UNIVERSITY OF CALIFORNIA,
IRVINE

Second Graders' Oral Discourse Production

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Education

by

Minkyung Cho

Dissertation Committee:
Professor Young-Suk Kim, Chair
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DEDICATION

To

my parents, family, and friends,

in recognition of their love and support

I dedicate this work to my parents, family, and friends,
who have provided me with nothing but love and support in my journey
across the Pacific Ocean

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language and literacy development, language and cognitive skills, linguistic and discourse features, academic language, English language learners, elementary students, secondary students

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Cho, M., Kim, Y.-S. G., & Wang, J. (2022). Perspective taking and language use in secondary students' text-based analytical writing. *Scientific Studies of Reading*. https://doi.org/10.1080/10888438.2022.2132864

Cao, Y., Kim, Y.-S. G. & **Cho, M.** (2022). Are observed classroom practices related to student language/literacy achievement? *Review of Educational Research*. https://doi.org/10.3102/00346543221130687

Cho, M., Kim, Y. S. G., & Olson, C. B. (2021). Does perspective taking matter for writing? Perspective taking in source-based analytical writing of secondary students. *Reading and Writing: An Interdisciplinary Journal*, *34*(8), 2081-2101. https://doi.org/10.1007/s11145-021-10136-7

Cho, M. (2021). Marketing the wang-chobo identity: Problematic construction of English learner identities in the advertising discourse of South Korea's English learning platforms. *The SNU Journal of Education Research*, *30*(2), 23-42. https://www.dbpia.co.kr/Journal/articleDetail?nodeId=NODE10728845

Kim, Y. S. G., Dore, R., **Cho, M.**, Golinkoff, R., & Amendum, S. (2021). Theory of mind, mental state talk, and discourse comprehension: Theory of mind process is more important for narrative comprehension than for informational text comprehension. *Journal of Experimental Child Psychology*, *209*, 1-20. https://doi.org/10.1016/j.jecp.2021.105181

ABSTRACT OF THE DISSERTATION

Second Graders' Oral Discourse Production

by

Minkyung Cho

Doctor of Philosophy in Education

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Professor Young-Suk Kim, Chair

This dissertation investigated second graders' oral discourse production regarding three aspects: 1) oral discourse production by discourse context, 2) dimensionality of oral discourse production, and 3) contributions of language and cognitive skills to oral discourse production. Data came from 330 second grade students (53% boys) from the Southeastern part of the United States, and oral discourse production was measured through picture description task which was transcribed verbatim and coded for linguistic (e.g., adverb, conjunction, pronominal, elaborated noun phrase, mental state talk) and discourse features (e.g., proper character introduction, degree of decontextualization, perspective taking).

Study 1 examined how second graders vary linguistic and discourse features depending on discourse conditions: contextualized condition—describing the picture to an examiner while looking at it together—and decontextualized condition—pretending to describe the picture to a friend while sitting in front of the examiner. Results of multilevel regression showed that type-token ratio, higher degrees of decontextualization, and complex perspective taking were higher in the contextualized condition whereas some elaborated noun phrases, coordinating

conjunctions, non-clauses, and proper character introduction occurred more frequently in the decontextualized condition, controlling for total productivity and student demographics. The findings illustrated the extent to which children used their discourse knowledge in oral discourse production. Study 2 looked at the factor structure of oral discourse production using a total of nine linguistic and discourse features identified from the same picture description task in Study 1. Results from confirmatory factor analysis showed that a bi-factor structure consisting of a general oral discourse production factor and two specific linguistic features and discourse features factors provided the best fit to the data. The only reliable factor was the general factor reflecting the common variance among the linguistic and discourse features. Study 3 investigated the structural relations of children's domain-general cognitive skills (working memory, attentional control), foundational language skills (vocabulary, grammatical knowledge), and higher-order cognitive skills (knowledge-based inference, perspective taking, and comprehension monitoring) to oral discourse production. Oral discourse production was measured by the same picture description task as in Study 1. The results from structural equation models showed that domain-general cognitive skills and foundational language skills had indirect contributions to oral discourse production through the higher-order cognitive skill of inference, highlighting the supporting role of language and cognitive skills and their direct and indirect relations to oral discourse production.

INTRODUCTION

Background

Children develop their oral language skills throughout their preschool years into adolescence (Barnes et al., 2014; Rowe, 2012). Children engage in diverse communicative interactions with their parents, peers, and teachers at home and in schooling contexts (Rowe & Weisleder, 2020). For example, children engage in oral storytelling or shared book reading with their parents, where they are encouraged to talk about objects or events that are not of their immediate setting (Curenton et al., 2008). At school, children may engage in show and tell, where they are prompted to construct discourse revolving around a theme (Curenton & Justice, 2004). Through such interactions, young children grow not only in their language skills but also their knowledge of discourse contexts while figuring out ways to adjust their language to suit the situational context (Kintsch, 1988; Snow et al., 1987). Having a good grasp of oral language is important for communication in everyday lives as well as for supporting reading and writing development and future academic success (NICHD Early Child Care Research Network, 2005). Therefore, examining oral discourse language in children is an important research task.

In essence, oral language is a broad and multifaceted construct composed of lexical, sentence, and discourse skills, and various aspects such as phonology, semantics, and pragmatics (Kim et al., 2020). Oral *discourse* language, in particular, refers to a discourse skill that encompasses the receptive skill of listening comprehension and the productive skill of oral production (Kim, 2016; Language and Reading Research Consortium, 2017). There is a growing amount of research involving the skill of listening comprehension (e.g., Kim & Phillips, 2014; Lepola et al., 2012). However, relatively fewer number of studies comprehensively examined oral discourse production put within specific discourse contexts (e.g., Grimminger et al., 2020).

Given such a gap in the field, this dissertation focused on oral discourse production, specifically in picture description context for second graders.

According to the construction-integration model (Kintsch, 1988) and the direct and indirect effects model of text comprehension and production (DIET; Kim, 2016), various language and cognitive skills are involved in multiple stages of discourse production. Specifically, oral discourse production relies on foundational language skills such as vocabulary and grammatical knowledge, higher-order cognitive skills such as inference and perspective taking, and discourse knowledge (i.e., the knowledge of various discourse forms such as genre, text structure, procedures, and strategies; Kim, 2020). Studies have examined the contributions of oral language skills and knowledge to oral discourse production through language sample analysis by identifying linguistic and discourse features in various discourse contexts (e.g., Curenton et al., 2008; Rowe, 2013). For example, linguistic features, such as the number of certain parts of speech or clausal density, and discourse features, such as complexity in thinking, have been shown to reflect not only one's foundational language skills but also higher order cognitive skills and discourse knowledge (Curenton & Justice, 2004).

However, there are some significant gaps in the literature on oral discourse production regarding three aspects. First, previous literature identifying the linguistic and discourse features of oral discourse production was limited to analyzing naturalistic discourse (e.g., parent child shared reading, oral storytelling) in an attempt to examine the hypothesized features of decontextualized or academic language (e.g., Curenton & Justice 2004; Schleppegrell, 2001). However, there is room for more systematic examination of oral discourse production by discourse context through comparing between experimental discourse conditions, such as contextualized and decontextualized discourse settings (De Temple et al., 1991). The second

aspect pertains to the examination of the dimensionality of oral discourse language. Prior studies have examined the dimensionality of oral discourse skills, oftentimes involving discrete measures of oral language skills, and have yielded varying findings depending on the types of measures, target language, and children's developmental stages (e.g., Lonigan & Milburn, 2017; Mehta et al., 2005; Mouzaki et al., 2020). However, no studies have yet examined the structure of oral discourse production within specific discourse contexts using indicators of linguistic and discourse features elicited from oral production. Lastly, there is a lack of research examining the contributions of language and cognitive skills to oral discourse production (Bornstein et al., 2014; Strasser & Río, 2014). Furthermore, no studies have investigated the structural relations (i.e., direct and indirect relations) among the language and cognitive skills to oral discourse production. In this dissertation, I aimed to address these gaps in the literature.

Overview of the Dissertation

This dissertation examined second graders' oral discourse production, consisting of three thematically coherent and cumulative studies. The first study examined oral discourse production by discourse context; the second study investigated the dimensionality of oral discourse production; and the third study looked into the contributions of language and cognitive skills to oral discourse production. This way, the first study set the foundation for the following two studies, while the second study informed the third. The three studies used data from a previous project. Participants were 330 second grade children (53% boys) from 58 classrooms in the Southeastern part of the United States (see Kim, 2020). Majority are White, eligible for free and reduced-priced lunch, and non-English language learners. In what follows, I provide a brief overview of the research aims, questions, and findings for each study.

Study 1 examined the occurrences of various linguistic and discourse features in oral discourse production in two distinct experimental discourse conditions: the contextualized condition—describing the picture to an examiner while looking at it together—and the decontextualized condition—pretending to describe the picture to a friend while sitting in front of the examiner. Children's oral discourse production was measured by picture description tasks, which were transcribed verbatim and coded for linguistic (e.g., adverb, conjunction, pronominal, elaborated noun phrase, clausal density, mental state talk) and discourse features (e.g., proper character introduction, degree of decontextualization, perspective taking). Descriptive statistics and multilevel regression models were run. Regarding linguistic features, type-token ratio, or lexical diversity, was higher in the contextualized compared to the decontextualized condition, whereas a few types of elaborated noun phrased (e.g., simple descriptive noun phrase, noun phrase with post-modification), coordinating conjunctions, and non-clause were used more frequently in the decontextualized condition, controlling for total number of C-units and student demographics. Regarding discourse features, proper character introduction was higher in the decontextualized condition, while more complex perspective taking and higher degrees of decontextualization occurred in the contextualized condition. The findings illustrated second grade students differentially employed their linguistic and discourse knowledge depending on discourse context.

Study 2 focused on examining the dimensionality of oral discourse production, using the linguistic and discourse features identified in second graders' picture description as in Study 1. Specifically, I generated composite score for each of the linguistic features (i.e., adverb, conjunction, pronominal, elaborated noun phrase, clausal density, mental state talk) and discourse features (i.e., proper character introduction, degree of decontextualization, perspective

taking) across discourse conditions for each child, and examined the dimensionality of these features using confirmatory factor analysis. Three alternative models were tested: (1) a unidimensional model where all the linguistic and discourse features tapped a single construct; (2) a two-factor model with the linguistic and discourse factors; and (3) a bi-factor model consisting of a general factor that encompasses common variance across all features and two specific linguistic and discourse factors. Results showed that the bi-factor structure provided the best fit to the data and that the general factor was the only reliable factor. This suggested that various linguistic and discourse features in second graders' oral discourse production have a general underlying oral language factor with other specific factors.

Study 3 looked into the structural relations of language and cognitive skills to oral discourse production. In other words, this study examined the direct and indirect relations of second graders' domain-general cognitive skills (working memory, attentional control), foundational language skills (vocabulary, grammatical knowledge), and higher order cognitive skills (knowledge-based inference, perspective taking, and comprehension monitoring) to oral discourse production. Oral discourse production was derived from the factor score of the general oral language factor identified in the bi-factor model of oral discourse production in Study 2. The results of structural equational modeling showed that there were indirect contributions of domain-general cognitive skills and foundational language skills to oral discourse production through inference. This finding emphasizes the supporting roles of language and cognitive skills in oral discourse production and the direct and indirect relations of language and cognitive skills to oral discourse production.

Significance of the Dissertation Research

Together, the three studies advanced the field's understanding of second graders' oral discourse language, specifically regarding oral discourse production within the context of picture description. The studies are unique in that oral discourse production was examined not only in its linguistic features but also its discourse features for second graders, who are at a crucial stage of developing their oral language skills and discourse knowledge. Furthermore, the findings highlighted the role of discourse knowledge and higher order cognitive skills such as inference, on top of language skills, in their contributions to oral discourse production. While previous literature on oral discourse language has oftentimes focused on identifying linguistic or language skills, the current findings revealed the roles of discourse features and higher-order cognitive skills in children's oral discourse language.

Study 1 contributed to enhancing our understanding of the role of discourse knowledge in children's oral discourse production. The findings of this study showed that second graders were able to vary their use of certain linguistic and discourse features in oral language production depending on discourse conditions where communication demands were different. In other words, children employ their knowledge of the discourse context when producing oral language. This is in line with the theoretical models of listening comprehension (Kim, 2016) as well as reading comprehension (Kim, 2020) where discourse knowledge is included as part of discourse skills. This study also makes a practical contribution to the clinical field by offering guidance on identifying simple to complex linguistic and discourse features in language sample analysis in diagnosing children's level of oral language development (Pavelko et al., 2016).

