Critical Review:
Exploring The Efficacy of Explicit Instruction of Morphological Awareness to Improve Literacy Outcomes in School Age Children

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Abstract

This study presents a critical review of research examining the effectiveness of explicit instruction of morphological awareness in improving literacy outcomes for school age children. The critical review involves an evaluation of six articles exploring various methods of morphological intervention for children from pre-school through grade twelve. Overall, the results of this review suggest that morphological instruction, particularly when integrated with the curriculum, may have benefits for various literacy outcomes among school age children.

Introduction

Literacy is at the core of every child's academic career, and literacy skills set the foundation for students to be successful from kindergarten through to post-secondary education, and beyond. Understanding what contributes to the development of these literacy skills is, therefore, of great importance. Morphological awareness refers to an awareness of the underlying structure of words, and the ability to parse them into their meaningful units (Deacon & Kirby, 2004). As it contributes to reading, one must be able to use morphological awareness to construct meaning (Carlisle, 2000). Children as young as first grade have been found to show morphological awareness, and morphological awareness has been shown to influence literacy development (Wolter, Wood & D'zatko, 2009). Thus, it is not surprising that morphological awareness has been the focus of many research studies as a predictor of later literacy achievement.

However, it is surprising that relatively few research studies have focused on the explicit instruction of morphological awareness and the effect of such instruction on the literacy outcomes of typically developing children. Morphological knowledge has been shown to relate to many components of literacy achievement, including vocabulary knowledge (Goodwin & Ahn, 2013), which is an established predictor of reading comprehension (Baumann, Edwards, Boland, Olejnik & Kame'enui, 2003). Previous research has implicated the need for differentiation in the nature and the timing of morphological instruction for different grade levels (Nagy, Beringer & Abbott, 2006). Baumann, Edwards, Font, Tereshinski, & Olejnik (2002) and Baumann et al. (2003) looked at the effects of instruction in morphemic analysis and contextual analysis, which were defined as analyzing the meaningful parts of words and analyzing the surrounding linguistic context, respectively. Further research in the area of morphological instruction is required in order to evaluate the potential of integrated instruction as a tier one intervention. Tier one intervention refers to the first level in a Responsiveness to Intervention (RTI) model, involving instruction and supports in general education classrooms (American Speech and Hearing Association, 2006). Offering instruction in morphological awareness at this level may act as a form of preventative intervention for all children in order to provide added support for literacy development, and thus academic achievement. Instruction in morphological awareness may be helpful for children who do not develop morphological knowledge on their own, but it may also be beneficial when explicitly offered to all students to supplement development of literacy skills. However, this distinction is not centrally relevant to this critical review.

Objectives

The objective of this paper is to review and evaluate existing literature exploring the impact of explicit instruction in morphological awareness on the literacy outcomes of school age children.

Methods

Search Strategy

Online databases (PsycINFO, Western Libraries, and Google Scholar) were searched using the following terms: (morpholog*) AND ((instruction OR intervention)) AND (literacy).

Selection Criteria

Studies included examined the effectiveness of morphological intervention programs for heterogeneous school age classrooms. Subjects described in each study were required to be part of a typically developing classroom. Studies examining the effectiveness of morphological intervention programs for children with

identified language delays or disorders, or for specific populations such as children of low socioeconomic status, were excluded from this review. No restrictions were set on specific ages or grades of school age children, although the studies found involved children ranging from preschool to grade 12.

Data Collection

This literature search generated six articles pertaining to morphological instruction for school age children, including three between-groups cohort design studies (level 2b research evidence; Baumann et al., 2003, Baumann et al., 2002, Henry, 1989), two systematic reviews (Bowers, Kirby, & Deacon, 2010, Carlisle, McBride-Chang, Nagy, & Nunes, 2010), and one meta-analysis (Goodwin & Ahn, 2013).

Results

Baumann et al. (2003)

This study is a between-groups cohort design that explored the effects of integrated instruction in morphemic and contextual analysis strategies (MC) on 79 grade five students' text comprehension and ability to learn new word meanings, as compared to 78 grade five students receiving explicit instruction in textbook vocabulary (TV). Both types of instruction were integrated during social studies classes, and the TV group acted as an active control for the MC group. Recruitment was well specified, and profiles of both participants and teachers were well described. The participating classes were diverse in terms of race, ethnicity, and socioeconomic status of the students. Each classroom received 25 45-minute instructional lessons including 15 minutes on vocabulary, but TV students received instruction in specific, content-central textbook words while MC students received instruction in morphemic and contextual analysis strategies based on example words from the textbook. One pre-test was standardized; the remaining pre- and post-tests were either constructed specifically for this research, or were used verbatim or adapted from the assessment components of the social studies textbook program used in this study. Fidelity of treatment was clearly and appropriately established and methods were described in sufficient detail for replication.

