between their reading of second- vs. fifth-grade passages.

Researcher Linnea Ehri, who has spent her career studying sight-word memory, independently came to a similar conclusion as Torgesen and colleagues:

> If readers know words by sight and can recognize them automatically as they read text, then word reading operates unconsciously. In contrast, each of the other ways of reading words requires conscious attention. If readers attempt to [phonically] decode words, to analogize, or to predict words, their attention is shifted from the text to the word itself to identify it . . . It is clear that being able to read words automatically from memory is the most efficient, unobtrusive way to read words in text. Hence, building a sight vocabulary is essential for achieving text-reading skill. (Ehri, 2005, p. 170)

If the size of the orthographic lexicon is central to reading fluency, how can it be efficiently built? Why are those with dyslexia so poor at remembering words, and thus lack fluency? Findings related to this question have emerged in the niche area of the reading research that examines orthographic learning. Orthographic learning research is designed to understand how we remember the words we read. Two of the most strongly supported theories of orthographic learning are David Share's *self-teaching hypothesis* (Share, 1995, 2011) and Ehri's *orthographic mapping theory* (Ehri, 2005, 2014; Miles & Ehri, 2019). Both of these theories place a heavy emphasis on the phonological properties of spoken language.

The Self-Teaching Hypothesis

How many of the tens of thousands of words in our databank of familiar words did our teachers or parents teach us? Very few. Perhaps only several hundred. This means that we taught ourselves the rest of them. The self-teaching hypothesis (Share, 1995, 2011) explains how we add new words to our orthographic lexicons after encountering them in print and successfully sounding them out. As a result of this process of *phonological recoding* (a term used by some researchers as an equivalent term for *phonic decoding*), connections between a word's pronunciation and its letter sequence are made. However, if the word is not sounded out, its likelihood of being remembered in the future decreases dramatically (Share, 1999). This indicates that the ability to sound out an unfamiliar word forms the foundation of remembering words. The self-teaching process is supported by many direct studies.

An Issue That Science Must Explain

The self-teaching model prompts a very interesting question. Ask yourself: of the tens of thousands of words that are familiar to you, what percentage of them did you—upon first encounter—put any conscious effort into remembering for the next time? If you are like most skilled readers, you would say very few, perhaps 1–2%, if even that. This means that words are remembered implicitly, and that requires a scientific explanation. How is it that we can remember tens of thousands of words that we have encountered over the years, and we have no conscious awareness of doing anything to remember them? Compare that to when you had to remember your math facts, or state capitals, or terms for a biology test. That's because orthographic learning seems to happen unconsciously, automatically, and in the background. When we encounter a new word in a text, we figure it out it and move on. We do not run to get flashcards. Our goal is comprehending what we read, and the simple determination of the word via sounding it out is enough to serve that purpose. Yet in the background, our orthographic memory is "logging" some kind of connection between that spoken word and that printed word so that on future encounters, it is a familiar word and easily recognized.

Ehri's theory of orthographic mapping takes us a big step in the direction of understanding this amazing process.

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Orthographic Mapping

Orthographic mapping is the cognitive process we use to store words for later, instant, and effortless retrieval. It is basically how we add each "entry" into our orthographic lexicon/sight vocabulary. "Letter sound knowledge and phonemic awareness are central to the orthographic mapping process" (Miles & Ehri, 2019, p. 63). It involves connecting something we already know (the word's pronunciation) to something we are trying to learn (the printed form of the word). This connection forming process occurs at the level of phonemes, given the alphabetic nature of our writing system. If students can distinguish between the different phonemes within a spoken pronunciation in long-term phonological memory, they have the necessary anchoring points to attach the word's spelling to that pronunciation. Studies show that from second grade on, typically developing readers require only 1–4 exposures to a new word before it is firmly (and permanently) established in long-term orthographic memory (e.g., Share, 2004), such that the word becomes effortlessly recognized thereafter. However, for students who don't have access to the phonemic structure of the oral pronunciation (i.e., weak phoneme awareness), they do not have adequate anchoring points in their long-term memory to efficiently "store" the letter orders that represent spoken words. A word's letter order represents that word's orthography. *Orthography* comes from two Greek words meaning "correct" and "written characters" (Liddell et al., 1968). Orthographic memory for a written word means that the word's letter order is familiar and thus instantly recalled.