Study 2 provided theoretical and practical insights into the dimensionality of oral discourse production. Although previous studies have examined the structure of oral discourse language using discrete measures and yielded mixed results (e.g., Lonigan & Milburn, 2007;

Mouzaki et al., 2020; Tomblin & Zhang, 2006), the present study incorporated linguistic and discourse features from oral discourse production data and identified a bi-factor structure of oral discourse production. The finding showed that various linguistic and discourse features primarily measure a common variance in oral discourse production for second graders. This is in line with previous studies identifying the bi-factor structure of discourse skills (Language and Reading Research Consortium, 2015; Kim et al., 2015) showing that there is essentially a single underlying construct of oral discourse language, along with other specific factors. This result has practical implications in informing the design and choice of language assessments and instruction/intervention in early elementary grades—assessment and instruction could target discourse features, in addition to linguistic features, in oral discourse production.

Study 3 was significant in advancing our understanding of the structural relations among language and cognitive skills in their contribution to oral discourse production. While previous studies were oftentimes limited to examining each language and cognitive skill as direct predictors of oral discourse production (Bornstein et al., 2014; Strasser & Río, 2014), this study supported the hierarchical or direct and indirect relations among the skills (Kim, 2016). In addition, the finding emphasized the importance of knowledge-based inferencing skill to oral discourse production (Elleman, 2017; Kendeou et al., 2008), suggesting that instruction on higher order thinking skill such as inference is necessary to enhance oral discourse skills.

References

Barnes, A. E., Kim, Y.-S., & Phillips, B. M. (2014). The relations of proper character introduction to narrative quality and listening comprehension for young children from high poverty schools. *Reading and Writing*, *27*(7), 1189–1205. https://doi.org/10.1007/s11145-013-9481-0

Bornstein, M. H., Hahn, C.-S., Putnick, D. L., & Suwalsky, J. T. D. (2014). Stability of core language skill from early childhood to adolescence: A latent variable approach. *Child Development*, *85*(4), 1346–1356. https://doi.org/10.1111/cdev.12192

Curenton, S. M., Craig, M. J., & Flanigan, N. (2008). Use of decontextualized talk across story contexts: How oral storytelling and emergent reading can scaffold children's development. *Early Education and Development*, *19*(1), 161–187. https://doi.org/10.1080/10409280701839296

Curenton, S. M., & Justice, L. M. (2004). African American and Caucasian preschoolers' use of decontextualized language: Literate language features in oral narratives. *Language, Speech, and Hearing Services in Schools*, *35*(3), 240–253. https://doi.org/10.1044/0161-1461(2004/023)

De Temple, J. M., Wu, H., & Snow, C. E. (1991). Papa pig just left for pigtown: Children's oral and written picture descriptions under varying instructions. *Discourse Processes*, *14*(4), 469–495. https://doi.org/10.1080/01638539109544797

Elleman, A. M. (2017). Examining the impact of inference instruction on the literal and inferential comprehension of skilled and less skilled readers: A meta-analytic review. *Journal of Educational Psychology*, *109*(6), 761–781. https://doi.org/10.1037/edu0000180

Grimminger, A., Rohlfing, K. J., Carina, L. Ü. K. E., Liszkowski, U., & Ritterfeld, U. (2020). Decontextualized talk in caregivers' input to 12-month-old children during structured interaction. *Journal of Child Language*, *47*(2), 418-434. https://doi.org/10.1017/S0305000919000710

Kendeou, P., Bohn-Gettler, C., White, M. J., & van den Broek, P. (2008). Children's inference generation across different media. *Journal of Research in Reading*, *31*(3), 259–272. https://doi.org/10.1111/j.1467-9817.2008.00370.x

Kim, Y.-S. G. (2016). Direct and mediated effects of language and cognitive skills on comprehension of oral narrative texts (listening comprehension) for children. *Journal of Experimental Child Psychology*, *141*, 101–120. https://doi.org/10.1016/j.jecp.2015.08.003

Kim, Y.-S. G. (2020). Hierarchical and dynamic relations of language and cognitive skills to reading comprehension: Testing the direct and indirect effects model of reading (DIER). *Journal of Educational Psychology*, *112*(4), 667–684. https://doi.org/10.1037/edu0000407

Kim, Y.-S. G., Park, C., & Park, Y. (2015). Dimensions of discourse level oral language skills and their relation to reading comprehension and written composition: An exploratory study. *Reading and Writing*, *28*(5), 633–654. https://doi.org/10.1007/s11145-015-9542-7

Kim, Y.-S. G., Petscher, Y., Uccelli, P., & Kelcey, B. (2020). Academic language and listening comprehension—Two sides of the same coin? An empirical examination of their dimensionality, relations to reading comprehension, and assessment modality. *Journal of Educational Psychology*, *112*(7), 1367–1387. https://doi.org/10.1037/edu0000430

Kim, Y.-S. G., & Phillips, B. (2014). Cognitive correlates of listening comprehension. *Reading Research Quarterly*, *49*(3), 269–281. https://doi.org/10.1002/rrq.74

Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction-integration model. *Psychological Review*, *95*(2), 163–182. https://doi.org/10.1037/0033-295X.95.2.163

Language and Reading Research Consortium. (2015). The dimensionality of Spanish in young Spanish-English dual-language learners. *Journal of Speech, Language & Hearing Research*, *58*(3), 754–766. https://doi.org/10.1044/2015_JSLHR-L-13-0266

Language and Reading Research Consortium. (2017). Oral language and listening comprehension: Same or different constructs? *Journal of Speech, Language & Hearing Research*, *60*(5), 1273–1284. https://doi.org/10.1044/2017_JSLHR-L-16-0039

Lepola, J., Lynch, J., Laakkonen, E., Silvén, M., & Niemi, P. (2012). The role of inference making and other language skills in the development of narrative listening comprehension in 4-6-year-old children. *Reading Research Quarterly*, *47*(3), 259–282. https://doi.org/10.1002/rrq.020

Lonigan, C. J., & Milburn, T. F. (2017). Identifying the dimensionality of oral language skills of children with typical development in preschool through fifth grade. *Journal of Speech, Language & Hearing Research*, *60*(8), 2185–2198. https://doi.org/10.1044/2017_JSLHR-L-15-0402

Mehta, P. D., Foorman, B. R., Branum-Martin, L., & Taylor, W. P. (2005). Literacy as a unidimensional multilevel construct: Validation, sources of influence, and implications in a longitudinal study in grades 1 to 4. *Scientific Studies of Reading*, *9*(2), 85–116. https://doi.org/10.1207/s1532799xssr0902_1

Mouzaki, A., Spyropoulou, E., Ralli, A., Antoniou, F., Diamanti, V., & Papaioannou, S. (2020). The dimensionality of oral language ability: Evidence from young Greek children. *Journal of Speech, Language & Hearing Research*, *63*(8), 2732–2751. https://doi.org/10.1044/2020_JSLHR-19-00008

NICHD Early Child Care Research Network. (2005). Pathways to reading: The role of oral language in the transition to reading. *Developmental Psychology*, *41*(2), 428–442. http://dx.doi.org/10.1037/0012-1649.41.2.428

Pavelko, S. L., Owens Jr, R. E., Ireland, M., & Hahs-Vaughn, D. L. (2016). Use of language sample analysis by school-based SLPs: Results of a nationwide survey. *Language, speech, and hearing services in schools*, *47*(3), 246-258. https://doi.org/10.1044/2016_LSHSS-15-0044

Rowe, M. L. (2013). Decontextualized language input and preschoolers' vocabulary development. *Seminars in Speech and Language*, *34*(4), 260–266. https://doi.org/10.1055/s-0033-1353444

Rowe, M. L. (2012). A longitudinal investigation of the role of quantity and quality of child-directed speech in vocabulary development. *Child Development*, *83*(5), 1762–1774. https://doi.org/10.1111/j.1467-8624.2012.01805.x

Rowe, M. L., & Weisleder, A. (2020). Language development in context. *Annual Review of Developmental Psychology*, *2*(1), 201–223. https://doi.org/10.1146/annurev-devpsych-042220-121816

Schleppegrell, M. J. (2001). Linguistic features of the language of schooling. *Linguistics and Education*, *12*(4), 431–459. https://doi.org/10.1016/S0898-5898(01)00073-0

Snow, C. E., Cancino, H., Gonzalez, P., & Shriberg, E. (1987). Second language learners' formal definitions: An oral language correlate of school literacy. *Center for Language Education and Research University of California, Los Angeles*, 37.

Strasser, K., & Río, F. del. (2014). The role of comprehension monitoring, theory of mind, and vocabulary depth in predicting story comprehension and recall of kindergarten children. *Reading Research Quarterly*, *49*(2), 169–187. https://doi.org/10.1002/rrq.68

Tomblin, J. B., & Zhang, X. (2006). The dimensionality of language. *Journal of Speech, Language & Hearing Research*, *49*, 1193–1208. https://doi.org/10.1044/1092-4388

CHAPTER 1

Do Second Graders Adjust Their Language by Discourse Context?

Abstract

Children's ability to adjust one's language according to discourse context is important for success in academic settings. This study examined whether second graders vary linguistic and discourse features depending on discourse contexts: when describing pictures in a contextualized condition—describing the picture to an examiner while looking at it together—and a decontextualized condition—pretending to describe the picture to a friend while sitting in front of the examiner). A total of 330 English-speaking second graders in the US (M_{age} = 7.33, 53% boys, 55% Caucasian children and 35% African American children) described three pictures in contextualized and decontextualized conditions. Children's picture descriptions were transcribed verbatim and coded for linguistic (e.g., elaborated noun phrase) and discourse features (e.g., proper character introduction, degree of decontextualization). Type-token ratio was higher in the contextualized compared to the decontextualized condition, whereas certain types of elaborated noun phrases (e.g., simple descriptive noun phrase, noun phrase with post-modification), coordinating conjunctions, and non-clauses occurred more frequently in the decontextualized condition, controlling for total productivity and student demographics. The proportion of proper character introduction was higher in the decontextualized condition, while higher degrees of decontextualization and complex perspective taking were found in the contextualized condition. Various linguistic and discourse cues illustrated the extent to which primary grade students employ their discourse knowledge when producing oral language.

Keywords: oral language; decontextualized language; discourse knowledge

Introduction

Children develop their oral language competencies throughout their preschool years into adolescence (A. E. Barnes et al., 2014; Rowe, 2012). Children as young as 3-years-old learn to use oral language for appropriate purposes and discourse contexts while engaging in natural conversations with their parents (Beals & Snow, 1994; De Temple & Beals, 1991). For example, as young children engage in shared reading and oral storytelling with their parents, they are prompted to talk about objects and events that are not in their immediate setting and they are prompted to construct discourse that revolve around a theme (Curenton et al., 2008; Curenton & Justice, 2004). Through such interactions, children develop not only their language skills but also their knowledge of discourse contexts while figuring out ways to adjust their language to suit the situational context (Kim, 2016; Kintsch, 1988; Rowe & Weisleder, 2020; Snow et al., 1987).

Talking about objects and events that are not in the immediate setting is an example of decontextualized language. Decontextualized language reflects the extent of shared context between interlocutors (i.e., communication partner) (Curenton & Justice, 2004; Davidson et al., 1986; De Temple et al., 1991). In comparison, contextualized language refers to language used in contexts where interlocutors talk about objects or events that are part of their shared physical environment (Curenton et al., 2008; Snow & Uccelli, 2009). In general, decontextualized language requires more precise vocabulary and formal syntactic marking than contextualized language, as the speaker is removed from the immediate context with their interlocutor (Curenton & Justice, 2004). Research has found that decontextualized language is necessary for the abstract thought process required for academic success (Gillam et al., 2012; Schleppegrell, 2001; Snow, 1991) as it is related to higher-quality oral narratives and reading comprehension (Griffin et al., 2004; Rowe, 2012; Uccelli et al., 2019). Measures used to examine

decontextualized language include picture description, word definition, narrative retell, and production tasks (e.g., A. E. Barnes et al., 2014; Beals & Snow, 1994; De Temple et al., 1991; Greenhalgh & Strong, 2001; Grimminger et al., 2020; Kim et al., 2021; Snow et al., 1995). However, despite the measures used, studies examining oral language have not yet employed experimental designs to compare discourse contexts.

