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The Impact of Morpheme Instruction on Literacy Skills

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The Impact of Morpheme Instruction on Literacy Skills

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Capstone Project: An Action Research Project

Northwestern College, Orange City, Iowa

Abstract

The purpose of this action research project was to determine what impact a four-week class-wide morphology intervention would have on students' literacy. Specifically, the researcher hypothesized that teaching morphology would improve students' morphological awareness, their ability to spell words that include the morphemes taught, their knowledge of the meaning of words that include the taught morphemes, and their accuracy in reading words that include the taught morphemes. The research was conducted by a fifth grade teacher in her tenth year of teaching. The researcher was interested in research-based practices that improve students' spelling while also improving other reading skills. The fifth grade students were assessed in the four areas of literacy before and after the instruction period. The 10 minutes of daily morphology instruction included direct instruction, discussion, and activities to practice reading and spelling words with eight of the most common English morphemes including suffixes, prefixes, and root words. Data analysis revealed a statistically significant increase in participants' spelling scores, morphological awareness, and reading following the four weeks of instruction. Students' knowledge of word meanings did not improve. These research findings may be beneficial for elementary and middle school educators who are considering ways to help improve their students' spelling while also improving their students' overall understanding of the English language.

Keywords: spelling, morphology, morphological awareness, reading

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The Impact of Morpheme Instruction on Literacy Skills

Many teachers across English-speaking countries today are ill-prepared and ill-equipped to teach spelling in a way that matches research-proven best practices. While teachers have some knowledge of basic spelling patterns, most educators lack knowledge of more complex spelling patterns (Pittman et al., 2022). In the United States and other English-speaking countries, literacy teachers often feel unhappy with traditional spelling curricula and desire help finding suitable replacements and creating instructional routines to support spelling instruction (Tortorelli & Bruner, 2022; Anoniou, 2014). Meanwhile, the students who are struggling the most with spelling are trending in the wrong direction with spelling skills getting worse in recent decades (Westwood, 2018). Recent research supports morphology, the study of meaningful word parts such as prefixes and suffixes, as a key component of spelling and reading instruction alongside phonics (Levesque et al., 2020; Casalis et al., 2018). Despite the research supporting morphology, the primary emphasis recently has been on phonics alone to teach reading. In the United States, the National Reading Panel, a government body formed to assess the effectiveness of various strategies to teach reading, announced in a 2000 report the superiority of systematic phonics over other reading methods (Bowers & Bowers, 2018). That same report neglected, however, to place any emphasis on morphology's role in both reading and spelling (Bowers & Bowers, 2018). The problem is students are ill-prepared to understand the logic of English spelling and consequently, they are struggling with spelling accuracy and other literacy skills.

The purpose of this action research is to identify the effect of morphology instruction on students' morphological awareness, spelling, reading (decoding), and vocabulary. Educators can improve their practice based on the results of this study as results will identify the effect of morphology instruction on students' morphological awareness, spelling, reading (decoding), and

vocabulary. Findings will inform classroom teachers and administrators who make curriculum-level decisions. Recent research has shown positive effects of spelling instruction, including the explicit teaching of morphemes, on students' morphological awareness skills and overall spelling of derived words (Casalis et al., 2018; Galuschka et al., 2020). A gap in literature exists for a whole-class morphology intervention. Some studies have focused on only students with dyslexia or other learning disabilities or focused their research on the impact on student spelling alone. This study adds to the growing body of research showing how students can benefit from morphology-focused literacy instruction. This research fills the gap left by other researchers by looking at a typical mixed-ability class and the impact this type of intervention has on their vocabulary, spelling, reading, and morphological awareness.

Resources for this study were gathered from both Google Scholar and the DeWitt Library at Northwestern College. All sources considered for inclusion were published in a peer-reviewed journal within the last 10 years. The twenty sources selected for inclusion were relevant to this study in that they discussed teacher knowledge of the English system of spelling, educators' perceptions of spelling curricula and instructional practices, spelling and reading interventions, and morphology. These resources were used to establish the current knowledge base and identify any holes in the current research on this topic.

Research suggests that explicitly teaching students how English words consist of meaningful word parts called morphemes and teaching them some of the most common morphemes in the language will benefit not only their spelling but their overall literacy skills (Graham & Santangelo, 2014; Galuschka et al., 2020; Levesque et al., 2020; Georgiou et al., 2021). Knowing this, educators may choose to invest some of their precious time in the school day to morphology instruction. Students need to be able to spell accurately, read fluently, and

comprehend grade level text. Teaching morphemes from the perspective of their influence on word meanings and spellings can help students in all these areas.

The upcoming review of the literature is organized around key themes deemed essential to understand the theoretical basis for this action research study on a morpheme intervention. The review begins by introducing the logic behind the English spelling system, or why words are spelled the way they are. English spelling is governed by phonics, orthography, and morphology. The review presents an overview of the current theories of how kids learn to spell. These theories, particularly the development stage theory of spelling development, have driven recent and current spelling practices in education, despite research showing problems with stage theories that overemphasize phonics and underemphasize morphology in the early years (Westwood, 2018). Next, the literature review will discuss the relationship between spelling and reading. Being two sides of the same coin, an effective spelling intervention is likely to positively impact reading as well. Lastly, studies will be presented that show the proven benefits of research-based spelling instruction on both reading fluency and spelling. The culmination of these topics will show the logic behind this action research study and the author's reasoning for the hypothesis, namely that a daily lesson on morphemes will improve students' morphological awareness, spelling accuracy, decoding or reading accuracy, and vocabulary.