Quantitative data were analyzed appropriately using ANOVAs and ANCOVAs. Descriptive data were analyzed by three researchers for reliability purposes, and their methods were appropriate and described in detail. Analyses of pre-intervention scores revealed no statistically significant differences between intervention groups. Overall, results revealed that students in the MC group scored significantly higher than students in the TV group on a test of word parts, and on a delayed test of vocabulary in context. There were no significant group differences on an immediate test of vocabulary in context, or on measures of reading comprehension or social studies content learning. Students in the TV group scored significantly higher than students in the MC group on a measure of textbook vocabulary learning, as hypothesized. Descriptive results provided more detail to support quantitative findings.

This study provides suggestive evidence for incorporating the teaching of morphemic analysis strategies to derive meanings of morphemically decipherable novel words, as well as the pre-teaching of specific subject-matter vocabulary. However, findings related to vocabulary-to-comprehension relationships remain equivocal. Notably, these results can only be applied to grade five students in a social studies classroom setting.

Baumann et al. (2002)

This study is a between-groups cohort design that explored the effects of instruction in morphemic analysis only (MO), contextual analysis only (CO), or combined morphemic-contextual analysis (MC) on 67 grade five students' ability to learn words presented during instruction, ability to infer meanings of uninstructed words, and comprehension of text containing morphologically and contextually decipherable words, as compared to 21 grade five students in an instructed control group (IC). Data were gathered by four of the authors in 20 50-minute sessions over a five-week period, consisting of 12 intervention sessions. Teacher instructional and assessment effects were appropriately controlled for. The three experimental groups followed an explicit instruction model, and all lessons followed the same three-part format. The IC group was included to control for a possible Hawthorne effect, which refers to the potential for subjects to alter their behaviour due to their awareness of being observed. One pre-test was standardized; the remaining pre- and post-tests were constructed specifically for this research and were well described, with strong internal consistency reported for all measures. Fidelity of treatment was clearly and appropriately established.

Quantitative data were analyzed appropriately using ANCOVAs in order to explore differential treatment effects, and descriptive interview data were also analyzed appropriately. No statistically significant treatment group differences were found on pre-intervention measures. Overall, results revealed a strong effect of morphemic and contextual analysis instruction on learning lesson words. However, for inferring

meanings of transfer words, a stronger effect was seen in the MO and MC groups than in the CO group. There was no evidence that instruction in morphemic or contextual analysis, either in isolation or in combination, enhanced comprehension of text. In general, students were equally effective in inferring word meanings when morphemic and contextual analysis instruction was provided in combination as when provided separately. Treatment effects for morphemic analysis instruction were, in general, stronger than they were for contextual analysis instruction. Descriptive results provided more detail to support quantitative findings.

This study provides suggestive evidence for incorporating instruction in morphemic analysis in order to learn words presented during instruction and to infer meanings of untaught words. Similar evidence was provided for instruction in contextual analysis only, although less robust when inferring the meanings of transfer words. However, findings related to a relationship between morphemic analysis instruction and improved text comprehension remain equivocal. Notably, these results can only be applied to grade five students in a classroom setting, and it is unknown whether they can be replicated when instruction is delivered by teachers as opposed to experimenters.

Henry (1989)

This study is a between-groups cohort design that evaluated whether morphological awareness instruction designed to promote understanding word structure and word origin, a technical decoding vocabulary, and strategies for word analysis is associated with word structure knowledge and decoding and spelling ability, as compared to no instruction or instruction less focused on morphological awareness. The study's methods and results were divided into Experiment 1 and Experiment 2, although they involved the same participants and appeared to potentially be carried out simultaneously. This lack of clarity in the design caused some confusion in attempting to interpret results, however only the methods and results of Experiment 2 will be discussed as Experiment 1 was not pertinent to this review's research question. A total of 443 students in grades three to five, from six different schools in a large, heterogeneous urban school district, were involved in this study. Teachers of 20 different classes participated: six classes received Project READ instruction from their teachers, eight classes received Project READ instruction with five weeks of additional intensive decoding instruction with a focus on morphological awareness from their teachers, labelled Project READ PLUS, and six classes were designated as controls who received no Project READ nor supplementary decoding instruction. Grade and sex were fixed between-subjects subject factors in order to analyze the effects of the different types of instruction. Pre- and post-tests were conducted using the same assessment instrument, consisting of 12 subtests. Total test reliability was reported to be high, and internal consistencies for each subtest were reported, but it was not explained how these numbers were reached.