In this study, we examined the extent to which diverse linguistic (e.g., elaborated noun phrase) and discourse features (e.g., proper character introduction, degree of decontextualization – description, evaluation, prediction) in second graders' oral language use differ depending on discourse contexts: contextualized versus decontextualized. In the contextualized condition, there was a shared context with the communication partner (the examiner); the child described a picture while looking at it together with the examiner. In the decontextualized condition, there was not a shared context with the communication partner (a friend); rather, the child described a picture to a friend who was not in the room. This study identifies the linguistic and discourse features that vary by context, thereby empirically testing the differences in children's oral language use as a function of discourse settings. Second graders are at a developmental point where their oral language and discourse knowledge are growing; thus, we expect to see some differences in their oral language use by context.

Literature Review

Oral Language and the Role of Discourse Context

Discourse oral language skills includes comprehension and production of multi-utterance conversations, stories, and passages. According to the direct and indirect effects model of text comprehension (DIET; Kim, 2016), discourse language skills including language use in various contexts draw on foundational language skills (e.g., vocabulary, grammatical knowledge) and

higher order cognitive skills (e.g., inference, perspective taking, comprehension monitoring) (Kim, 2020b). Furthermore, discourse knowledge—the knowledge of various discourse forms such as genre, procedures, and strategies that is activated when using oral or written language—enables one to appropriately comprehend and produce discourse oral language (Kim, 2020b). Specifically, discourse knowledge is necessary for successful comprehension and for producing or adjusting one's language to deliver their message effectively (Kim et al., 2020; Kintsch, 1988; Rowe & Weisleder, 2020). In fact, discourse knowledge is closely related to perspective taking—one's knowledge of their own mental and emotional states and inferences about others' mental and emotional states—in such ways that one accounts for their interlocutors and their shared knowledge base in adjusting oral language (Curenton et al., 2008; Kim, 2015, 2016, 2020a). Thus, perspective taking is closely related with discourse knowledge as one effectively navigates various discourse contexts (Cho et al., 2021; Kim, 2016, 2020b; Kim & Park, 2019).

Oral language used in distinct settings can be examined in multiple ways, including linguistic knowledge (e.g., vocabulary, connectives, syntax) and discourse knowledge and skills (e.g., register, text structure, perspective taking, referential inference; Uccelli et al., 2015). In the subsequent sections, we review the linguistic and discourse features that have been discussed to be used differentially by discourse contexts.

Linguistic Features of Oral Language Production

Researchers have studied how the usage of certain parts of speech are characteristic of oral language use in different contexts (Benson, 2009; Curenton et al., 2008). Frequent usage of adverbs was discussed as a characteristic of decontextualized speech because adverbs describe manner, time, degree, or frequency in a way that makes the discourse more elaborate and easy-to-picture for those who do not share the same context as the speaker (Curenton & Justice, 2004).

In contrast, using pronouns (e.g., he, you) as subjects resembles more informal everyday conversations, as interlocutors share immediate context and can communicate via gestures or deictic pronouns, while in academic texts, shared situational knowledge is suspended and more sophisticated lexicon, instead of pronoun, is used as subjects or themes (Schleppegrell, 2001).

The sophistication of nouns has also been found to vary by context. Specifically, decontextualized language requires the use of more complex elaborated noun phrase (ENP) in explaining sophisticated concepts or describing objects or situations that are not of the immediate context (Curenton et al., 2008; Scott & Balthazar, 2010; Schleppegrell, 2004). Moreover, the use of more complex ENP comes with increased processing capacity as interlocutors have to identify the noun and hold it in working memory to make connections to the appropriate verb (Fang, 2008; Lundine & McCauley, 2016). In fact, researchers studying children's language development have found that noun phrase post-modification (e.g., the boy who threw the snowball), classified as being complex ENP, is a notable growth area in the school-age years (Curenton & Justice, 2004; Nippold et al., 2008). Children grow from using simple ENP with a single modifier plus a noun structure (e.g., pretty hat) to a more complex ENP with two or more modifiers followed by the noun (e.g., the girl with the dog walking) (Eisenberg et al., 2008; Greenhalgh & Strong, 2001).

Moving beyond the word level, certain types of conjunctions are posited to be used more frequently in decontextualized language as they signal relations among multiple meaning units (Curenton et al., 2008). Specifically, coordinating (e.g., and, or, but) and correlative conjunctions (e.g., both, either, if, then) provide information about connectivity between phrases and clauses, whereas subordinating conjunctions (e.g., because, since, until, when, although) contain information about time, causality, continuality, or oppositional relations between meaning units

(Koutsoftas & Petersen, 2017). Furthermore, embedded clauses, such as relative, nominal, and adverbial clauses, function within another clause or as part of the nominal group to make contributions to a more sophisticated or decontextualized discourse (Lundine & McCauley, 2016; Nippold et al., 2008; Schleppegrell, 2004). In contrast, paratactic clauses (e.g., I came, I saw, and I conquered) that are linked with coordinating conjunctions or merely juxtaposed are used more frequently in colloquial language (E. M. Barnes et al., 2016; Snow, 2010). Therefore, embedded clauses are considered more typical of texts where abstract and complex ideas are delivered (Schleppegrell, 2004).

Discourse Features of Oral Language Production

Researchers have also examined how discourse features in oral language vary by contextual demands to reflect one's understanding of various agents' mental and emotional states (Curenton et al., 2008; Kim et al., 2021). For one, mental state verbs (e.g., think, know, believe, remember) provide information on one's ability to take on different perspectives as they think and talk about the mental and emotional states of themselves and their interlocutors as well as those of characters in stories or books (Dore et al., 2018; Kim & Phillips, 2014; Pinto et al., 2016). Studies found that children increasingly use more mental state verbs as they grow older (Curenton & Justice, 2004) and that mental state verbs are used more frequently in situations where interlocutors are not communicating face-to-face (e.g., communication via phone; Pinto et al., 2016).

Moreover, appropriate character introduction is a developmental skill that taps into children's ability to adjust language according to their understanding of their audience's perspectives, audience awareness (Villaume, 1988). Children aged six or seven were able to introduce characters in ways that accommodate their listener's background knowledge by using

pronouns as well as definite and indefinite noun phrases (Villaume, 1988; Wigglesworth, 1990). A. E. Barnes and colleagues (2014) examined the quality of character introduction when a child introduced the character for the first time in their narrative and found that it accounted for small but statistically significant amount of variance in oral language measures.

Furthermore, researchers have distinguished a continuum of contextualized to decontextualized discourse, based on the abstractness and specificity of discourse (Curenton et al., 2008; Kang et al., 2009; Rowe, 2012; Uccelli et al., 2019). For example, Curenton and colleagues (2008) operationalized contextualized talk to include elements such as descriptions of objects or events or using gestures whereas decontextualized discourse entailed much more explanations, predictions, extensions, or print/story conventions (e.g., once upon a time, the end). The middle ground between contextualized and decontextualized talk was intermediate utterance, which included utterances that addressed characters' psychological states, and showed the speaker's reflections and opinions, or recalled everyday life events linked with the events or characters. Other scholars have identified that explanatory, pretend, and narrative types of talk were all representative of decontextualized talk as they go beyond simple descriptions of what is shared between interlocutors in the immediate context (Rowe, 2012; Uccelli et al., 2019).

Another approach to looking at discourse features in oral language use is through examining the extent of perspective taking represented in texts (Cho et al., 2021; Taylor et al., 2019). Perspective taking is a higher order cognitive skill that contributes to oral language use, especially as it pertains to gauging the shared knowledge base between oneself and their interlocutors and adjusting oral language accordingly (Curenton et al., 2008; Kim, 2015, 2016, 2020a). For example, Cho and colleagues (2021) coded for multiple levels of perspective taking (i.e., own-side, dual, and integrative) represented in written essays, identifying various agents

such as the student writers themselves, potential audience, and characters in a story. In fact, studies have shown that essays containing more complex perspectives had higher writing quality scores (Cho et al., 2021; Taylor et al., 2019). Although they have so far been examined exclusively in written discourse, similar approaches can be taken to examine how perspective taking in oral language varies by discourse contexts.

Present Study

The ability to use language effectively according to contexts is increasingly more important as children encounter various discourse contexts upon entering school. Prior literature suggests that oral language used in different contexts may exhibit unique linguistic and discourse features. However, previous studies were mostly limited to analyzing the occurrences of hypothesized decontextualized oral language features from naturalistic discourse and were sometimes confounded with the issue of language used for different purposes (e.g., academic, colloquial language) and in different modality (i.e., spoken, written) (Scarcella, 2003; Schleppegrell, 2001). To address these issues, the present study examined second graders' oral language use in picture description tasks to investigate linguistic and discourse features in two distinct conditions, contextualized and decontextualized. Below are the specific research questions:

1. What are the characteristics of *linguistic* (e.g., elaborated noun phrase) and *discourse* features (e.g., proper character introduction, degree of decontextualization) in second graders' picture description in contextualized and decontextualized conditions?
2. Do the *linguistic* features vary by contextualized versus decontextualized conditions, controlling for total productivity and student demographic backgrounds?

3. Do the *discourse* features vary by contextualized versus decontextualized conditions, controlling for total productivity and student demographic backgrounds?

We hypothesized that second graders use more sophisticated and elaborate word-level features such as complex ENPs and adverbs in the decontextualized condition because they are likely to attempt to describe the picture more specifically to the listener who does not have access to the picture (De Temple et al., 1991). We also posited that they are able to introduce characters more properly in the decontextualized condition as they are developing audience awareness that enables them to adjust their language accordingly (A. E. Barnes et al., 2014).

Method

Participants

Participants were 330 second grade students (M_{age} = 7.33) from 58 classrooms in the Southeastern part of the United States. The sample was drawn from a larger longitudinal study of children's language and literacy development and previous studies focusing on reading skills have been reported (Kim, 2017, 2020b). The study obtained ethics approval and informed consent was obtained from participating children's parents/guardians (HSC No. 2017.20455). The sample consisted of 53% boys (n = 174). There were approximately 55% Caucasian (n = 181), 35% African American (n = 116), 4% Hispanic (n = 14), 1% Asian American (n = 2), and 5% multiracial or other ethnicity (n = 17) students. A large proportion (72%; n = 239) of the students were eligible for free or reduced-price lunch. Only around 1% of the students (n = 3) were identified as English language learners, as determined by the state-wide assessments conducted annually. According to the district record, children with exceptionality, majority of whom received speech services, consisted of 21% (n = 70) of the sample.

Measures

Oral Language Production

Children were presented with three pictures. The first one was a girl in a sofa chair with her green shoes off, reading a book, and a cat sleeping next to her. The second one was a child on his belly drawing an animal with crayons scattered around and a cat watching the child on a stool. The third one was a red-dressed girl pulling a cow out of the water in a forest (see Appendix A). They were asked to describe each picture twice, once in a contextualized condition and the other in a decontextualized condition (De Temple et al., 1991). For the contextualized condition, the examiner said, "Look at the picture carefully and describe the picture to me" while they were looking at the same picture at the same time. For the decontextualized condition, the examiner prompted, "I want you to pretend that you are describing the picture to a friend that cannot see the picture. Pretend the friend will listen to your description on the tape recorder later, so please describe this picture in a way that your friend could draw the picture just by listening to your description." Here, the child and their intended audience (i.e., friend) were not sharing the same picture, reflecting a more decontextualized discourse setting. The order of the presentation of each condition was counterbalanced for two groups, such that for one group, children responded to the decontextualized condition first for pictures 1 and 3, followed by the contextualized condition, whereas for picture 2, it was the other way around. The other group responded in the reverse order of conditions for each picture. The pictures were presented in an identical order across the two groups. This was done to avoid the effect of repetition either benefiting or reducing the response in the second condition, across the two groups (Shadish et al., 2002).

Children's description of the pictures was digitally recorded (wav. file) and transcribed verbatim following the Systematic Analysis of Language Transcription (SALT; Miller &

Iglesias, 2006) guidelines. The transcripts were segmented into communication units (C-units), which adhere to a clausal structure, containing a subject and a verb, followed by any dependent clauses or phrases (Loban, 1976). Given that not all utterances in oral language adhere to a clausal structure, some that were not complete but contained key information (e.g., missing a be-verb) were regarded as one C-unit (e.g., "a family having a campfire" as one C-unit). Then, SALT transcripts were transported to CLAN software (MacWhinney, 2000) as CHAT files to run additional analyses.