Most people find this orthographic mapping concept quite abstract when they first hear about it. Don't feel bad if you do not "get it" the first time through. I certainly didn't! But when people have the "aha moment" about orthographic mapping, many things they see about reading instruction and intervention with children fall into place.

At this point, it is important to distinguish orthographic mapping from phonic decoding. Phonic decoding is a process used with unfamiliar written words that goes from graphemes to phonemes, then from phonemes to the activation of a word's pronunciation. Orthographic mapping cannot occur unless the person already knows what the word is that he or she is looking at and needs to map. Once the word is known, the phonemes in the spoken word are connected to the letters/graphemes in the written word. The string of letters (i.e., the written word) is thus anchored to the word's pronunciation. From then on, that letter sequence is now familiar and as a unit, and it activates the word's pronunciation. Phonic decoding is no longer needed for that particular word because the printed word is now highly familiar and thus instantly recognized.

Recall that with the self-teaching hypothesis, while we are reading for meaning we encounter new words, determine them through phonic decoding (with context as a backup to address ambiguity and irregularities) and move on. We do not typically participate in conscious word study when we encounter new words. That means that we have barely a "split second" to make the kind of connections that Ehri is talking about. This parallels our own experience that we don't even recall making such connections. How does that happen so quickly and unconsciously?

The Phonemic Proficiency Hypothesis

To do what Ehri says we are doing in the time-limited scenario that Share says we are doing it, the required letter-sound skills and phonemic skills *must* be automatic. Consider the following logic: If the process of storing words for later retrieval is automatic, unconscious, and goes on "behind the scenes," that means that any skills required to bring about that process must also be automatic, unconscious, and occur "behind the scenes." This logic seems inescapable. That means that letter-sound *knowledge* and phonemic *awareness* are not enough—perhaps they are enough for phonic decoding—but not for efficiently remembering words during real world reading. Instead, the skills required for efficient orthographic learning are letter-sound *proficiency* and phonemic *proficiency*. Proficiency here refers to automatic, unconscious access to the sounds associated with specific graphemes (letter-sound proficiency) and automatic, unconscious access to the phonemic structure of the spoken language (phonemic proficiency). Thus, the phonemic proficiency hypothesis naturally emerges as a necessary way to characterize what happens in efficient orthographic learning.

To illustrate letter-sound proficiency, consider the fact that by late first grade, typically developing readers can respond instantly to CVC pseudowords like *bim* or *vup*. To do that, they have to retrieve the sounds of all three letters and blend them together. This suggests automatic access to those sounds. Students who accurately but more slowly look at such words and say "/v/ - /u/ - /p/, *vup*!" are already a few months behind (Harn et al., 2008). They demonstrate blending and letter-sound *knowledge*, yet despite these skills, they are progressing more slowly than they should be. They lack proficiency.

Similarly, from about third grade on, typical readers can respond to complex phonemic manipulation tasks instantly. For example, they can change the /l/ in *flute* to an /r/ to result in *fruit,* all in one second. To accomplish this, they need to do four classic phonemic awareness tasks in that one-second time frame: 1) phonemic segmentation, 2) phonemic isolation (i.e., determine *where* in the word the change needs to be made), 3) phonemic manipulation (i.e., substitute the /r/ for the /l/), and finally 4) phonemic blending. This strongly suggests that the first of these—parsing the word into its individual phonemes—was instant and automatic, and did not require any conscious

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effort. This illustrates phonemic proficiency—instant access to the phonemic structure of the spoken word without conscious effort. By contrast, phoneme awareness implies conscious access to phonemes (the word *awareness* implies *consciousness*).