Review of the Literature

English: a morphophonemic language often misunderstood by educators

Researcher Pittman et al. (2022) conducted a quantitative study to determine what teacher educators know about the phonological, orthographic, and morphological patterns of English spelling. Participants in this study included 85 educators who worked in teacher preparatory programs at four-year institutions in the United States. The study consisted of a survey sent to participants and an analysis of the responses. The researchers discovered that most of the participating educators had a good understanding of simple spelling patterns, but less than half of the participants exhibited knowledge of more challenging spelling patterns. The survey results showed that those educators with the greatest spelling knowledge were the most confident about their ability to teach spelling, and overall, the participants' responses suggested that they view spelling as only moderately important. These responses did not vary significantly as a result of the educator's years of experience or grade level taught. The findings of Pittman et al. (2022) seem to suggest that there is a need for instruction in English spelling in teacher preparatory programs, and more understanding of the patterns of English spelling has the potential to improve how students are taught.

The confusion many educators have around the logic of spelling and the most effective ways to provide spelling instruction are also presented in a study by Anoniou (2014). In this research study, Anoniou (2014) explores the knowledge and pedagogy educators require to teach spelling. Anoniou (2014) conducts observations, interviews, and gathers survey data from 14 first year teachers in Australia over the course of 16 months. As in the findings from Pittman et al. (2022), spelling was found to be an area in which many educators lacked confidence. The participating new teachers identified spelling as the area of literacy they felt least happy with,

largely because they knew enough to recognize that their spelling curriculums were not serving the students well, but they did not know what to use to replace it. English as a language is considered morphophonemic, as words are constructed based on both sound (phonemes) and meaning (morphemes). Children come across dozens of words every day that cannot be accurately spelled using phonological strategies alone. Yet, all the new teachers had spelling programs which focused exclusively on the phonological and visual, ignoring the morphological component of English spelling. This study by Anoniou (2014) calls attention to the importance of continued research into the effectiveness of morphological instruction, so that curricula and teacher preparatory programs can prepare teachers for effective spelling instruction that teaches the logic of English.

Westwood (2018) presents an overview of current research on teaching spelling and argues for better training for educators and the need for teachers to gain a more in-depth knowledge of the language. Putting together recent research conducted in English speaking countries like Australia and the United States, this article reiterated the connection between teachers' metalinguistic knowledge of English and their ability to effectively teach spelling, similar to the findings of Anoniou (2014) and Pittman et al. (2022). When teachers lack training in how orthography, morphology, and phonology work together in the spelling process, they teach using ineffective approaches. Professional development that focuses on developing teachers' metalinguistic knowledge of English has been shown to build confidence and competence. The gap between the evidence of how spelling is learned and the ways spelling is taught suggests the need for continued research on the impact of literacy interventions on spelling, reading, and writing.

Bowers and Bowers (2018) help to explain why spelling is so often misunderstood by educators and poorly taught. To teach English well requires that educators know it is a morphophonemic system that grew to jointly represent units of meaning (morphemes) and sound (phonemes). Teachers should know that spelling in English more consistently follows the morphemes rather than phonemes. However, the recent consensus in literacy education is that phonics is the best way to teach reading. Bowers and Bowers (2018) challenge the phonics-only approach and argue for increased morphology instruction to show students of all ages the logic of the English language, something they cannot understand if the teachers providing instruction also lack that knowledge. While Bowers and Bowers (2018) do not share specific data on teachers' knowledge or perceptions of spelling the way Anoniou (2014) and Pittman et al. (2022) do, all of these articles show a need for research into approaches that show the logic of English spelling and provide explicit morphological instruction.

Theories of spelling acquisition/development

There are many theories of spelling acquisition. Treiman (2017) studies what research says about how children learn to spell. The youngest writers, before learning to match letters to sounds, use their statistical-learning skills to learn some information about the patterns in writing, something shown in both Brazilian and U.S. studies. Evidence shows that even as children start to use phonology to pick letters that match the sounds in words, they are also influenced by their early understandings of the patterns of the language (Treiman, 2017). Children were more likely to spell "eater" with the "t" in the middle correctly which contains the stem "eat" than they were to spell "city," which does not have a stem (Treiman, 2017). This suggests that young children's spelling is influenced by the morphological structure of words, and not just phonology.

A common theory is that spelling development goes in stages or phases. Treiman (2017) lists the stages as pre-alphabetic, partial alphabetic, full alphabetic, and the consolidated alphabetic phases. While stage theories correctly show that spelling is not simply rote memorizing, they undervalue nonphonological knowledge or imply that young children are not capable of using morphology or orthography when spelling. Dual-route theories speculate that spelling is learned through the lexical route, those words we memorize, and the non-lexical route, words we learn based on rules and letter sounds. This theory also undervalues nonphonological knowledge. The studies analyzed by Treiman (2017) explore these common spelling theories and Treiman's conclusions support the idea that more research on various methods of teaching spelling is necessary.