General Linguistic Indexes. Some general descriptive indexes of linguistic features in the picture description tasks were generated automatically for each condition and picture through SALT standard measures report (Miller & Iglesias, 2012) and by using CLAN's kideval command (MacWhinney, 2000). They include total productivity indexes such as the number of words and C-units. They also include sentence-level indexes such as the mean length of unit in words and morphemes, and the number of verbs per unit. Type-token ratio representing lexical diversity was calculated as the number of different words divided by the total number of words.

Parts of Speech. The number of words belonging to certain parts of speech were counted using the CLAN software's frequency command (MacWhinney, 2000).

Adverbs. The number of adverbs used in each description task was counted. Words were counted as adverbs in the CLAN morpheme if they modify verbs, adjectives, or other adverbs.

Pronominals. The frequency of pronominal usage, or the number of pronouns (e.g., he, you, they) used as the subject of a clause, was counted for each description task.

Coordination. The number of coordinating conjunctions used in each description task was counted. The coordinating conjunctions included in the CUT file from CLAN included the following: and, either, or, or else, versus, neither, nor, and, or, plus.

Conjunctions. The number of conjunctions used in each description task was counted. The conjunctions included in the CUT file from CLAN included only those that were not used as coordinating conjunctions listed above.

Linguistic Features. Children's use of specific linguistic features was manually identified every time they appeared on the transcript. The frequency of each type of linguistic features was calculated through SALT code summary analysis (Miller & Iglesias, 2006).

Elaborated Noun Phrase (ENP). Fifteen types of ENP were coded (Butler et al., 2004) and counted in their frequency for each description task. ENPs were categorized by 1) their level of complexity and 2) their grammatical role in the unit (i.e., subject, predicate, non-applicable). There were five types of ENP, and within each, they could take on one of the three grammatical roles mentioned above. The first type of ENP was referred to as *simple designating noun phrase* and included those with nouns that were preceded by articles (e.g., a boy), demonstratives or determiners (e.g., that doll), possessives (e.g., her cow), and quantifiers (e.g., many trees). The second type of ENP was designated as *simple descriptive noun phrase*, where adjectives or noun modifiers preceded the noun (e.g., a tall tree). The third type of ENP was called *complex noun phrase* and included those with two or more modifiers plus the noun (e.g., the big red house). The fourth type of ENP was called *noun phrase with noun post modification* and included those that had simple designating noun phrase, followed by relative clauses (e.g., the girl that drew the picture), qualifiers (e.g., the boy with the glove), or participial modifiers (e.g., the number of crayons). The final type of ENP was called *complex noun phrase with post modification*, which took the form of a simple descriptive or complex noun phrase followed by post modifications (e.g., the brown cat that is sleeping), or a simple noun phrase followed by two or more post modifications (e.g., a girl wearing a pajama sleeping). All ENPs that were identified in their

types were also coded for their grammatical role, depending on whether it served as the subject, predicate, or was unidentifiable; thus, fifteen types in total. A total of 615 C-units included in 54 picture description tasks were independently coded and exact agreement rates were 91% for ENP type and 93% for grammatical role.

Type of Clause. Eight types of clauses were coded and counted in their frequency for each description task. Broadly, they were divided into categories of 1) non-clause, 2) independent clause, 3) participial phrase and 4) subordinating clause. First, non-clauses were those that were missing a verb, which is the core element of a clause. Next, independent clauses were divided into three types: single independent clause, independent clause missing only the be-verb, and independent clause missing an obvious subject that was stated before. The reason for including them into one category of independent clause was to account for dialectal variance in the use of be-verbs (Cukor-Avila, 2002) and the nature of oral language where subjects may be missing when they can be commonly assumed within the discourse context. Moreover, participial phrases, where present or past participles were used to shorten a main clause, were counted in their occurrences. Lastly, subordinating clauses were classified into nominal, relative, and adverbial, and counted for their frequency. A total of 615 C-units included in 54 picture description tasks were independently coded, and the exact agreement rate was 95%.

Discourse Features. The frequency of children's use of discourse features were counted for each picture and condition by either generating a list of words to be identified (e.g., mental state talk) or manually coding for their occurrences.

Mental State Talk. A list of words representing mental and emotional states was created based on previous coding schemes (Kim et al., 2021; Meins & Fernyhough, 2015; Ruffman et

al., 2002). Frequency command was run to identify how often such mental state talk (e.g., think, know, feel, forget) put in a CUT file (MacWhinney, 2000) were used in each description task.

Proper Character Introduction. The appropriateness of children's attempt at introducing the characters for the first time was coded into three categories: proper, improper, and depending on context (A. E. Barnes et al., 2014). There were two animate characters that could be introduced in the respective pictures, so the maximum number of proper introductions for each description task was two. A proper code was assigned when the character was introduced using an indefinite article (e.g., a girl), a name (e.g., John), or a reference to the previously introduced character (e.g., a girl and her cat). Improper code was given in cases where the character was introduced using definite article (e.g., the boy), pronouns without referent (e.g., they, he), or when missing an article when needed. Dependent code was assigned when the character was introduced using demonstrative determiner (e.g., this girl). Then, all the dependent codes were reassigned to either proper or improper depending on condition: for contextualized condition, such introduction was deemed proper given that determiners can be used to indicate objects in shared context; for decontextualized condition, they were considered improper given that the audience cannot look at the picture being described. A total of 615 C-units included in 54 picture description tasks were independently coded, and the exact agreement rate was 99%.

Degree of Decontextualization. Each C-unit was coded in their degree of decontextualization for each description task (Curenton et al., 2008). They were classified into three categories depending on their complexity in terms of the degree of decontextualization: 1) low, 2) mid, 3) high. Low degree of decontextualization focused on information present in the immediate context, encompassing descriptive statements or clarification of the meaning of words. Next, middle degree of decontextualization was assigned to units that required reflection

using information that was not available in the immediate context but still related to it. These included C-units that were addressing character's psychological states, recalling information, or making judgements. The highest degree of decontextualization was for units that required extrapolation from the picture, including those that predict what happened or will happen, state hypothetical situations, or employ story conventions (e.g., once upon a time). Incomplete or incomprehensible units were also flagged. A total of 735 C-units included in 54 picture description tasks were independently coded and the exact agreement rate was 97%.

Perspective Taking. Each C-unit was coded for their level of perspective taking, which were divided into four categories of 1) no perspective taking, 2) own perspective taking, 3) dual perspective taking, and 4) incomprehensible (Cho et al., 2021). No perspective taking was assigned to units that were unopinionated descriptions, with no inference and connections to anything beyond the picture itself. Own perspective taking was given for units that portrayed the student's own perspective, including those that had evaluative statements. Dual perspective taking was for those units that contained perspectives beyond the students' own, such as those of the characters in the pictures. Incomprehensible units were identified. A total of 735 C-units in 54 picture description tasks were independently coded, and the exact agreement rate was 97%.

Procedure

Children were individually assessed by trained research assistants in a quiet place in the schools. Examiners were majority White females from the local community where the study was conducted.

Data Analysis Strategy

For data analysis, we included only those students who spoke at least one C-unit or a word across the two conditions. To prepare the data for analysis, composite scores across three

pictures within the same condition were calculated so that each child has one score for each linguistic and discourse index for contextualized and decontextualized condition, respectively. A few additional indexes for certain linguistic and discourse features were generated. For example, clausal density across all three pictures was calculated by adding up the total number of independent and subordinating clauses and dividing it by the total number of C-units (Nippold et al., 2008). A score for the proportion of properly introduced characters was calculated by the number of proper character introduction divided by the total number of attempts at introducing characters. Moreover, a total degree of decontextualization score was generated by adding the number of low degree of decontextualization multiplied by 1, the number of mid degree of decontextualization multiplied by 2, and the number of high degree of decontextualization multiplied by 3. Similarly, a total perspective taking score was generated by summing up the number of own-side perspectives multiplied by 1 and the number of dual perspectives multiplied by 2. This way, degree of decontextualization and perspective taking scores reflected the greater weight put to more complex levels. Applying weighting to a higher order or more complex perspective is akin to a widely used approach in evaluating short-constructed responses where different weights are assigned to reflect the precision of response (e.g., 0 for an incorrect response, 1 for a partially correct response, and 2 for a precise response).

To address the first research question regarding the extent to which second grade children exhibit linguistic and discourse features in picture description, descriptive statistics for all general linguistic indexes (e.g., mean length of unit in words, type token ratio), linguistic features, and discourse features were examined. To test whether the linguistic and discourse features vary by contextualized versus decontextualized conditions, we conducted multiple paired samples *t* tests and calculated effect sizes (i.e., Cohen's *d*) for the variables that exhibited

normal distribution (see the variables without the superscript [a] in Table 1.1). For eleven variables that exhibited non-normality in the univariate distribution (i.e., total number of units, total number of words, mean length of units in words, conjunction, mental state talk, complex noun phrase, mid degree of decontextualization, degree of decontextualization score, own perspective taking, dual perspective taking, perspective taking score), we conducted non-parametric test (i.e., Wilconxon signed-rank test) and report their z scores and r values. In examining bivariate correlations and multiple regression models, however, severe outliers (i.e., values that exceeded 3 times the interquartile range) were winsorized to meet the assumptions of univariate and multivariate normality. It should be noted that winsorization maintains the rank order of values, which is the key information for correlational analysis. The extreme outliers were due to overly lengthy and repetitive utterances in some language samples. Winsorization can reduce Type 1 error without introducing much bias when sample size is sufficient and the extent of a few outliers is not large (Liao et al., 2016), which was the case in our data. Also note that we did not employ corrections for multiple testing for bivariate correlation analysis because there is no consensus on whether it is necessary or not (Streiner & Norman, 2011), and since the present study is situated within a theoretically sound approach, the addition of a correction was not considered obligatory.

To address research questions 2 and 3 on the relations between contextualization and children's use of linguistic and discourse features, multilevel regression analyses were conducted, which accounts for students being nested within classes/teachers, using STATA IC 15.1 "mixed" command (StataCorp, 2017). Multilevel models are beneficial as they produce unbiased estimates of the relations between variables with precise standard errors and p values (Raudenbush & Byrk, 2002). For the analyses, the dummy variable of contextualized condition,

1 denoting contextualized condition and 0 indicating decontextualized condition, predicted each and every linguistic and discourse feature, controlling for the total C units and student demographics. The intraclass correlation coefficient (ICC) provides the dependence of scores between students (level 1) in the same classroom (level 2); in other words, it represents the percentage of variance that is attributable to the classroom (level 2).

Results

Research Question 1: Characteristics and Comparisons of Linguistic and Discourse Features by Condition

Descriptive statistics for the sample by condition are reported in Table 1.1. The mean number of C-units, a measure of total productivity, was 19.81 (*SD* = 12.51) in the decontextualized condition and 18.66 (*SD* = 9.98) in the contextualized condition. Type token ratio, representing lexical diversity, was 0.61 (*SD* = 0.13) in the decontextualized and 0.64 (*SD* = 0.11) in the contextualized condition. The total number of ENP used was 28.23 (*SD* = 17.51) in the decontextualized condition and 25.79 (*SD* = 13.96) in the contextualized condition. Among the ENPs, the most commonly used forms were simple or simple descriptive noun phrases, followed by noun phrases with post-modification, for both conditions. Clausal density, a measure of syntactic complexity, was 0.98 (*SD* = 0.30) for decontextualized and 1.01 (*SD* = 0.21) for contextualized condition. Regarding discourse features, the proportion of proper character introduction was 0.57 (*SD* = 0.34) for the decontextualized and 0.52 (*SD* = 0.33) for the contextualized condition. For both conditions, the majority of the C-units consisted of low degrees of decontextualization (17.84 for decontextualized, 16.52 for contextualized) and non-perspective taking units (17.89 for decontextualized, 16.54 for contextualized) compared to the

more complex degrees of decontextualization and perspective taking units. All linguistic and discourse features had sufficient variations around their means.