Having both letter-sound proficiency and phonemic proficiency provides a workable explanation for how we can make the kind of orthographic mapping connections under such time-limited conditions. It helps explain how we automatically stored the tens of thousands of words we know without even thinking about it. The automatic process of remembering words is presumably driven by automatic access to letter sounds combined with the automatic access to the phonemic structure of spoken words. With these skills in place, a word's pronunciation can be implicitly mapped onto its letter order automatically, unconsciously, and "behind the scenes" while we focus on comprehending what we read.

For those with difficulty accessing the phonemic structure of the spoken language, learning a phoneme-based writing system is very difficult. Indeed, that is the case for those with dyslexia, who experience the phonological-core deficit, as well as those who are deaf.

Independent Support for the Phonemic Proficiency Hypothesis

Given what Share's and Ehri's theories tell us about how we remember words, there is compelling logic that phonemic skills and letter-sound skills *must* be automatic. But there is empirical support independent of the logical deduction described above. First, there have been a few direct tests of whether timed phoneme manipulation tasks (i.e., an assessment of phonemic proficiency) are better associated with reading than untimed tasks (i.e., conventional phonemic *awareness*). Although few in number, these studies involved large samples of students (ranging from 162 to 1,423 participants) across a wide range of ages and ability levels (first grade to college students, skilled readers and dyslexics). This association was dramatically displayed via the *Phonemic Proficiency* subtest from the new WIAT-4, with hundreds of students at each age level from age 4 to adulthood (Pearson, 2020). These studies' results, along with the nationally stratified sample from the WIAT-4 norms, suggest that timed manipulation tasks tell us something about word learning beyond pseudoword reading tasks, RAN, and most importantly, untimed phonemic tasks (e.g., Vaessen & Blomert, 2010). While the relationship between reading and conventional phonemic awareness tasks declines over time, these studies and the WIAT-4 norms indicate that timed manipulation tasks maintain a substantial relationship with reading over time.

A second source of support comes from the word reading intervention literature. Studies that involved phonemic manipulation tasks, which allow for an assessment and training of phonemic proficiency, consistently demonstrate substantially higher standard score point gains in intervention studies (Kilpatrick, 2015; Kilpatrick & O'Brien, 2019). Third, support comes from the research literature on dyslexia. Studies show that those with dyslexia do not develop letter-sound proficiency (Yap & van der Leij, 1993) nor phonemic proficiency (Caravolas et al., 2005; de Jong & van der Leij, 2003; Snowling et al., 1997). Finally, indirect support comes from numerous studies that indicate that there is an automatic, unconscious activation of phonology during skilled, silent reading (e.g., Halderman et al., 2012).

Putting Phonemic Skills in Perspective

The notion that phonemic skills lie at the center of proficient word reading should come as no surprise given the alphabetic nature of the English writing system. In traditional Chinese writing, which is not alphabetic, written characters represent words. However, in alphabetic languages, we do not write characters that represent words. Aside from the three words *a, I,* and the archaic *O* (replaced by *oh*), there are no words in English where a single character represents a whole word. Characters represent phonemes (or at most, morphemes) in the spoken language. So, for those with difficulty accessing the phonemic structure of the spoken language, learning a phoneme-based writing system is very difficult. Indeed, that is the case for those with dyslexia, who experience the phonological-core deficit, as well as those who are deaf. Learning to read proficiently is an ongoing challenge for those who are deaf (Lederberg et al., 2013). Because the nature of alphabetic writing is to capture the phonemic sequences in the speech stream, it should be no surprise that phonemic skills are so central to word-level reading.

Perhaps why this may initially surprise us is that our intuition strongly suggests that because written words are visual, we must be using some kind of visual memory process to read. However, for several reasons, researchers know this intuition is not accurate. I have covered this more extensively elsewhere (Kilpatrick, 2015; Kilpatrick & O'Brien, 2019), but briefly summarize here.

