Evidence from multiple investigations suggests that these differences are present qualitatively (i.e., types of spelling errors) and quantitatively (i.e., number of spelling errors) in children with typical language both quantitatively (i.e., number of spelling errors) and qualitatively (i.e., types of spelling errors). Children with diagnoses other than speech and language impairment, reading impairment, and writing impairment (i.e., cognitive impairment, autism, hearing loss) were excluded. All children passed a hearing screening bilaterally prior to testing and spoke English as a first language. Children in the typical language group 85 or above and children in the SLI group scored below 85 on the Core Language Index of the Clinical Evaluation of Language Fundaments-Fourth Edition (CELF-4; Semel et al., 2003).

**METHOD**

Participants completed a language, reading, and writing assessment battery. The test of written spelling-4 was used as a first language. Children in the typical language group 85 or above and children with language impairment were not significant. Hierarchical multiple regression analyses were used to examine the relative contributions of phonological processing, morphological knowledge, and orthographic knowledge to spelling performance of each group individually suggests that there may be some differences that were not captured by our overall multiple regression interaction model. The linguistic knowledge variables accounted for almost 23% of the total variance. In addition, morphological knowledge accounted for 17.1% of the total variance. Contrary to our hypothesis, interactions of linguistic variables and language explained almost 60% of the variance in spelling performance of children with typical language (17.4% of the total variance). Thus, orthographic knowledge uniquely predicted spelling performance for children with language impairment.

**RESULTS**

Does phonological processing, morphological knowledge, and/or orthographic knowledge uniquely predict spelling performance for children with typical language?

**Multiple Regression Model for Children with Typical Language**

Does phonological processing, morphological knowledge, and/or orthographic knowledge uniquely predict spelling performance for children with language impairment?

**Multiple Regression Model for Children with Language Impairment**

None of the interaction terms contributed unique variance to the model.

**Multiple Regression Model with Interaction Effects**

Does linguistic knowledge interact with group membership to predict spelling?

**Does linguistic knowledge influence group membership to predict spelling?**

**INTERROGTION**

More than 40 years of research has confirmed the linguistic basis of literacy (e.g., Catts et al., 2002; Mattingly, 1972). Studies that have examined the contribution of language skill to literacy have focused almost exclusively on reading with much less systematic focus on spelling (e.g., Catts et al., 2002). To fully understand literacy skill, there is a need to investigate the linguistic basis of spelling separately from the linguistic basis of reading.

Researchers have begun to explore the role of linguistic knowledge in spelling, but most studies have addressed only one area of linguistic knowledge. The roles of phonological knowledge, morphological knowledge, and orthographic knowledge have been the focus in most studies of the development of English spelling (Bourassa & Treiman, 2001). With few exceptions (e.g., Apel et al., 2012; Walker & Hauenwas, 2006), most studies of the linguistic basis of English spelling have evaluated the role that each type of linguistic knowledge plays in isolation. In addition, the spelling of children with SLI differs from spelling of children with typical language both quantitatively (i.e., number of spelling errors) and qualitatively (i.e., types of spelling errors). Evidence from multiple investigations suggests that these differences arise from differences in linguistic knowledge (e.g., MacKee & Dockrell, 2004; Stilman, 2006).

The purpose of this investigation was to explore systematically the relationship of phonological processing, morphological knowledge, and orthographic knowledge to spelling performance independent of visual memory in elementary school children with and without language impairment. After controlling for visual memory, phonological processing, morphological knowledge, and orthographic knowledge contributed unique variance to spelling performance for children with typical language, but only morphological knowledge contributed unique variance to spelling performance of children with SLI. Interaction effects of linguistic variables and language group status were not statistically significant; although examination of the individual models for children with SLI and children with typical language revealed differences in the types of knowledge that predicted spelling in each group. The results indicate that spelling instruction should take into account children’s linguistic knowledge and explicitly relate their linguistic knowledge to spelling. It is likely that children with language impairment are less accurate at spelling words, particularly written language (see Schlagal, 2002). Because children with language impairment are less accurate at spelling words, particular attention on how to effectively teach spelling to this population is necessary to teach spelling to children with language impairment using approaches that may differ in some ways from those used to teach children with typical language.

The present investigation was the first to examine concurrently the relative contributions of phonological processing, morphological knowledge, and orthographic knowledge to spelling performance of children with and without language impairment in the elementary grades. The present investigation indicates that phonological processing, morphological knowledge, and orthographic knowledge predicts spelling in children in the elementary grades. Overall, the multiple regression model for children with typical language explained almost 60% of the variance in spelling performance. The linguistic knowledge variables accounted for almost 50% of the variance in spelling performance for children with typical language. In contrast to the results of our study, visual memory did not contribute unique variance to the spelling of children with typical language (only about 3%). Orthographic knowledge was a significant predictor of spelling performance in children in the elementary grades, accounting for almost 23% of the total variance. In addition, morphological knowledge was a unique predictor of spelling performance, accounting for almost 15% of the total variance. Somewhat surprisingly, particularly given the focus that phonological processing processing has received in the literature and in the classroom, it was not a unique predictor of spelling for children with typical language.

## DISCUSSION

## ACKNOWLEDGEMENTS

The present investigation was the first to examine concurrently the relative contributions of phonological processing, morphological knowledge, and orthographic knowledge to spelling performance of children with and without language impairment in the elementary grades. The present investigation indicates that phonological processing, morphological knowledge, and orthographic knowledge predicts spelling in children in the elementary grades. Overall, the multiple regression model for children with typical language explained almost 60% of the variance in spelling performance. The linguistic knowledge variables accounted for almost 50% of the variance in spelling performance for children with typical language. In contrast to the philosophy that drives much spelling instruction, visual memory did not contribute unique variance to the spelling of children with typical language (only about 3%). Orthographic knowledge was a significant predictor of spelling performance in children in the elementary grades, accounting for almost 23% of the total variance. In addition, morphological knowledge was a unique predictor of spelling performance, accounting for almost 15% of the total variance. Somewhat surprisingly, particularly given the focus that phonological processing has received in the literature and in the classroom, it was not a unique predictor of spelling for children with typical language.

Overall, the multiple regression model for children with language impairment explained almost 70% of the variance in spelling performance. The linguistic knowledge variables accounted for almost 40% of the total variance, indicating that for children with language impairment (like children with typical language) linguistic knowledge is a strong predictor of spelling performance. The only unique linguistic predictor of spelling for children with language impairment was morphological knowledge, accounting for 17.1% of the total variance.

Contrary to our hypothesis, interactions of linguistic variables and language explained almost 60% of the variance in spelling performance of children with typical language (17.4% of the total variance). Thus, children with language impairment may rely more on nonlinguistic spelling skills than they spell children with typical language.

At least some types of linguistic knowledge predict spelling for children with and without language impairment; however, typical spelling instruction for children with language impairment may not explicitly connect spoken and written language (see Schlagal, 2002). Because children with language impairment are less accurate at spelling words, particular attention on how to effectively teach spelling to this population is warranted. Future research should examine empirically the effectiveness of linguistic spelling instruction for children with SLI. Spelling instruction for children with SLI should focus on improving linguistic knowledge that is used by children to spell words and explicitly teach the links between spoken and written language.

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