Table 1.1

Descriptive Statistics of General Linguistic Indexes and Linguistic and Discourse Features in Decontextualized and Contextualized Conditions (N=330)

	Decontextualized				Contextualized						
	Mean	SD	Min	Max	Mean	SD	Min	Max	*t*(329)	*p*	*d*
General Indexes											
Total Number of Units[a]	19.81	12.51	0.00	94.00	18.66	9.98	2.00	54.00	1.70	.089	.07
Total Number of Words[a]	143.29	94.60	0.00	712.00	130.38	73.02	7.00	445.00	3.33	<.001	.13
MLU in Words[a]	7.55	2.77	0.00	33.00	7.25	2.27	1.54	22.67	2.83	.005	.11
Type Token Ratio	0.61	0.13	0.00	0.97	0.64	0.11	0.29	0.92	-3.97	<.001	-.22
Number of Words											
Adverb	5.25	4.13	0.00	24.00	5.06	3.83	0.00	19.00	1.03	.305	.06
Conjunction[a]	0.82	1.61	0.00	12.00	0.89	1.53	0.00	12.00	-1.54	.124	-.06
Coordinating	14.00	11.29	0.00	87.00	12.31	9.00	0.00	63.00	4.29	<.001	.17
Pronominal	6.70	5.50	0.00	30.00	7.12	5.49	0.00	30.00	-1.70	.089	-.08
Mental State Talk[a]	1.01	1.60	0.00	10.00	1.12	1.84	0.00	12.00	-0.46	.644	-.02
Elaborated Noun Phrases											
Total Elaborated NP	28.23	17.51	0.00	120.00	25.79	13.96	1.00	94.00	4.24	<.001	.15
Simple NP	18.02	9.88	0.00	61.00	17.49	8.67	1.00	62.00	1.28	.200	.06
Simple Descriptive NP	6.84	6.94	0.00	47.00	5.59	5.51	0.00	27.00	4.86	<.001	.20
Complex NP[a]	1.21	1.84	0.00	12.00	0.95	1.48	0.00	9.00	3.70	<.001	.14
NP with Post-modification	1.29	1.57	0.00	8.00	1.04	1.33	0.00	6.00	3.23	.001	.18
Complex NP with Post-modification	0.87	1.37	0.00	8.00	0.72	1.26	0.00	8.00	2.53	.012	.12
NP as subject	5.83	5.36	0.00	32.00	6.33	4.95	0.00	26.00	-2.31	.021	-.10
NP as predicate	20.68	13.79	0.00	98.00	18.34	10.86	0.00	75.00	4.92	<.001	.19
NP as fragment	1.72	3.72	0.00	26.00	1.12	2.74	0.00	21.00	4.22	<.001	.18
Types of Clauses											
Non	2.24	4.40	0.00	34.00	1.52	3.07	0.00	24.00	4.69	<.001	.19
IC	17.42	12.07	0.00	80.00	17.05	9.89	1.00	52.00	0.90	.368	.03
Subordinating	1.90	2.40	0.00	13.00	1.77	2.40	0.00	23.00	1.06	.291	.06
Participial phrase	1.34	1.49	0.00	10.00	1.15	1.27	0.00	8.00	2.46	.014	.14
Clausal Density	0.98	0.30	0.00	3.00	1.01	0.21	0.08	2.15	-1.97	.050	-.10
Character Introduction											
Proper	3.20	2.01	0.00	6.00	2.95	1.98	0.00	6.00	2.98	.003	.13
Improper	2.25	1.87	0.00	6.00	2.66	1.88	0.00	6.00	-4.65	<.001	-.22
Total	5.45	1.08	0.00	6.00	5.61	0.89	1.00	6.00	-2.40	.017	-.15
% Proper	0.57	0.34	0.00	1.00	0.52	0.33	0.00	1.00	3.95	<.001	.17
Degree of Decontextualization											
Low	17.84	12.37	0.00	91.00	16.52	10.01	0.00	51.00	3.09	.002	.12
Mid[a]	1.13	1.46	0.00	11.00	1.39	1.58	0.00	9.00	-4.00	<.001	-.16

High	0.27	0.76	0.00	6.00	0.33	0.93	0.00	7.00	-1.34	.182	-.07
Exclude	0.57	1.04	0.00	8.00	0.43	0.79	0.00	4.00	2.40	.017	.15
Score[a]	20.91	12.50	0.00	91.00	20.27	10.32	2.00	54.00	0.80	.424	.03
Perspective Taking											
Non	17.89	12.37	0.00	91.00	16.54	10.03	0.00	50.00	3.17	.002	.12
Own[a]	0.47	1.05	0.00	9.00	0.54	1.25	0.00	9.00	-1.20	.230	-.05
Dual[a]	0.90	1.18	0.00	8.00	1.17	1.40	0.00	9.00	-4.15	<.001	-.16
Exclude	0.55	0.97	0.00	7.00	0.42	0.78	0.00	4.00	2.43	.016	.15
Score[a]	2.27	2.84	0.00	18.00	2.87	3.34	0.00	19.00	-4.56	<.001	-.18

Note. SD = Standard Deviation; MLU = Mean Length of Unit; NP = Noun Phrase. Clausal Density is calculated as the sum of independent clauses and subordinating clauses divided by the total number of units.

[a]For non-parametric variables, Wilconxon signed-rank test, instead of paired t-tests, were conducted; z statistic and r value are reported, instead of t statistic or Cohen's *d*.

To test whether there were mean differences in the linguistic and discourse features across the two conditions, we conducted paired sample *t* tests and Wilconxon signed-rank test according to the distributional properties of the variables (see above the Measures section and Table 1.1). Total number of words were significantly higher in the decontextualized condition (*Mdn* = 124) than the contextualized condition (*Mdn* = 117) with a small effect size, $z = 3.33$, $p < .001$, $r = .13$. Similarly, the mean number of words in C-units was also significantly higher in the decontextualized condition (*Mdn* = 7.37) than the contextualized condition (*Mdn* = 6.95) with a small effect size, $z = 2.83$, $p = .005$, $r = .11$. In contrast, type-token ratio was higher in the contextualized than in the decontextualized condition ($t = -3.97$, $p < 0.001$) with a small effect size ($d = .22$). Regarding linguistic features, more coordinating conjunctions ($t = 4.29$, $p < .001$; $d = .17$), ENPs ($t = 4.24$, $p < .001$; $d = .15$), and non-clauses ($t = 4.69$, $p < .001$; $d = .19$) were used in the decontextualized condition. With regard to the discourse features, the proportion of proper character introduction was higher in the decontextualized condition ($t = 3.95$, $p < .001$; $d = .17$) although more characters were introduced in the contextualized condition ($t = -2.40$, $p = .017$; $d = -.15$). In addition, mid degree of decontextualization was shown more often in the

contextualized condition (z = -4.00, p <.001, r = -.16), similar to the case for dual perspective taking (z = -4.15, p <.001, r = -.16) and perspective taking score (z = -4.56 p <.001, r = -.18). There were no statistically significant differences in the number of adverbs, conjunctions other than coordinating conjunctions, pronominals, mental state talk and clausal density.

Table 1.2

Correlations Between Discourse Context, General Linguistic Indexes, Linguistic Features and Discourse Features (N=330)

	Ctxtd	Tot utts	MLU	TTR	Coord	ENP	Non	Cha Intro	DoD – mid	PT – dual
Ctxtd	--									
Tot utts	-0.05	--								
MLU	-0.06	-0.19***	--							
TTR	0.11**	-0.47***	-0.05	--						
Coord	-0.08*	0.73***	0.13***	-0.50***	--					
ENP	-0.08*	0.90***	0.09*	-0.49***	0.79***	--				
Non	-0.09*	0.24***	-0.33***	0.09*	0.08*	0.16***	--			
Cha Intro	-0.09*	0.21***	0.08*	-0.05	0.18***	0.27***	0.22***	--		
DoD – mid	0.09*	0.03	0.09*	-0.01	-0.02	-0.03	-0.19***	-0.23***	--	
PT – dual	0.11**	-0.01	0.12**	-0.00	-0.04	-0.06	-0.19***	-0.24***	0.83***	--
PT – score	0.10**	0.00	0.12**	-0.00	-0.03	-0.07	-0.20***	-0.27***	0.90***	0.94***

Note. Ctxtd = Contextualized condition; Tot utts = Total Number of Units; MLU = Mean Length of Unit in word count; TTR = Type Token Ratio; Coord = Coordinating Conjunction; ENP = Elaborated Noun Phrase; Non = Non-clause; Cha Intro = Proportion of Proper Character Introduction; DoD = Degree of Decontextualization; PT = Perspective Taking. *p < .05. **p < .01. ***p < .001.

Table 1.2 presents the bivariate correlations among contextualized condition, general linguistic indexes, linguistic features, and discourse features. The selected linguistic and discourse variables were those that exhibited significant differences between discourse conditions (see Table 1.1) and were serving as representative indexes of the given features (e.g., proportion of proper character introduction representing proper, improper, or total number of character introduction). All the selected indexes except for the total number of units and mean number of words per unit were significantly related to discourse conditions. Total number of

utterances were positively and strongly related to the number of coordinating conjunctions (r = .73) and ENPs (r = .90); positively and weakly related to the number of non-clauses (r = .24) and the proportion of proper character introduction (r = .21); and negatively related to the mean length of unit in words (r = -.19) and type token ratio (r = -.47). Mid degree of decontextualization, dual perspective taking, and perspective taking score were not significantly correlated with total number of utterances.

Research Question 2: Linguistic Features Predicted by Discourse Condition

Table 1.3 shows multilevel regression models where linguistic features were predicted by discourse condition, controlling for total number of C-units and student demographics. Intraclass correlations in the linguistic features ranged from 0.01 to 0.10. In other words, approximately 1 to 10% of the total variance in the linguistic indexes in children's picture descriptions were attributed to differences among classes. Children produced higher type-token ratio in the contextualized condition ($p < .01$) after accounting for total number of C-units and student demographic variables in the model. On the other hand, children produced higher number of coordinating conjunctions, non-clauses, simple descriptive noun phrase, and noun-phrase with post-modification in the decontextualized condition (ps < .05), after controlling for all other variables. Discourse condition was not related to other types of ENPs (i.e., complex noun phrase, complex noun phrase with post-modification), after accounting for total productivity and student demographic variables. African American students had lower performance on type token ratio and ENPs than their White peers (ps < .005), controlling for all other variables. Students coming from low socioeconomic backgrounds showed lower performance on most of the ENPs compared to students who were not from low socioeconomic backgrounds (ps < .01), controlling for all other variables.

Table 1.3

Multilevel Models: Linguistic Features Predicted by Contextualized Condition Controlling for Total Productivity and Student Demographics (N=330)

Variable	TTR	Coord	SDNP	CNP	NPP	CNPP	Non
Fixed Effects							
Intercept	0.75***	-1.34	-0.76	-0.56	-1.75*	-0.89	3.09
	(0.06)	(3.91)	(2.35)	(0.76)	(0.69)	(0.64)	(2.04)
Contextualized	0.02**	-1.02*	-0.85**	-0.17	-0.20*	-0.12	-0.62*
	(0.01)	(0.51)	(0.32)	(0.10)	(0.10)	(0.09)	(0.27)
Total Utterance	-0.01***	0.67***	0.39***	0.07***	0.06***	0.04***	0.09***
	(0.00)	(0.03)	(0.02)	(0.00)	(0.00)	(0.00)	(0.01)
Age in months	-0.00	0.03	0.02	0.01	0.02**	0.02*	-0.03
	(0.00)	(0.04)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)
Male	-0.01	-0.23	-0.90**	-0.14	0.26*	-0.17	0.79**
	(0.01)	(0.54)	(0.33)	(0.11)	(0.10)	(0.09)	(0.28)
FRPL dummy	-0.00	0.27	-1.41***	-0.38**	-0.14	-0.48***	-0.18
	(0.01)	(0.68)	(0.41)	(0.13)	(0.12)	(0.11)	(0.36)
ELL dummy	-0.06	-2.13	-1.54	-0.39	-1.37*	-0.20	-2.41
	(0.05)	(3.17)	(1.93)	(0.63)	(0.58)	(0.53)	(1.66)
Exceptionality	-0.00	-1.52*	-0.50	-0.35**	-0.27*	-0.06	0.33
	(0.01)	(0.68)	(0.41)	(0.13)	(0.12)	(0.11)	(0.35)
African American	-0.02*	-0.69	-1.33***	-0.43***	-0.63***	-0.44***	-0.24
	(0.01)	(0.65)	(0.39)	(0.13)	(0.12)	(0.11)	(0.34)
Asian-American	0.06	0.44	1.94	-0.37	1.08	-0.76	0.54
	(0.05)	(3.48)	(2.11)	(0.68)	(0.63)	(0.58)	(1.82)
Hispanic	-0.00	-0.61	-0.96	-0.53	-0.06	-0.50	0.82
	(0.02)	(1.52)	(0.93)	(0.30)	(0.28)	(0.26)	(0.80)
American Indian	-0.13	0.25	-4.38	-1.65	-0.79	-1.38	-1.01
	(0.07)	(4.78)	(2.93)	(0.96)	(0.89)	(0.82)	(2.50)
Multiracial or Other	0.01	-0.32	-0.46	0.27	0.56*	-0.27	1.51*
	(0.02)	(1.34)	(0.80)	(0.26)	(0.24)	(0.22)	(0.70)
Variance components							
Classroom	0.00	4.93	0.92	0.05	0.01	0.01	1.14
Child	0.01	43.56	16.48	1.77	1.54	1.32	11.97
Intraclass Correlations	0.03	0.10	0.05	0.03	0.01	0.01	0.09

Note. Standard errors in parentheses. TTR = Type token ratio; Coord = Coordinating conjunctions; SDNP = Simple Descriptive Noun Phrase; CNP = Complex Noun Phrase; NPP = Noun Phrase with Post-modification; CNPP = Complex Noun Phrase with Post-modification; Non = Non clause; FRPL = Students receiving Free and Reduced Priced Lunch, indicating low socioeconomic status; ELL = English Language Learner; Exceptionality = Students with Exceptionality. White students are the reference group. *$p < .05$. **$p < .01$. ***$p < .001$.