First, there is a moderate to strong correlation between phonemic skills and reading, but a low correlation between visual memory and word reading. Second, related to the first, is that those with dyslexia, as a group, do not have poor visual memories. Third, we can easily recognize a written word we know, even if it looks very different from our original exposure to that word. For example, *BAG* and *bag* look nothing alike (or even bag; note the different visual presentations of the letter g/g, neither of which looks like G). It is the *sequence of letters* that is familiar, not the visual look of the word. Fourth, as mentioned, those who are deaf struggle learning to read. Their visual memory is as good as hearing individuals. If reading were based upon visual memory, we would not expect them to struggle.

Fifth, we have lapses in visual-phonological memory when we forget people's names or the names of objects we are looking at ("Hand me that uh . . . that thingy over there"). But we never have such failures with familiar written words. Finally, neuroimaging studies show different activation patterns in the brain between visual memory tasks and word recognition tasks.

Visual memory is not how we remember words for later retrieval. We remember words via orthographic memory. That is, we recognize letter sequences in written words as familiar, regardless of the visual presentation of the word—whether uppercase, lowercase, or in differing fonts or people's handwriting, as long as the word is legible.

Conclusion

Contrary to our intuitions, phonemic skills are foundational for fluent, word-level reading in alphabetic writing systems. They not only assist in sounding out new words, but they are central to remembering words. The more efficiently we remember words, coupled with wide reading experience, the more quickly we build our pool of known words. And the larger that pool of known words, the more easily we move through text quickly and accurately. We thus see there is a relationship, a couple of steps removed, between phonemic skills and reading fluency. But it must be understood that not all studies show this because they typically assess phonemic *awareness*—that is, conscious access to phonemes—in untimed phonemic tasks. However, efficient orthographic mapping happens under an extremely limited time frame while reading, so the phonemic skills needed to connect pronunciations with spellings of words must be lightning fast. Struggling readers taught via phonics may not develop this level of phonemic proficiency, so while their pseudoword reading skills develop (indicating the phonics instruction did its job), their real-word reading skills may show more limited gains. We can conclude that letter-sound proficiency and phonemic proficiency are both needed for skilled word-level reading. These two skills we find in typically developing readers, but not in struggling readers. We must thus "upgrade" our recommendations from letter-sound knowledge and phonemic awareness to letter-sound proficiency and phonemic proficiency.

References

Caravolas, M., Volín, J., & Hulme, C. (2005). Phoneme awareness is a key component of alphabetic literacy skills in consistent and inconsistent orthographies: Evidence from Czech and English children. *Journal of Experimental Child Psychology, 92*, 107–139. https://doi.org/10.1016/j.jecp.2005.04.003

de Jong, P. F., & van der Leij, A. (2003). Developmental changes in the manifestation of a phonological deficit in dyslexic children learning to read a regular orthography. *Journal of Educational Psychology, 95*(1), 22–40. https://doi.org/10.1037/0022-0663.95.1.22

Ehri, L. C. (2005). Learning to read words: Theory, findings, and issues. *Scientific Studies of Reading, 9*(2), 167–188.

Halderman, L. K., Ashby, J., & Perfetti, C. A. (2012). Phonology: An early and integral role in identifying words. In J. S. Adelman (Ed.), *Visual word recognition: Vol. 1. Models and methods, orthography and phonology* (pp. 207–228). Psychology Press.

Harn, B. A., Stoolmiller, M., & Chard, D. J. (2008). Measuring the dimensions of alphabetic principle on the reading development of first graders: The role of automaticity and unitization. *Journal of Learning Disabilities, 41*, 143–157. https://doi.org/10.1177/0022219407313585

Jenkins, J. R., Fuchs, L. S., van den Broek, P., Espin, C., & Deno, S. L. (2003). Sources of individual differences in reading comprehension and reading fluency. *Journal of Educational Psychology, 95*(4), 719–729.