Quantitative data were analyzed appropriately by calculating correlations between pre- and post-test scores on each subtest for each intervention group, and ANOVAs to compare group means. Although significant results were reported for the two between-subject factors of grade and sex, differences in treatment condition are the focus here as they were central to the research question. Overall, results revealed that receiving decoding instruction in the upper grades increased knowledge of word structure and improved reading and spelling performance, as demonstrated by significantly better outcomes for both the READ and the READ PLUS groups in comparison with the control group. In comparing READ and READ PLUS groups, READ PLUS students who received supplementary morphological awareness instruction made significantly greater gains on the prefixes, suffixes, syllables, and roots subtests, and surpassed the READ students on the reading and spelling subtests. However, these results were less consistent than anticipated. The authors suggested that the significant gains made by the READ group could possibly be explained by competitiveness among READ teachers who were in the same schools as READ PLUS teachers.

This study provides suggestive evidence for morphological instruction based on word structure and word origin in order to improve spelling and reading performance in school age children. It appeared that the opportunities for practice and discussion of the instructed material within the READ PLUS groups benefitted those students' reading and spelling outcomes in comparison to the READ and control group students. Notably, these results apply only to grade three, four and five students within a classroom setting, and complete mastery of each unit may require a longer period of instruction.

Bowers et al. (2010)

This study is a systematic review of the literature on the effects of morphological instruction on literacy skills. For elementary students, the authors considered the effects of morphological instruction for sublexical, lexical, and supralexical measures of reading, spelling, vocabulary, and morphological skills, and the effects relative to age, ability level, and instruction context

(isolation vs. integrated with other literacy skills). Relevant studies were identified through a comprehensive and clearly described search. Six inclusion criteria were used, and of the identified studies, 22 met all six criteria and were included in the systematic review. Studies were coded by participant characteristics, and by instruction and study characteristics, however it was not clearly stated how the coding was completed or by whom, and thus no inter-rater agreement was reported. An appropriate effect size measure was employed. Characteristics of the sample populations and the nature of the morphological instruction in the reviewed studies were provided for descriptive purposes.

Results indicated the strongest average instructional effects and the highest average effect size for morphological sublexical outcomes. These results supported the authors' argument that instruction in sublexical morphology may produce word knowledge that transfers up to lexical and supralexical skills. At the lexical linguistic layer (reading, spelling, and vocabulary tasks), results indicated moderate average instructional effects for experimental group versus control group comparisons, but little to no effect for experimental group versus alternative treatment group comparisons. As well, morphological instruction was associated with larger effect sizes for less able learners and when integrated with other aspects of literacy instruction. There was some evidence that morphological instruction was more effective for younger learners.

This study provides strong suggestive evidence for morphological instruction as a means of positively contributing to students' literacy outcomes. The evidence indicates that instruction should be embedded in the curriculum in a sustained manner, rather than being added temporarily. Integrating problem-solving techniques into morphological instruction may also contribute to the transfer of morphological knowledge. Notably, these recommendations may have stronger effects for less able readers, and potentially for younger children.

Carlisle et al. (2010)

This study is an integrative review of the literature on the association of morphological awareness instruction with literacy development in school age children. Relevant studies were identified through a comprehensive and clearly described search. Five inclusion criteria and two exclusion criteria were used, and of the identified studies, 16 met all criteria and were included in the integrative review. The authors explained why a meta-analysis was not appropriate for what they were trying to accomplish, and that they conducted an integrative review in the hopes of being informative to researchers and practitioners. Studies were not coded, as the purpose of this study was to obtain more qualitative and descriptive findings. As a result, no inter-rater reliabilities or average effect sizes were reported. Studies were grouped by their primary focus on the relation of morphological awareness to one of three areas: phonology, orthography, or meaning. The measures of morphological awareness and literacy used in each study were listed to supplement the narrative examination of each. Descriptive, detailed information about each study was included in an appendix.

Results of this integrative review included narrative examinations of the designs, measures, and results of each study. For each of the three groups of studies, a table listed the measures of morphological awareness and literacy that were used in each study in order to compare methods. Results also included a narrative analysis of program content, instructional approaches, and how the quality of the research may affect interpretation of results. Overall, the findings of the included studies generally showed that morphological awareness instruction was associated with improvements in word reading or spelling and morphological analysis of unfamiliar words.

This study provides suggestive evidence for an association between morphological awareness instruction and literacy development in school age children. The included studies were not compared quantitatively or in terms of effect size, however this integrative review contains valuable information for practitioners looking to implement morphological instruction, and for future research directions.