Research Question 3: Discourse Features Predicted by Discourse Conditions

Table 1.4 shows multilevel regression models where discourse features were predicted by discourse condition, controlling for total number of C-units and student demographics. Intraclass correlations in the discourse features ranged from 0.03 to 0.10. In other words, approximately 3 to 10% of the total variance in the discourse indexes in children's picture descriptions were attributed to differences among classes. Children had higher proportion of proper character introduction in the decontextualized condition ($p < .05$) after accounting for total number of C-units and student demographic variables. On the other hand, children produced more mid degree of decontextualization and dual perspective taking and had higher perspective taking score in the contextualized condition ($ps < .05$), after controlling for all other variables. African American children showed higher performance on complex degrees of decontextualization and perspective taking ($ps < .01$) than their White peers but had lower performance on proper character introduction ($p < .001$) after controlling for all other variables.

Table 1.4
Multilevel Models: Discourse Features Predicted by Contextualized Condition Controlling for Total Productivity and Student Demographics (N = 330)

Variable	Proportion of Proper Character Intro	Degree of Decontextualization - Mid	Perspective Taking - Dual	Perspective Taking Score
Fixed Effects				
Intercept	0.79***	0.63	-0.24	0.80
	(0.17)	(0.83)	(0.67)	(1.63)
Contextualized	-0.05*	0.27*	0.27**	0.60**
	(0.02)	(0.11)	(0.09)	(0.21)
Total Utterance	0.00***	0.00	-0.00	0.00
	(0.00)	(0.01)	(0.00)	(0.01)
Age in months	-0.00	0.01	0.01	0.01
	(0.00)	(0.01)	(0.01)	(0.02)
Male	-0.04	-0.07	-0.08	-0.16
	(0.02)	(0.12)	(0.09)	(0.23)
FRPL	-0.03	-0.27	-0.22	-0.43
	(0.03)	(0.15)	(0.12)	(0.28)

ELL	-0.18	-0.05	0.15	0.47
	(0.14)	(0.69)	(0.56)	(1.32)
Exceptionality	-0.02	-0.01	0.04	0.05
	(0.03)	(0.15)	(0.12)	(0.28)
African American	-0.25***	0.38**	0.40***	1.00***
	(0.03)	(0.14)	(0.11)	(0.27)
Asian	-0.09	0.30	0.49	0.69
	(0.15)	(0.75)	(0.61)	(1.45)
Hispanic	-0.12	0.01	0.28	0.65
	(0.07)	(0.33)	(0.27)	(0.64)
American Indian	0.15	0.41	1.74*	2.62
	(0.21)	(1.05)	(0.84)	(1.99)
Multiracial or Other	-0.08	0.15	0.15	0.29
	(0.06)	(0.29)	(0.23)	(0.56)
Variance Components				
Classroom	0.005	0.08	0.06	0.88
Child	0.09	2.10	1.37	7.56
Intraclass Correlations	0.06	0.03	0.04	0.10

Note. Standard errors in parentheses. FRPL = Students receiving Free and Reduced Priced Lunch, indicating low socioeconomic status; ELL = English Language Learner; Exceptionality = Students with Exceptionality. White students are the reference group. *$p < .05$. **$p < .01$. ***$p < .001$.

Discussion

Children's ability to adjust one's language according to discourse context is increasingly more important for success in academic settings where more decontextualized language is used (Rowe, 2013; Schleppegrell, 2004; Uccelli et al., 2019). This study examined whether second graders in the US vary linguistic and discourse features when describing pictures in two distinct discourse conditions. Overall, second graders used more ENPs and exhibited precise character introduction in the decontextualized setting while higher lexical diversity and discourse beyond simple description occurred more often in the contextualized setting. These features illustrate the areas in which discourse knowledge and perspective taking played roles in their oral language.

Linguistic Features by Contextualized and Decontextualized Conditions

Type-token ratio was higher in the contextualized condition compared to the decontextualized condition, controlling for total productivity and student demographics. It can be inferred that contextualized condition allowed for more varied and detailed explanation due to the ease of describing pictures because the child knew that the interlocutor concurrently had access to the same material. Alternatively, it can be interpreted that children did not have a full grasp of discourse knowledge, as more descriptions are needed in the decontextualized condition because of a lack of material shared between the interlocutors. This explanation is supported by previous literature showing that lexical diversity is higher when adult English language learners were writing about more familiar or personal topics (Yu, 2010) because oral language production in contextualized condition resembles more familiar discourse context. However, it is divergent with other studies showing that lexical diversity is positively related to more complex discourse context for children and adolescents (Lundine & McCauley, 2016; Schleppegrell, 2001). The mixed findings in the previous literature may be due to differences in how lexical diversity was compared in terms of target population (e.g., age group, ELL status) and discourse contexts (e.g., topic familiarity, discourse genre). Thus, more research is needed on the effect of decontextualization in children's oral language production regarding lexical diversity.

Decontextualized condition was uniquely and positively related to the number of simple descriptive noun phrase and noun-phrase with post-modification, after controlling for all other variables. The result implies that second grade children are at least implicitly aware that more precise and descriptive language is needed for explaining pictures in the decontextualized condition, which is in line with the previous literature showing that more sophisticated linguistic features such as ENPs were more often found in decontextualized discourse for preschoolers and adolescents (Curenton et al., 2008; Scott & Balthazar, 2010). It is also interesting to note that

only selective types of ENPs (i.e., simple descriptive noun phrase, noun-phrase with post-modification), not all types, were used more often. Thus, these selective indexes can serve as evidence of children's growing discourse knowledge, indicating how they're capable of adjusting their language by discourse context.

It is also notable that coordinating conjunctions were used more frequently in the decontextualized condition than the contextualized condition, controlling for all other variables. Greater use of coordinating conjunctions in the decontextualized condition may be due to the greater cognitive demand required in the decontextualized condition, leading children to resort to simpler forms of connecting sentences (Berninger et al., 2010). This appears to contrast with the findings of text analysis which showed that more sophisticated linguistic features such as conjunctions other than coordinating ones (e.g., subordinating) are found in academic texts (Schleppegrell, 2004) or decontextualized settings (E. M. Barnes et al., 2016; Nippold et al., 2008). Furthermore, children had a greater number of non-clauses in the decontextualized condition after controlling for all other variables. It can be inferred that children had more difficult time forming complete sentences when describing pictures in the decontextualized condition, most likely due to greater cognitive load in adjusting their language to suit the needs of their audience who are not sharing their immediate context (Lundine & McCauley, 2016; Nippold, 2009). Further research is warranted to examine these speculations.

Discourse Features by Contextualized and Decontextualized Conditions

The proportion of proper character introduction was higher in the decontextualized condition, controlling for total productivity and student demographics. This is noteworthy because it shows that children took the perspective of their audience in the decontextualized condition to produce more accurate introductions of the characters than in the contextualized

condition where character introduction was less important given shared context (A. E. Barnes et al., 2014; Villaume, 1988). In contrast to proper character introduction, a more complex degree of decontextualization (i.e., mid degree of decontextualization) and higher perspective taking (i.e., dual perspective taking) were found in the contextualized condition, controlling for all other variables. This contrasts with the previous literature that contextualized talk involves more simple descriptions of objects and events while decontextualized talk is characterized by more explanations, predictions, and extensions such as in parent-child book reading or story-creating interactions (Curenton et al., 2008; van Kleeck et al., 1997). The present finding may be due to children's ability to modulate their language according to their understanding of the intended audience (A.E. Barnes et al. 2014) and suggests that adjusting language according to the audience may be a lower-order form of perspective taking than taking the perspectives of the characters in the picture to talk from their mental and emotional states (Cho et al., 2021; Curenton et al., 2008). Future studies are warranted to examine the different levels of perspective taking portrayed in oral language production.

Finally, the intraclass correlations for the linguistic and discourse measures showed that less than 10% of the variance in the results were explained at the classroom level. This means that the variance in the linguistic and discourse features in second graders' oral language use were mostly attributed to individual differences rather than differences across classrooms. Also noteworthy is that African American children's language sample had more complex discourse features (i.e., degree of decontextualization, perspective taking) than their White peers, while White peers had more complex linguistic features (i.e., type token ratio, ENPs) than African American children, after controlling for total productivity and other demographic variables. These findings indicate the importance of examining discourse features in addition to linguistic

features in understanding children's oral discourse. The findings also suggest a need for future work to investigate mechanisms that explain differences in discourse and linguistic features as a function of racial/ethnic backgrounds.

While the present study advances the discussion around the various linguistic and discourse indexes that point to children's growing discourse knowledge in oral language production, there are several limitations to be noted for future research. First, the present study was restricted to examining the linguistic and discourse features in picture description tasks, which may have limited the extent to which children engaged in higher order thinking beyond simple descriptions. Future studies can explore children's discourse features in diverse range of oral tasks (e.g., story retelling) to examine how they vary by task type as well as the extent of shared context between speaker and the listener. Another limitation is that the contextualized and decontextualized conditions in the present study assumed different audience or interlocutor (i.e., contextualized condition—examiner, decontextualized condition—friend), which may have been associated with the discourse features exhibited in children's picture descriptions. In other words, depending on the target audience, children would have a different understanding of the shared knowledge and may exhibit different degrees of decontextualization or perspective taking. Future research can look into oral language production with different communication partners as part of situational context. Moreover, although all the assessors/examiners were from the local community where the study was conducted, there may have been a potential cultural mismatch between some participating children and assessors, and this may have influenced the way the children engaged in the picture description tasks. Relatedly, the illustrations used in the study lacked diversity, and familiarity with the content of the pictures (e.g., girl with a cow) may have differed across children. Consequently, this may have impacted the linguistic features used, such

as lexical diversity and ENPs. Future studies are encouraged to use images that are reflective of students' diverse backgrounds and environments.

Despite these limitations, this study contributed to better understanding primary grade students' discourse knowledge in oral language production. Specifically, the distinctive linguistic and discourse indexes showed that differences in communication partner or setting may impact oral discourse. We recognize that school-based speech language pathologists work with constraints such that they may not be able to routinely use language sample analysis (Pavelko et al., 2016). Nonetheless, there is much to be explored on children's discourse knowledge through language sample analysis such as Monitoring Indicators of Scholarly Language (MISL; Gillam et al., 2017). Moreover, alternatives such as automated evaluation systems using natural language processing may be considered for exploring children's oral discourse across different conditions, given the need for more scaled down and clinically practical approaches.