Westwood (2018) also analyzes enduring theories of spelling development, starting with the stage theories discussed by Treiman (2017). Stage theory states that learners only start using orthographic patterns and knowledge of morphemes at later stages of spelling development. However, Westwood (2018) shares evidence showing that children often produce spelling that does not match their stage of development. The dual route theory is also frequently cited to describe spelling acquisition, but again Westwood (2018) shares evidence showing that children's actual spelling is more complex than this theory suggests. Children often use other strategies to write words that are neither memorization nor phonology. Both Westwood (2018) and Treiman (2017) analyze current research on spelling acquisition and present a case for the need to conduct further research on how children learn to spell and what teaching strategies are most effective.

A third analysis of spelling research by Levesque et al. (2020) focuses primarily on the role of morphology in literacy development. Levesque et al. (2020) explicitly state what Treiman

(2017) and Westwood (2018) mention—that morphology is underrepresented in theories and models of spelling acquisition. Research on young children between the ages of 5 and 7 shows, contrary to stage theory, that these children are sensitive to morphemes. Children spell root morphemes more accurately than those same letters in a word where they are not a root, like *add* in addition versus *address*, and they spell two morpheme words such as *kicked* more accurately than one morpheme words like *collect* (Levesque et al., 2020). Because current models of spelling development have been shown to be incomplete, Levesque et al. (2020) introduces the *Morphological Pathways Framework* which highlights the role of morphology in the writing and spelling processes of English and other morphophonemic languages. This framework includes the position of morphological awareness in understanding literacy. Morphological awareness is an ability to manipulate and reflect on morphemes in spoken language, something research associates with word reading, spelling, and comprehension (Levesque et al., 2020). This research implies that building up students’ explicit knowledge of common English morphemes will likely benefit their morphological awareness, reading comprehension, word reading skills, and spelling.

A study by Rossi et al. (2019) explored the relationship between spelling skills and reading speed, and in so doing provided evidence for the Lexical Quality Hypothesis. The Lexical Quality Hypothesis (LQH) is a different way of understanding how people determine the spelling of words, namely that higher quality orthographic representations are accessed more quickly than words with lower quality cognitive representations. Rossi et al. (2019) conducted a quantitative study with 93 English-speaking high school students. Researchers tested the speed with which those students read 30 words, and then two weeks later the students took a spelling test to see how they spelled the same 30 words three times each, with no access to previous spellings. The LQH was being tested by seeing if words for which students had higher quality

orthographic representations were accessed and read more quickly than words with lower quality representations. If a student spelled the same word three times accurately, they likely had a high-quality orthographic representation, a type of mental image, of that word. If a student spelled the word incorrectly three different ways, they likely had a low-quality orthographic representation and were likely to take longer to read that word. Rossi et al. (2019) found that words which were consistently spelled accurately were read faster than words never spelled accurately.

Furthermore, words with stable misspellings (spelled wrong but the same way three times) were read faster than words spelled three different ways. This proved that the stability and strength of orthographic representation does impact reading efficiency as the Lexical Quality Hypothesis suggests. While Treiman (2017), Westwood (2018), and Levesque et al. (2020) all show the importance of morphology in understanding spelling development, Rossi et al. (2019) shows the way spelling strength benefits students in reading speed. These studies together point to morphological instruction benefiting kids in multiple areas of literacy.

The relationship between spelling and reading

Just as Rossi et al. (2019) showed a link between reading and spelling in their study on the Lexical Quality Hypothesis, many other studies have proven the close relationship between these two areas of literacy. Martin-chang et al. (2014) conducted a study similar to Rossi et al. (2019) to study how orthographic quality is related to reading speed. In this quantitative study, 74 English-speaking college students in Canada were given baseline tests of their reading speed and spelling skills. A week later, a spelling dictation test was given to see which words the students consistently knew the accurate spelling for. The conclusions closely matched those of Rossi et al. (2019). Words that were always spelled correctly were read significantly faster than those words that were never spelled correctly, and words spelled inaccurately but consistently

were read faster than words spelled inaccurately and inconsistently (Martin-chang et al., 2014). This added to the evidence that spelling and reading are closely linked and improved spelling improves reading speed.

The connection between spelling and reading speed was also explored by Ouellette et al. in a 2017 study of 56 Canadian undergraduate students. In their research, Ouellette et al. (2017) set up an experimental study to see if teaching students how to spell difficult words led to improved reading speed for those same words. After an initial spelling test, the participants were put in either a training or control group. The control group simply had exposures to the misspelled words, but the training group worked to improve spelling accuracy of missed words. After two weeks, the reading times were measured for those same words. This study found results close to those of Rossi et al. (2019) and Martin-chang et al. (2014). When words were consistently spelled correctly, those words were read on average 20% faster than words that were not spelled correctly. In addition, the experimental spelling test was moderately correlated with the reading speed assessment, supporting the theory that increased spelling accuracy is associated with increased reading speed. Teachers may be hesitant to devote time to teaching spelling when reading is tested far more, but this study shows that time devoted to spelling instruction can also positively affect reading achievement.