Kilpatrick, D. A. (2015). *Essentials of assessing, preventing, and overcoming reading difficulties.* Wiley & Sons.

Kilpatrick, D. A., & O'Brien, S. (2019). Effective prevention and intervention for word-level reading difficulties. In D. A. Kilpatrick, R. M. Joshi, & R. K. Wagner (Eds.), *Reading development and difficulties: Bridging the gap between research and practice* (pp. 179–210). Springer.

Kim, Y.-S., Wagner, R. K., & Lopez, D. (2012). Developmental relations between reading fluency and reading comprehension: A longitudinal study from Grade 1 to Grade 2. *Journal of Experimental Child Psychology, 113*, 93–111.

Lederberg, A. R., Schick, B., & Spencer, P. E. (2013). Language and literacy development of deaf and hard-of-hearing children: Successes and challenges. *Developmental Psychology, 49*, 15–30.

Liddell, H. G., Scott, R., Jones, H. S., & McKenzie, R. (1968). *A Greek-English lexicon*. Oxford University Press.

Miles, K. P., & Ehri, L. C. (2019). Orthographic mapping facilitates sight word memory and vocabulary learning. In D. A. Kilpatrick, R. M. Joshi, & R. K. Wagner (Eds.), *Reading development and difficulties: Bridging the gap between research and practice* (pp. 63–82). Springer.

National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the sub-groups* (NIH Publication No. 00-4754). U.S. Government Printing Office.

Pearson, Inc. (2020). *The Wechsler Individual Achievement Test–Fourth Edition.* Pearson.

Share, D. L. (1995). Phonological recoding and self-teaching: Sine qua non of reading acquisition. *Cognition, 55*, 151–218.

Share, D. L. (1999). Phonological recoding and orthographic learning: A direct test of the self-teaching hypothesis. *Journal of Experimental Child Psychology, 72*, 95–129.

Share, D. L. (2004). Orthographic learning at a glance: On the time course and developmental onset of self-teaching. *Journal of Experimental Child Psychology, 87*, 267–298.

Share, D. (2011). On the role of phonology in reading acquisition: The self-teaching hypothesis. In S. A. Brady, D. Braze, & C. A. Fowler (Eds.), *Explaining individual differences in reading: Theory and evidence* (pp. 45–68). Psychology Press.

Snowling, M., Nation, K., Moxham, P., Gallagher, A., & Frith, U. (1997). Phonological processing skills of dyslexic students in higher education: A preliminary report. *Journal of Research in Reading, 20*(1), 31–41.

Torgesen, J. K. (2004). Lessons learned from research on interventions for students who have difficulty learning to read. In P. McCardle & V. Chhabra (Eds.), *The voice of evidence in reading research* (pp. 355–382). Brookes.

Torgesen, J. K., & Hudson, R. (2006). Reading fluency: Critical issues for struggling readers. In S. J. Samuels and A. Farstrup (Eds.). *Reading fluency: The forgotten dimension of reading success* (pp. 130–158). International Reading Association.

Torgesen, J. K., Rashotte, C. A., & Alexander, A. (2001). Principles of fluency instruction in reading: Relationships with established empirical outcomes. In M. Wolf (Ed.), *Dyslexia, fluency, and the brain* (pp. 333–356). York Press.

Torgesen, J. K., Rashotte, C. A., Alexander, A., Alexander, J., & MacPhee, K. (2003). Progress toward understanding the instructional conditions necessary for remediating reading difficulties in older children. In B. R. Foorman (Ed.), *Preventing and remediating reading difficulties: Bringing science to scale* (pp. 275–297). York Press.

Vaessen, A., & Blomert, L. (2010). Long-term cognitive dynamics of fluent reading development. *Journal of Experimental Child Psychology, 105*, 213–231.

Yap, R., & van der Leij, A. (1993). Word processing in dyslexics: An automatic decoding deficit? *Reading and Writing: An Interdisciplinary Journal, 5*, 261–279.

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