Goodwin & Ahn (2013)

This study is a meta-analysis examining the effects of morphological instruction on language and literacy outcomes for school age children, and whether these effects are larger under certain circumstances. Relevant studies were identified through a comprehensive and clearly described search. Eight inclusion criteria were used, and of the 45 identified studies, 27 met all eight criteria and were included in the meta-analysis, providing 30 independent studies in total. Studies were coded for characteristics reflecting potential moderator variables, in the areas of design characteristics, participant characteristics, morphological instruction characteristics, and literacy achievement. Two independent coders completed the coding, and inter-rater agreement was computed appropriately and found to be adequate. Average effect sizes were calculated

using the standardized mean difference between comparison and treatment groups, representing the effect of morphological intervention on student literacy outcomes. Variations in effect sizes were accounted for and explained adequately. Dependence between subgroups was eliminated by separating effects by seven types of literacy outcomes.

92 standardized mean differences were collected from the 30 individual studies. Appropriate moderator analyses were conducted to examine between-group variations in effect sizes due to intervention features. Results indicated that children in morphological intervention groups scored statistically higher on literacy outcomes than those in comparison groups. Intervention effects differed significantly by type of literacy outcome, with decoding showing the largest statistically significant mean effects. Significant effects were also found for phonological awareness, morphological knowledge, vocabulary, and spelling, but not for reading comprehension or fluency. Morphological instruction was found to be equally effective regardless of comparison group. No statistically significant mean difference was found by unit of intervention, which was categorized into individualized, small groups (less than 12), and large group. Reading comprehension was of primary interest, thus a moderator analysis was conducted, revealing that interventions of more than 20 hours in duration, small group sizes, interventions with preschool and early elementary students, and interventions with a broad age range showed moderate effects on reading comprehension.

This study provides strong suggestive evidence for morphological instruction as a means of supporting and improving literacy outcomes for school age children. Notably, the evidence indicates that morphological instruction may have the strongest effects on outcomes of decoding, phonological awareness, and morphological knowledge, and for preschool and early elementary students.

Discussion

These studies provide evidence that morphological instruction can positively impact school age children's achievement on various measures of literacy outcomes. Instruction in morphological awareness can assist students in learning words presented during instruction, but also in inferring the meanings of untaught words based on newfound knowledge of word structure (Baumann et al., 2002). Opportunities to practice, discuss, and reflect on the material taught during morphological instruction seemed to benefit students (Henry, 1989), and framing the instruction with a problem-solving approach was a common theme among several studies. This problem-solving approach may be beneficial in transferring and applying morphological knowledge to other contexts (Bowers et al., 2010).

Students may benefit most from having morphological instruction embedded and integrated into the curriculum (Bowers et al., 2010). There is no evidence that morphological instruction has different effects on literacy outcomes when provided individually, in small groups, or in a large group (Goodwin & Ahn, 2013). There is some evidence to indicate that morphological instruction may have the strongest effects for preschool and early elementary students, however this may differ according to the literacy outcome measure being used (Goodwin & Ahn, 2013). In multiple studies, findings remained equivocal for the impact of morphological instruction on reading comprehension (Baumann et al., 2002; Baumann et al., 2003; Goodwin & Ahn, 2013). There was no evidence that explicit instruction in morphological awareness negatively impacted students' outcomes in the domain of literacy or otherwise, and across studies results generally revealed that morphological awareness instruction was associated with improvements on various literacy outcome measures.

Conclusion

The studies reviewed suggest integrating morphological instruction into the curriculum is associated with improved literacy outcomes for all school age children. However, future research is needed to determine the most effective methods of instruction in morphological awareness in order to have a direct impact on literacy. Following the finding that there was some effect of age on the impact of morphological instruction on literacy outcomes, further investigation is also required as to how to differentiate this instruction according to what is most suitable for different grade levels.

Clinical Implications

The importance of the development of literacy skills to each child's academic career, and thus to their success throughout the rest of their life, cannot be overstated. Previous research has had a large focus on the value of teaching phonological awareness skills, as phonological awareness has been identified as a strong predictor of later literacy skills (Castles & Coltheart, 2003). However, less research has been devoted to exploring the value of teaching morphological awareness skills for the same purpose. Morphological skills make an important and unique contribution to reading ability (Singson, Mahony, & Mann 2000). Although future research is required, clinicians and educators alike

should not discount the potential benefits for literacy outcomes that can be seen by providing explicit instruction of morphological skills, and should not hesitate to introduce the concepts of morphology to their students at any age.

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