A 2014 meta-analysis of the impact of spelling instruction on spelling, reading, and writing adds to what is known about the spelling/reading connection. Graham & Santangelo (2014) analyzed 53 studies with a combined 6,037 English-speaking K-12 students as participants. These quantitative studies all addressed the impact of formal, direct spelling instruction on spelling, reading, writing, and/or phonological awareness. Some of the findings from Graham & Santangelo (2014) included the following: formal spelling instruction was better

than no instruction or “spelling is caught” methods; receiving a greater amount of spelling instruction led to greater spelling achievement across all studies; and spelling instruction led to more accurate spelling when writing as well as improved word reading skills, reading fluency, reading comprehension, and phonological awareness skills. The only analyzed literacy area that was not statistically found to correlate with formal spelling instruction was students’ overall writing performance. This meta-analysis shares the impact of spelling interventions that teach phonology but does not discuss studies on morphology and/or orthography interventions. The meta-analysis by Graham & Santangelo (2014) highlights the way spelling is tied to nearly all areas of literacy and is not a distinctly separate entity.

An interesting study by Conrad et al. (2019) analyzed the differences in orthographic learning between reading and spelling. Conrad et al. (2019) looked at whether teaching 48 second grade children nonsense words in a spelling group or a reading group led to greater success in a spelling recognition, spelling production, and naming task the next day. While the reading group was overall more accurate in the three assessment tasks on the last day, presumably because spelling is a more challenging task than reading, the data that was collected showed that once spelling was established, what the spellers learned, they learned better. When only including those children who established accurate spelling during the practice phase, spellers were significantly more accurate than readers at choosing the correct target item, and significantly better at the naming and spelling production tasks. This shows that greater orthographic learning happens with learning spelling than reading. Graham & Santangelo (2014) and Conrad et al. (2019) both concluded that spelling instruction has a positive impact on other literacy skills such as reading.

Two other researchers looked at the specific relationship between spelling interventions and spelling and reading achievement for learners with dyslexia. Galuschka et al. (2020) conducted a meta-analysis of studies that included participants with average IQ but deficient spelling achievement. These participants showed a moderate effect size for spelling interventions on spelling performance, and a small to moderate effect size on reading achievement. Different from the Graham & Santangelo (2014) meta-analysis, Galuschka et al. (2020) included studies on phonics, morphological, and orthographic interventions. All of these showed positive effects. Interestingly, phonics interventions were more effective for younger learners, while morphological interventions benefited older children more. This may lend support to the value of the stage theory of spelling development, and overall highlights the value of spelling instruction that addresses both morphemes and phonemes.

The second study looking specifically at students with dyslexia is Van Rijthoven et al. (2020). This quantitative study conducted with 54 Dutch children with dyslexia consisted of an approximately 27-week intervention in which a clinician provided explicit instruction, exercises, and feedback on both reading and spelling. These sessions worked on grapheme-phoneme correspondence as well as spelling rules and exceptions. When comparing pre-intervention and post-intervention assessments, Van Rijthoven et al. (2020) concluded that the intervention focusing on the bidirectional relationship between phonological representations (the way words sound) and orthographic representations (written spelling) positively impacted both spelling and reading. These results were consistent regardless of students' starting scores, though all of the participants had a diagnosis of dyslexia. The Van Rijthoven et al. (2020) study involved Dutch-speaking children, different from the English-focused studies such as Graham & Santangelo (2014), Martin-chang et al. (2014), and Ouellette et al. (2017). It was also different because the

intervention was not specifically teaching spelling but a combined spelling and reading intervention. Teaching spelling and reading together has the potential to benefit all students, regardless of baseline spelling and reading achievement.

One other study that sought to shed light on the relationship between reading and spelling was Moll et al. (2020). This quantitative study of 167 German-speaking children looked at the stability of deficits for students who had a reading deficit but no spelling struggles, students with spelling deficits but no reading struggles, and those with both a reading and a spelling deficit. Over the course of three years, students with deficits in reading, spelling, or both were tested to see how stable those deficits were. Most children with reading-only or combined reading-spelling deficits saw little significant change in their scores over time, but those with spelling-only deficits were more likely to improve in their spelling. The findings by Moll et al. (2020) suggest that students who have strong decoding skills and phonological awareness, therefore not showing a reading deficit, are more likely to self-correct and improve in their spelling skills. However, Moll et al. (2020) admit that the consistent orthography of German means that results may be different in deep orthographies such as English in which strong decoding skills alone may not be enough to be an accurate speller. This study brings up the issue of language when considering how people learn to spell, as it may be different in languages that are phonetic. Additionally, Moll et al. (2020) offer a reminder that while spelling and reading have a proven link as shown in Rossi et al. (2019), Martin-chang et al. (2014), and other studies, sometimes there is a deficit or growth in one area but not the other.

Morphology instruction's impact on literacy

In the last 10 years, many studies have specifically focused on morphology instruction. Burton et al. (2021) conducted a study with a diverse group of 90 children, aged seven to nine, in

the UK. This study looked at the difference between students who were given explicit instruction on the rule of stem conservation in derived forms of words and those who received only implicit exposure to this morphological spelling rule. Children in both groups played practiced games in which they spelled derived words (i.e. eaten, jumped) after exposure to the base forms (i.e. eat, jump). The explicit teaching group then discussed the connections between the words' spellings in individual sessions. Assessments given after the instruction showed that explicitly teaching the morphological rule resulted in significantly larger gains in spelling than the implicit exposure group. Burton et al. (2021) suggest that explicitly teaching morphological spelling rules, even to young children, helps their spelling achievement. This study did not, however, investigate whether doing this intervention with a whole class all at once would have similar effects. Individualized interventions are much more difficult to implement in typical classrooms.