References

Barnes, A. E., Kim, Y.-S., & Phillips, B. M. (2014). The relations of proper character introduction to narrative quality and listening comprehension for young children from high poverty schools. *Reading and Writing*, *27*(7), 1189–1205. https://doi.org/10.1007/s11145-013-9481-0

Barnes, E. M., Grifenhagen, J. F., & Dickinson, D. K. (2016). Academic language in early childhood classrooms. *The Reading Teacher*, *70*(1), 39–48. https://doi.org/10.1002/trtr.1463

Beals, D. E., & Snow, C. E. (1994). "Thunder is when the angels are upstairs bowling": Narratives and explanations at the dinner table. *Journal of Narrative and Life History*, *4*(4), 331–352. https://doi.org/10.1075/jnlh.4.4.06thu

Benson, S. E. (2009). Understanding literate language: Developmental and clinical issues. *Contemporary Issues in Communication Science and Disorders*, *36*, 174–178. https://doi.org/10.1044/cicsd_36_F_174

Berninger, V. W., Abbott, R. D., Swanson, H. L., Lovitt, D., Trivedi, P., Lin, S. J. C., Gould, L., Youngstrom, M., Shimada, S. & Amtmann, D. (2010). Relationship of word-and sentence-level working memory to reading and writing in second, fourth, and sixth grade. *Language, Speech, and Hearing Services in Schools, 41(2),* 179-193. https://doi.org/10.1044/0161-1461(2009/08-0002)

Butler, F. A., Bailey, A. L., Stevens, R., Huang, B., & Lord, C. (2004). Academic English in fifth-grade math, science, and social studies textbooks. CSE Report 642. *Center for Research on Evaluation Standards and Student Testing CRESST.*

Cho, M., Kim, Y.-S. G., & Olson, C. B. (2021). Does perspective taking matter for writing? Perspective taking in source-based analytical writing of secondary students. *Reading and Writing, 34*(8), 2081–2101. https://doi.org/10.1007/s11145-021-10136-7

Cukor-Avila, P. (2002). She say, she go, she be like: Verbs of quotation over time in African American vernacular English. *American Speech, 77*(1), 3–31. https://doi.org/10.1215/00031283-77-1-3

Curenton, S. M., Craig, M. J., & Flanigan, N. (2008). Use of decontextualized talk across story contexts: How oral storytelling and emergent reading can scaffold children's development. *Early Education and Development, 19*(1), 161–187. https://doi.org/10.1080/10409280701839296

Curenton, S. M., & Justice, L. M. (2004). African American and Caucasian preschoolers' use of decontextualized language: Literate language features in oral narratives. *Language, Speech, and Hearing Services in Schools, 35*(3), 240–253. https://doi.org/10.1044/0161-1461(2004/023)

Davidson, R. G., Kline, S. B., & Snow, C. E. (1986). Definitions and definite noun phrases: Indicators of children's decontextualized language skills. *Journal of Research in Childhood Education, 1*(1), 37–48. https://doi.org/10.1080/02568548609594907

De Temple, J. M., & Beals, D. E. (1991). Family talk: Sources of support for the development of decontextualized language skills. *Journal of Research in Childhood Education, 6*(1), 11–19. https://doi.org/10.1080/02568549109594818

De Temple, J. M., Wu, H., & Snow, C. E. (1991). Papa pig just left for pigtown: Children's oral and written picture descriptions under varying instructions. *Discourse Processes, 14*(4), 469–495. https://doi.org/10.1080/01638539109544797

Dore, R. A., Amendum, S. J., Golinkoff, R. M., & Hirsh-Pasek, K. (2018). Theory of mind: A hidden factor in reading comprehension? *Educational Psychology Review*, *30*(3), 1067–1089. https://doi.org/10.1007/s10648-018-9443-9

Eisenberg, S. L., Ukrainetz, T. A., Hsu, J. R., Kaderavek, J. N., Justice, L. M., & Gillam, R. B. (2008). Noun phrase elaboration in children's spoken stories. *Language, Speech, and Hearing Services in Schools*, *39*, 145–157. https://doi.org/10.1044/0161-1461(2008/014)

Fang, Z. (2008). Going beyond the fab five: Helping students cope with the unique linguistic challenges of expository reading in intermediate grades. *Journal of Adolescent & Adult Literacy*, *51*(6), 476-487. https://doi.org/10.1598/JAAL.51.6.4

Gillam, S. L., Gillam, R. B., Fargo, J. D., Olszewski, A., & Segura, H. (2017). Monitoring indicators of scholarly language: A progress-monitoring instrument for measuring narrative discourse skills. *Communication Disorders Quarterly*, *38*(2), 96-106. https://doi.org/10.1177/1525740116651442

Gillam, S. L., Gillam, R. B., & Reece, K. (2012). Language outcomes of contextualized and decontextualized language intervention: Results of an early efficacy study. *Language, Speech, and Hearing Services in Schools*, *43*(3), 276–291. https://doi.org/10.1044/0161-1461(2011/11-0022)

Greenhalgh, K. S., & Strong, C. J. (2001). Literate language features in spoken narratives of children with typical language and children with language impairments. *Language, Speech, and Hearing Services in Schools*, *32*(2), 114–125. https://doi.org/10.1044/0161-1461(2001/010)

Griffin, T. M., Hemphill, L., Camp, L., & Wolf, D. P. (2004). Oral discourse in the preschool years and later literacy skills. *First Language*, *24*(2), 123–147. https://doi.org/10.1177/0142723704042369

Grimminger, A., Rohlfing, K. J., Lüke, C., Liszkowski, U., & Ritterfeld, U. (2020). Decontextualized talk in caregivers' input to 12-month-old children during structured interaction. *Journal of Child Language*, *47*(2), 418–434. https://doi.org/10.1017/S0305000919000710

Kang, J. Y., Kim, Y.-S., & Pan, B. A. (2009). Five-year-olds' book talk and story retelling: Contributions of mother—child joint bookreading. *First Language*, *29*(3), 243–265. https://doi.org/10.1177/0142723708101680

Kim, Y.-S. G. (2015). Language and cognitive predictors of text comprehension: Evidence from multivariate analysis. *Child Development*, *86*(1), 128–144. https://doi.org/10.1111/cdev.12293

Kim, Y.-S. G. (2016). Direct and mediated effects of language and cognitive skills on comprehension of oral narrative texts (listening comprehension) for children. *Journal of Experimental Child Psychology*, *141*, 101–120. https://doi.org/10.1016/j.jecp.2015.08.003

Kim, Y.-S. G. (2017). Why the simple view of reading is not simplistic: Unpacking component skills of reading using a direct and indirect effect model of reading (DIER). *Scientific Studies of Reading*, *21*(4), 310–333. https://doi.org/10.1080/10888438.2017.1291643

Kim, Y.-S. G. (2020a). Structural relations of language and cognitive skills, and topic knowledge to written composition: A test of the direct and indirect effects model of writing. *British Journal of Educational Psychology*, *90*(4), 910–932. https://doi.org/10.1111/bjep.12330

Kim, Y.-S. G. (2020b). Hierarchical and dynamic relations of language and cognitive skills to reading comprehension: Testing the direct and indirect effects model of reading (DIER). *Journal of Educational Psychology*, *112*(4), 667–684. https://doi.org/10.1037/edu0000407

Kim, Y.-S. G., Dore, R., Cho, M., Golinkoff, R., & Amendum, S. J. (2021). Theory of mind, mental state talk, and discourse comprehension: Theory of mind process is more important for narrative comprehension than for informational text comprehension. *Journal of Experimental Child Psychology*, *209*, 105181. https://doi.org/10.1016/j.jecp.2021.105181

Kim, Y.-S. G., & Park, S.-H. (2019). Unpacking pathways using the direct and indirect effects model of writing (DIEW) and the contributions of higher order cognitive skills to writing. *Reading and Writing*, *32*(5), 1319–1343. https://doi.org/10.1007/s11145-018-9913-y

Kim, Y.-S. G., Petscher, Y., Uccelli, P., & Kelcey, B. (2020). Academic language and listening comprehension—Two sides of the same coin? An empirical examination of their dimensionality, relations to reading comprehension, and assessment modality. *Journal of Educational Psychology*, *112*(7), 1367–1387. https://doi.org/10.1037/edu0000430

Kim, Y.-S. G., & Phillips, B. (2014). Cognitive correlates of listening comprehension. *Reading Research Quarterly*, *49*(3), 269–281. https://doi.org/10.1002/rrq.74

Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction-integration model. *Psychological Review*, *95*(2), 163–182. https://doi.org/10.1037/0033-295X.95.2.163

Koutsoftas, A. D., & Petersen, V. (2017). Written cohesion in children with and without language learning disabilities. *International Journal of Language & Communication Disorders*, *52*(5), 612–625. https://doi.org/10.1111/1460-6984.12306

Liao, H., Li, Y., & Brooks, G. (2016). Outlier impact and accommodation methods: Multiple comparisons of Type I error rates. *Journal of Modern Applied Statistical Methods*, *15*(1), 452-471. DOI: 10.22237/jmasm/1462076520

Loban, W. (1976). *Language development: Kindergarten through grade twelve* (NCTE Committee on Research Report No. 18). National Council of Teachers of English. https://eric.ed.gov/?id=ED128818

Lundine, J. P., & McCauley, R. J. (2016). A tutorial on expository discourse: Structure, development, and disorders in children and adolescents. *American Journal of Speech-Language Pathology*, *25*(3), 306-320. https://doi.org/10.1044/2016_AJSLP-14-0130

MacWhinney, B. (2000). *The CHILDES project: Tools for analyzing talk.* (3rd ed.). Lawrence Erlbaum Associates.

Meins, E., & Fernyhough, C. (2015). *Mind-mindedness coding manual, version 2.2*. Unpublished manuscript. University of York, York, UK.

Miller, J., & Iglesias, A. (2012). *Systematic analysis of language transcripts (SALT)* (research version 2012) [Computer software]. SALT Software, LLC.

Nippold, M. A. (2009). School-age children talk about chess: Does knowledge drive syntactic complexity? *Journal of Speech, Language, and Hearing Research*, *52*(4), 856–871. https://doi.org/10.1044/1092-4388(2009/08-0094)

Nippold, M. A., Mansfield, T. C., Billow, J. L., & Tomblin, J. B. (2008). Expository discourse in adolescents with language impairments: Examining syntactic development. *American*

Journal of Speech-Language Pathology, *17*(4), 356–366. https://doi.org/10.1044/1058-0360(2008/07-0049)

Pavelko, S. L., Owens, R. E., Jr., Ireland, M., & Hahs-Vaughn, D. L. (2016). Use of language sample analysis by school-based SLPs: Results of a nationwide survey. *Language, Speech, and Hearing Services in Schools*, *47*(3), 246–258. https://doi.org/10.1044/2016_LSHSS-15-0044

Pinto, G., Tarchi, C., Accorti Gamannossi, B., & Bigozzi, L. (2016). Mental state talk in children's face-to-face and telephone narratives. *Journal of Applied Developmental Psychology*, *44*, 21–27. https://doi.org/10.1016/j.appdev.2016.02.004

Raudenbush, S. W., & Byrk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (Vol. 1). Thousand Oaks, CA: Sage.

Rowe, M. L. (2013). Decontextualized language input and preschoolers' vocabulary development. *Seminars in Speech and Language*, *34*(4), 260–266. https://doi.org/10.1055/s-0033-1353444

Rowe, M. L. (2012). A longitudinal investigation of the role of quantity and quality of child-directed speech in vocabulary development. *Child Development*, *83*(5), 1762–1774. https://doi.org/10.1111/j.1467-8624.2012.01805.x

Rowe, M. L., & Weisleder, A. (2020). Language development in context. *Annual Review of Developmental Psychology*, *2*(1), 201–223. https://doi.org/10.1146/annurev-devpsych-042220-121816

Ruffman, T., Slade, L., & Crowe, E. (2002). The relation between children's and mothers' mental state language and theory-of-mind understanding. *Child Development*, *73*(3), 734–751. https://doi.org/10.1111/1467-8624.00435

Scarcella, R. (2003). *Academic English: A conceptual framework* (The University of California Linguistic Minority Research Institute Technical Report 2003-1). https://escholarship.org/uc/item/6pd082d4

Schleppegrell, M. (2004). *The language of schooling: A functional linguistics perspective*. Lawrence Erlbaum Associates.

Schleppegrell, M. J. (2001). Linguistic features of the language of schooling. *Linguistics and Education*, *12*(4), 431–459. https://doi.org/10.1016/S0898-5898(01)00073-0

Scott, C. M., & Balthazar, C. H. (2010). The grammar of information: Challenges for older students with language impairments. *Topics in Language Disorders*, *30*(4), 288–307.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Houghton, Mifflin and Company.

Snow, C. E. (1991). The theoretical basis for relationships between language and literacy in development. *Journal of Research in Childhood Education*, *6*(1), 5–10. https://doi.org/10.1080/02568549109594817

Snow, C. E. (2010). Academic language and the challenge of reading for learning about science. *Science*, *328*(5977), 450–452. https://doi.org/10.1126/science.1182597

Snow, C. E., Cancino, H., Gonzalez, P., & Shriberg, E. (1987). Second language learners' formal definitions: An oral language correlate of school literacy. *Center for Language Education and Research University of California, Los Angeles*, 37.