Another study, this one involving 70 French third grade students, did evaluate the impact of a whole class morphology intervention conducted over six weeks. Casalis et al. (2018) discovered that a morphology intervention had a significant positive effect on two out of three measures of morphological awareness. Students significantly improved in base extraction, where they identified the stem once given a derived word (i.e. find *grand* in *grandeur*), and in production, where they had to complete a sentence with a given sentence and a given base word. Students did not make significant gains in the definition task of morphological awareness, where they had to choose the definition, from two, for a pseudoword ending with a suffix. The Casalis et al. (2018) study did not find significant gains for students on a standard spelling test, but spelling benefits were shown for derived words that had an identifiable stem or affix covered in the intervention. The Casalis et al. (2018) study showed some gains for students undergoing a morphology intervention, though the benefits were not as practical as those shown in Burton et

al. (2021). Improvements in morphological awareness alone are not as valued in the education community, since morphological awareness is not measured in most standardized assessments. Still, gains in morphological awareness imply that students are making gains in their understanding of English and would therefore be likely to make further progress on standardized spelling tests with additional instruction.

Georgiou et al. (2021) conducted a study of 48 English-speaking students in grade three who had persistently poor reading skills, despite previous phonics interventions. This quantitative study out of Canada looked at how participants responded to a ten-week intervention of either Structured Word Inquiry (SWI) or Simplicity. SWI focuses on morphology and how it intersects with phonology and etymology, while Simplicity is a new phonics intervention. Both intervention groups made some gains, though not significant, in word reading. Both groups did improve in their morphological relatedness, a reading task where children identify semantically related words. Georgiou et al. (2021) concludes that reading and spelling interventions can help improve children's morphological skills but are not "magic bullets" for children who have struggled despite previous phonics interventions. Casalis et al. (2018) and Georgiou et al. (2021) show that morphology instruction leads to benefits for students, but they are not quick fixes. Teaching morphology builds students' understanding of language as shown in improved spelling for derived words and morphological awareness (Casalis et al., 2018; Georgiou et al., 2021). Over time, and with consistent morphology instruction, students can become more confident readers and spellers.

Claravall (2016) argues for the use of morphology instruction, the study of word structure and its meaning, in the special education classroom. Based on recent research on the way morphology impacts spelling acquisition and the ways morphology instruction can impact

students, it is likely that those with reading disabilities could benefit from morphology instruction. Often, children in special education classrooms work one on one or in small groups with certified educators. The Burton et al. (2021) study where children had individual practice sessions with the clinician showed great gains for those participants, and a special education classroom may show similar results. Claravall (2016) suggests that continued research on how it impacts students' spelling, decoding, vocabulary, and comprehension will encourage educators to consider morphology instruction as an option, particularly in the special education setting.

Methodology

Participants

The action research study took place in a fifth grade writing class in a rural public elementary school in the midwestern United States. The class consisted of 18 total students, aged 10 to 11, including five English Language Learners (ELLs). Two of the ELLs were newcomers, having been in the United States for less than two years. No students received special education services, but many were below grade level and considered at-risk in reading and writing. The 18 fifth grade participants had a wide span of reading levels ranging from first to seventh grade according to an iReady diagnostic assessment of phonological awareness, phonics, high-frequency words, vocabulary, comprehension of informational text, and comprehension of literature.

Procedures

The question investigated in this action research is how a morpheme-focused literacy intervention impacts the spelling, reading decoding skills, morphological awareness, and vocabulary skills of students. The independent variable was the four weeks of morpheme lessons provided to the students. The dependent variables were the students' scores on assessments of the four measured literacy areas. Over the course of five days, students completed teacher-created assessments in all four of these literacy areas—spelling, reading decoding skills, morphological awareness, and vocabulary skills—and then participants began a four-week instructional study of morphemes. This instruction consisted of 10 minutes daily of focused, explicit instruction in common English morphemes as a whole class. Each week, the instruction focused on two morphemes and time was divided between practice reading, spelling, writing, and understanding the meaning of words containing those morphemes. The book *Morpheme Magic* by Deb Glaser was used to determine some of the most common morphemes and as a

basis for the daily instruction. The morphemes taught were the suffixes *ly* and *tion/ion*, prefixes *inter* and *fore*, roots *plic* and *vis*, and Greek combining forms *graph/gram* and *logy*. At the conclusion of the four weeks of instruction, the initial assessments were repeated for all 18 students.

All participants were exposed to the same instruction, except when individual students were absent on days of instruction, and all assessments were done by the researcher. Students were not shown their scores on assessments to ensure they could not share answers with classmates who had not yet completed assessments. Assessment data was compiled and stored in both its original paper and subsequent electronic formats. IRB exemption was granted for the action research study as the instruction and assessments are part of standard educational practice. Approval for the study was also obtained from the building principal.

Measures

The assessments used to measure students' pre-instruction and post-instruction literacy skills were created by the researcher to specifically see what effect, if any, the morpheme instruction had on students. To measure students' morphological awareness, participants were assessed in each of the four components of morphological awareness. The question prompts came from the work of Apel, Petscher, and Henbest (2021) to form a Morphological Awareness Test for Reading and Spelling (MATRS). Students were given four questions for each question-type, and there were two question sets for each of the four components tested, for a total of 32 questions and total possible points. The first component measured if students recognize what morphemes sound and look like, the second measured if students know the meaning of affixes and alterations in meaning they bring to base words, the third evaluated student spelling of

written affixes including how they affect base word spellings, and the last component measured student understanding of the relation of base words to their derived forms.

To measure students' spelling, specifically of words that include the morphemes covered in the four weeks of instruction, the teacher created a 16-item spelling test that included two words for each of the eight morphemes that were covered in the instruction portion of the study. The words assessed on the spelling tests were not in the *Morpheme Magic* book, to help increase the likelihood that student success on the post-instruction spelling test showed their ability to use taught morphemes in unfamiliar words, and not just recall a word they were exposed to during recent instruction. For example, the suffix -ly was taught, but the words *slowly* and *happily* were not mentioned during instruction, so their presence on the spelling test was about morpheme knowledge and not rote memorization. Students were given two points for a correctly spelled word, one point if they spelled the assessed morpheme correctly, and zero points if they misspelled the assessed morpheme. If the word was *slowly*, a student who wrote *slowley* received zero points while a student who spelled *slowly* received one point for the correct spelling of the taught morpheme *ly*. The highest score a student could receive was 32 points.

To evaluate students' reading skills for words containing the taught morphemes, a reading decoding assessment was created consisting of 16 sentences. Each sentence contained a word derived from one of the eight taught morphemes. Correct decoding and pronunciation of each word equated to 1 point for a possible score of up to 16 points. The final assessment used the same 16 words used on the spelling test and reading decoding assessments to measure student knowledge of the meaning of words that include the taught morphemes. The teacher-created multiple-choice assessment had four options for each question. Each question was worth one point for a total possible score of 16 points on the vocabulary assessment.

Anticipated Statistical Analysis

At the completion of data collection, a dependent samples T-test was used to answer the research question. This type of statistical analysis determined if the group of participants improved from pre-test to post-test in each of the four measured areas, namely spelling, reading (decoding), vocabulary, and morphological awareness. The dependent samples T-test also showed whether this change in scores was statistically significant.

Data Collection

For this action research, the data collected was quantitative. The data included pre-instruction and post-instruction scores for all four literacy skill areas. The initial and final scores were collected over the course of approximately one week each before and after the four weeks of instruction on morphemes. The four types of assessments involved both speaking and writing. Any spoken tasks were done individually with the researcher, and the writing tasks were done by all participants at the same time after directions from the teacher. All assessments were done on paper except the vocabulary assessment, which was done via a Google Form. Anything measuring spelling could not be done online because of predictive text and other digital features that correct or suggest correct spellings when typing. The vocabulary assessment was read aloud to all students to ensure that reading decoding was not a complicating factor for this test and the assessment was a more reliable measure of student knowledge of word meanings. On portions of the morphological awareness test which did not measure reading decoding skills, the teacher read them aloud. To help ensure that assessment scores were reflective of students' true ability, the researcher walked around the room frequently to monitor students during all whole-class assessments. After paper spelling tests and morphological awareness tests were completed, the

resulting data was compiled into electronic spreadsheets which were then used to analyze the change in scores from initial to final assessments.

Findings

Data Analysis

All eighteen student participants completed both the pre and post-intervention assessments. Some students were absent for a portion of the instruction, but all students attended at least 75% of the daily morpheme instruction. A dependent samples t-test was carried out for each of the four areas of literacy being measured, and three of the four literacy areas showed significant improvement.

The first analysis was conducted to determine whether there was a significant change in students' word reading accuracy, a measure of students' ability to decode words containing morphemes they had learned, following the month-long instruction on morphemes. An initial assessment showed that students were able to score an average of 12 on a 16-point assessment, meaning the average student read 12 of the 16 words accurately ($M = 12.05$, $SD = 2.15$). All students participated in a four-week intervention where they learned about eight of the most common morphemes in a daily 10-minute instruction period focused on both reading and spelling. Following the intervention, all students did a second set of assessments including a repeat of the word reading accuracy test. In this post-intervention test, students were able to accurately read an average of 13.94 words on the 16-word assessment ($M = 13.94$, $SD = 1.8$). Results of the dependent samples two-tailed t-test reveal a significant difference between the initial and final assessment, $t(16) = -7.36$, $p < .001$. The daily morpheme instruction intervention increased students' word reading accuracy on words with the taught morphemes.

The second analysis was conducted to figure out whether there was a significant impact on students' ability to determine the meaning of a word containing morphemes they had learned during the intervention time. The initial results showed an average score of 10.72 ($M = 10.72$,

SD = 2.22) out of 16 possible points. Following the four-week instruction period, students' average went down slightly to 10.56 (M = 10.56, SD = 2.33). The two-tailed t-test did not show a significant difference between the initial and final assessments, $t(16) = .40$, $p = .69$. The intervention failed to improve students' scores on a word meaning test.

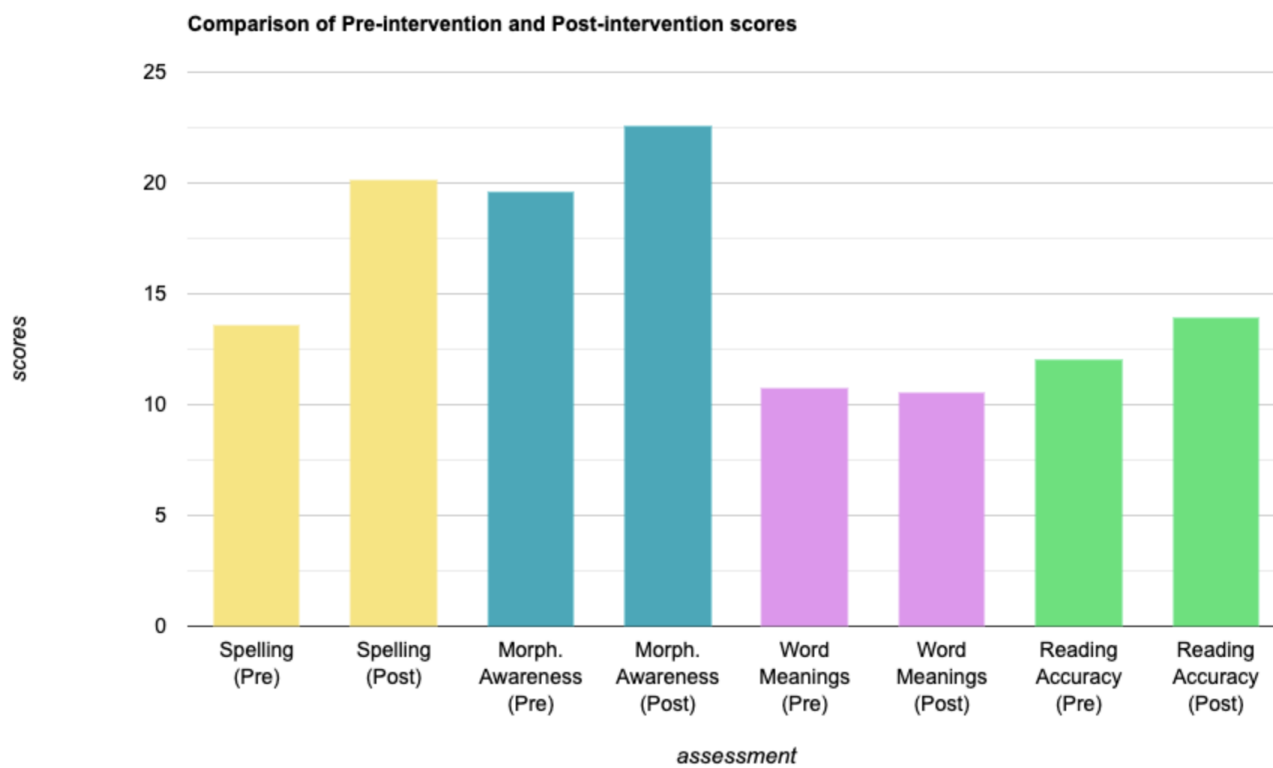
The next analysis looked at students' spelling of words containing the morphemes they learned during instruction. While the eight assessed morphemes were practiced during instruction, the specific words on the spelling test were not explicitly taught during instruction. Each word on the spelling assessment was worth two points, with students scoring both points if the word was accurately spelled, one point if the word was misspelled but the morpheme taught during the instruction period was spelled correctly, and zero points if the morpheme and therefore the entire word were misspelled. The test was worth a possible 32 points total. Initial results showed an average score of 13.56 points (M = 13.56, SD = 6.07). Following the four weeks of instruction, students scored an average of 20.17 points (M = 20.17, SD = 7.22). Of the 18 students, 17 increased their individual spelling score from the initial to the final assessment. Results of the dependent samples two-tailed t-test reveal a significant difference between the initial and final assessments, $t(16) = -5.395$, $p < .001$. The class-wide instruction increased the participants' spelling accuracy for words that contain the taught morphemes.

The fourth and final analysis measured students' morphological awareness. Participants were tested on eight areas that together give a picture of students' overall morphological awareness. Each of the eight areas was worth four points, so there were 32 possible points on this assessment. Initial results showed an average score of 19.61 points (M = 19.61, SD = 5.26). Following the four weeks of instruction, students scored an average of 22.56 (M = 22.56, SD = 4.06). Once again, the researcher conducted a dependent samples two-tailed t-test which showed

a significant difference in the pre and post-intervention scores, $t(16) = -4.51, p < .001$. The students' morphological awareness, their understanding of how words can be broken down into smaller meaningful units, increased following the four weeks of daily morpheme instruction. In three of the four literacy areas measured, there was a statistically significant difference shown through data analysis. Chart 1 shows a visual representation of the change in scores from the initial assessments to the post-intervention assessments. The greatest difference in scores was in students' spelling, and the one area in which students did not improve was in their determination of word meanings.

Chart 1

Comparison of Pre-intervention and Post-intervention Scores



Discussion

Summary of Major Findings

The findings of this study show that dedicating a small portion of time daily to teaching morphemes does positively impact fifth grade students' ability to decode words, their spelling, and their morphological awareness. The findings lend support to most parts of the researcher's hypothesis that a daily morpheme lesson will improve students' morphological awareness, spelling accuracy, decoding or reading accuracy, and vocabulary. In all but one of these measured areas of literacy, the data showed statistically significant improvement when comparing the pre-intervention and post-intervention assessments. In the vocabulary assessment, however, students did not show improvement and the class average went down slightly. This could be due to the specific way the teacher researcher conducted the daily lessons with an emphasis primarily on reading and spelling, and less so on word meanings and using words in the context of meaningful writing. The same materials could be used differently to emphasize vocabulary in the context of learning morphemes, with potentially different outcomes.

The action study results convey the value of morphological instruction. Research such as that of Anoniou (2014) shows that many teachers are dissatisfied with their current traditional spelling curriculum that focuses solely on phonics and visuals. They want to find replacement instructional materials, and morpheme studies like this one are valid, research-backed alternatives. These results also match the currently available research on morphological awareness, morpheme instruction, spelling, and reading. Studies such as Rossi et al. (2018) show that better spelling leads to increased speed of reading, and the fact that both reading accuracy and spelling improved through this morpheme study aligns with their work. Burton et al. (2021) showed that individual tutoring sessions with elementary students on morphology rules leads to increased spelling accuracy of derived words. This study shows that similar results are gained

through a class-wide intervention. Casalis et al. (2018) showed that morphological instruction class-wide could have a positive effect on French children's morphological awareness, and this study confirmed that this can also apply to English-speaking students and their morphological awareness.

Limitations of the Study

Some limitations of this study include the relatively small number of participants and short intervention time. This study was contained to one classroom that included 18 general education students, and the instruction period that constituted the whole of the intervention lasted four weeks. A better measure of the impact of morpheme instruction on students' literacy skills would evaluate the results in multiple classrooms led by different teachers. Furthermore, only eight of the 52 morphemes in Deb Glaser's *Morpheme Magic* were instructed and assessed. A longer-term study could measure how well students react to learning a significantly larger number of the most common morphemes. It is possible that the limited number of morphemes taught made it easier for students to retain the information and inflated the post-intervention scores.

Other limitations include the fact that all the assessments were created by the researcher, so their validity and reliability are unknown. The researcher would have preferred to use a standardized measure of morphological awareness, for example, but one was not available for use. The instructional materials in Deb Glaser's *Morpheme Magic* were also open-ended, allowing a large amount of teacher flexibility to determine the specifics of how to instruct students in the various morphemes. Due to the lack of specificity in the lesson materials, a proactive approach was taken to devise instructional content conducive to reaching the objectives. The resulting activities were designed to address the learners' needs and align with

the overarching goals of the intervention, but another teacher may have done different activities using the same instructional materials and that may lead to different results.

Further Study

The next step would be to continue the instruction of morphemes for a longer period to see if the results are similar after a full semester or a full year of daily instruction. The upcoming year, three sections of fifth grade could participate in the intervention to see if the results are replicated across different groups of participants. If the intervention continues to improve students' spelling, reading accuracy, and morphological awareness, it would be shared with other educators as an effective instructional practice to consider. Having students repeat the assessments a month later would also further what is known on the topic of morphology's impact on spelling and whether the knowledge that is gained is easily retained.

Furthermore, the morpheme magic lessons could be used in a small group as an intervention for students who have reading and spelling difficulties. The data has shown its effectiveness in improving the whole class average, but would the results be greater or less if the only students participating were historically poor readers and spellers? Another possible area of further research is the specific impact of morphology instruction on English language learners. Of the 18 participants in this study, five were English language learners and each of those students made gains from pretest to posttest in the three areas of literacy in which the class average significantly improved, so the existing data supports the intervention's usefulness for ELLs. None of the students in this study were on Individualized Education Plans, but the experiment could be repeated with a small group in a special education setting to gain more knowledge about the possible benefits of morphological instruction with diverse groups of students.

Conclusion

This study provides further evidence that morphological instruction has benefits for upper elementary students who, as a whole, have largely mastered phonics but still have difficulty in many areas of literacy including spelling. The English language is morphophonemic and English spellings follow morphemes, or meaningful word parts such as roots and affixes, more so than phonics. Logically, then, students should be taught the most common morphemes and the researcher hypothesized that this should improve their understanding of what words mean, how they are spelled, and even how they are pronounced. Unfortunately, there are few curricula being used to teach morphemes and most teachers are not instructed in morphology in teacher preparatory programs. Research studies such as this one are essential to show that morphology has an important place in literacy instruction.

For this action research study, 18 students benefited from participating in a four-week period of daily instruction on some of the most common morphemes. The participants' average number of words read correctly and spelled correctly both improved significantly, as well as students' scores on an assessment of morphological awareness. Only one area, students' understanding of the meanings of words, failed to increase from before the intervention period to after. The results indicate that this type of class-wide morphology intervention significantly increases student literacy skills, particularly in spelling where the class average went up 48% in four weeks. The results provide encouragement to those looking for a research-based way to improve spelling skills that also benefits other literacy areas.

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