Snow, C. E., Tabors, P. O., Nicholson, P. A., & Kurland, B. F. (1995). SHELL: Oral language and early literacy skills in kindergarten and first-grade children. *Journal of Research in Childhood Education*, *10*(1), 37–48. https://doi.org/10.1080/02568549509594686

Snow, C. E., & Uccelli, P. (2009). The challenge of academic language. In D. R. Olson & N. Torrance (Eds.), *The Cambridge Handbook of Literacy* (pp. 112–133). Cambridge University Press. https://doi.org/10.1017/CBO9780511609664.008

StataCorp. (2017). *Stata statistical software: Release 15* [Computer software]. StataCorp LLC.

Streiner, D. L., & Norman, G. R. (2011). Correction for multiple testing: is there a resolution? *Chest*, *140*(1), 16-18. https://doi.org/10.1378/chest.11-0523

Taylor, K. S., Lawrence, J. F., Connor, C. M., & Snow, C. E. (2019). Cognitive and linguistic features of adolescent argumentative writing: Do connectives signal more complex reasoning? *Reading and Writing*, *32*(4), 983–1007. https://doi.org/10.1007/s11145-018-9898-6

Uccelli, P., Demir-Lira, Ö. E., Rowe, M. L., Levine, S., & Goldin-Meadow, S. (2019). Children's early decontextualized talk predicts academic language proficiency in midadolescence. *Child Development*, *90*(5), 1650–1663. https://doi.org/10.1111/cdev.13034

Uccelli, P., Galloway, E. P., Barr, C. D., Meneses, A., & Dobbs, C. L. (2015). Beyond vocabulary: Exploring cross-disciplinary academic-language proficiency and its association with reading comprehension. *Reading Research Quarterly*, *50*(3), 337–356. https://doi.org/10.1002/rrq.104

van Kleeck, A., Gillam, R. B., Hamilton Lori, & McGrath Cassandra. (1997). The relationship between middle-class parents' book-sharing discussion and their preschoolers' abstract language development. *Journal of Speech, Language, and Hearing Research*, *40*(6), 1261–1271. https://doi.org/10.1044/jslhr.4006.1261

Villaume, S. K. (1988). Creating context within text: An investigation of primary-grade children's character introductions in original stories. *Research in the Teaching of English*, *22*(2), 161–182.

Wigglesworth, G. (1990). Children's narrative acquisition: A study of some aspects of reference and anaphora. *First Language*, *10*(29), 105–125. https://doi.org/10.1177/014272379001002902

Yu, G. (2010). Lexical diversity in writing and speaking task performances. *Applied linguistics*, *31*(2), 236-259. https://doi.org/10.1093/applin/amp024

CHAPTER 2

Dimensionality of Oral Discourse Production for Second Graders

Abstract

Examining the dimensionality of oral discourse language skills in early childhood is crucial in informing theories of language and literacy development. This study examined the factor structure of linguistic and discourse features in oral discourse production for second graders. A total of 330 English-speaking second graders (M_{age} = 7.33, 53% boys, 55% White) described three pictures, each involving two animate characters. Children's picture descriptions were transcribed verbatim and coded for a total of nine linguistic (e.g., elaborated noun phrase, clausal density) and discourse features (e.g., proper character introduction, perspective taking). Results from confirmatory factor analysis showed that bi-factor structure consisting of a general oral discourse production factor and two specific linguistic features and discourse features factors provided the best fit to the data. The general factor reflecting the common variance among the nine indicators was the only reliable factor. Findings suggested that various linguistic and discourse features in oral discourse production can be best described as having an underlying general oral language factor along with other specific factors.

Keywords: oral discourse production, dimensionality, second grade, bi-factor model

Introduction

Children develop their oral discourse language skill as they interact with their parents, peers, and teachers at home and in schooling contexts (Rowe & Weisleder, 2020). As children are exposed to more diverse communication settings, they develop not only their language skills but also their discourse knowledge as they figure out ways to adjust their language according to the situational demands (Kintsch, 1988; Snow et al., 1987). Oral language is a broad and multifaced construct that is composed of various grain sizes such as lexical, sentence, and discourse skills, and various aspects such as phonology, semantics, and pragmatics (Kim et al., 2020). Of the multi-faceted oral language skills, oral *discourse* language is a discourse skill and includes receptive and productive skills such as listening comprehension or oral production (Kim et al., 2015; Language and Reading Research Consortium, 2017). Having a good grasp of oral discourse language is necessary as it serves as the foundation for reading and writing development and future academic success (Kim & Graham, 2022; NICHD Early Child Care Research Network, 2005). Moreover, understanding the structure of oral discourse language in children is important as it relates to testing the theories of language development and informing language assessment and instruction (Dockrell & Marshall, 2015).

In this study, we investigated the dimensionality of the features of *oral discourse production* in picture descriptions. Specifically, we examined English speaking second graders' oral picture descriptions by analyzing their linguistic (e.g., elaborated noun phrase, clausal density) and discourse features (e.g., proper character introduction, perspective taking). The present study is unique in that discourse features in addition to linguistic features in oral discourse production were examined for second graders, who are rapidly developing their oral language and discourse knowledge.

Understanding the dimensionality of oral discourse production has theoretical and practical implications. Theoretically speaking, a single dimension of oral discourse production would indicate that although various linguistic and discourse features appear to tap into disparate skills, they essentially represent a single underlying construct. Results of multiple dimensions would indicate, for example, that linguistic features and discourse features are related but dissociable constructs. These results, in turn, may have practical implications for assessment and instruction/intervention. A single dimension may suggest that addressing a feature may be sufficient to make changes to the general construct of oral discourse production. In contrast, multiple dimensions would suggest addressing identified constructs, respectively (Kim, 2023).

Literature Review

Dimensionality of Oral Language Production in Discourse Contexts

According to the direct and indirect effects model of text comprehension and production (DIET; Kim, 2016), oral discourse language skills draw on a multitude of language and cognitive skills and knowledge. Particularly relevant to the present work is that discourse skills draw on foundational language skills such as vocabulary and grammatical knowledge (morphosyntactic and syntactic knowledge), higher-order cognitive skills such as inference and perspective taking, and discourse knowledge—the knowledge of various discourse forms such as genre and associated text structure, procedures, and strategies (Kim, 2020; Kintsch, 1988). In other words, DIET posits that discourse skills rely on not only language skills but also higher order cognitive skills and discourse knowledge.

According to DIET and other theoretical frameworks such as the construction-integration model (Kintsch, 1988), discourse skills, including comprehension and production, encompass both linguistic and discourse features. Regarding linguistic features, researchers have examined

word and syntactic features in oral language production and how it varies by discourse context. For instance, the frequent usage of adverbs (Curenton & Justice, 2004), elaborated noun phrases (Eisenberg et al., 2008), and subordinating clauses (Lundine & McCauley, 2016) were considered characteristic of oral language used in more complex discourse contexts (e.g., expository genre, when interlocutors are not sharing the same time and space, or when abstract and complex ideas are being delivered) because higher quantity and quality of elaboration and cohesive ties are needed. In contrast, pronouns and coordinating conjunctions have been discussed to be found more frequently in simpler discourse contexts, resembling colloquial language (Schleppegrell, 2001; Snow, 2010). Furthermore, more frequent usage of mental state verbs (e.g., think, believe, remember) was found in the telephone condition, where the interlocutors were not sharing the concurrent space, than in the face-to-face discourse condition (Pinto et al., 2016). This shows that the different demands put in the discourse condition are associated with how foundational language skills are manifested in oral discourse language.

Furthermore, discourse features are also important in oral discourse language. For example, effective communication requires adjusting language use according to one's understanding of the knowledge base of their interlocutors and the discourse setting. Discourse features have been operationalized or measured by their level of sophistication or accuracy. For example, higher degrees of decontextualization (e.g., description, evaluation, imagination; Curenton et al., 2008) and perspective taking (e.g., own-side perspective [portraying one's own perspective]; dual perspective [portraying perspectives other than one's own]) are associated with higher order thinking skills and were found to be used differentially by discourse context (Cho & Kim, 2023). Appropriate character introduction, a measure of the appropriateness of one's attempt at introducing the characters for the first time, has also been discussed as a

discourse feature that taps into one's ability to adjust language according to their understanding of their audience's perspectives (Barnes et al., 2014). Children as young as second graders were shown to vary the use of this feature by discourse context (Cho & Kim, 2023). Likewise, different extents of linguistic and discourse features in oral discourse production serve as evidence for the role of foundational language skills, higher order cognitive skills, and discourse knowledge in oral language production.

Dimensionality of Oral Discourse Production

Many studies have examined the dimensionality of oral language. Some studies predominantly included foundational language skills such as vocabulary, syntactic knowledge, and sentence skills to identify various factor structures of oral language. For example, Tomblin and Zhang (2006) found a unidimensional model of oral language for students in kindergarten, second grade, and fourth grade, using receptive and expressive measures of vocabulary and sentence structure. Studies have further examined the structure of oral discourse language consisting of multiple correlated language or discourse-level factors. For example, studies have found that oral language consisted of two factors of language (i.e., expressive/receptive vocabulary/grammar) and phonology (Tomblin et al., 2004); and vocabulary and grammar (Lonigan & Milburn, 2017; Tomblin & Zhang, 2006). Researchers have also identified three latent factors of general language, articulation, and speech perceptions for preschool children (Anthony et al., 2014); and morphological awareness, vocabulary, and syntactic awareness for students in Grades 2 and 3 (Metsala et al., 2021).

There are studies that further included discourse level skills in addition to the foundational language skills (e.g., Massonnié et al., 2022; Protopapas et al., 2012). For example, a unidimensional model consisting of vocabulary, grammar, and discourse skills (i.e.,

comprehension monitoring, narrative structure, inference) was found for children in prekindergarten and kindergarten (Language and Reading Research Consortium, 2015a). Similarly, a single factor model of oral language comprehension for receptive and expressive vocabulary and listening comprehension was found for Greek children in Grades 3 through 5 (Protopapas et al., 2012). Two factor structure of lower-level language (i.e., vocabulary, grammar) and discourse-level skills (e.g., inference making, comprehension monitoring) was found for children in Grades 1 and 2 whereas a three-factor structure of vocabulary, grammar, and discourse factors was preferred for Grade 3 students (Language and Reading Research Consortium, 2015a). A recent study also found a two-factor structure of language and literacy skills consisting of sound/word level and sentence/discourse level skills for school-aged population of 6-18 years (Nelson et al., 2022). Furthermore, Mouzaki and colleagues (2020) found that four dimensions, consisting of semantic discourse, pragmatic, morphological, and phonological factors was appropriate for Greek-speaking preschool children while a five-dimensional model where the semantic discourse factor was split into the more specific semantics and discourse factors fit the data best for kindergarteners and first graders.

The vast majority of these studies employed discrete assessments to measure language and cognitive skills, and only a limited number of studies incorporated oral language features (e.g., mean length of utterance) in oral discourse production. In the few studies that examined oral discourse production, mean length of utterance or sentence length was examined as an indicator of oral discourse language, and the studies reported different factor structures. For example, in a series of longitudinal studies from early childhood to adolescence (Bornstein et al., 2014, 2016; Bornstein & Putnick, 2012), a single robust and stable dimension was identified from various measures such as linguistic features in children's free-play interaction with their

mothers (e.g., mean length of utterance, number of different lexical items), assessments of verbal intelligence, and maternal reports of children's receptive and expressive communication skills. In a study with Norwegian 4-year-old children, a two-dimensional structure of oral language (e.g., vocabulary, grammar) and discourse features in narrative retell (e.g., information, length of utterance) was identified (Karlsen et al., 2021). Moreover, for Korean speaking first graders, a general oral discourse language factor and specific listening comprehension and oral retell factors were found (Kim et al., 2015). For Spanish-English dual-language learners in prekindergarten (Language and Reading Research Consortium, 2015b), a single general Spanish language factor and two additional word knowledge (i.e., vocabulary and comprehension monitoring) and integrative language knowledge (i.e., background knowledge, inference, sentence recall, and narrative comprehension) factors were identified. Although these studies included some indexes generated from oral discourse production, they were mixed with discrete measures of language or cognitive skills and only examined linguistic features, not discourse features of oral discourse production.

Present Study

Oral discourse production is built upon not only foundational language skills but also discourse knowledge and features (Kim, 2016). Given the importance of discourse level skills in language interactions and reading and writing development noted above, there is a need for expanding our understanding of the dimensionality of oral discourse language production. The present study investigated the dimensionality of linguistic and discourse features in oral discourse production by English-speaking second graders. Specifically, we identified linguistic features (i.e., adverb, conjunction, pronominal, elaborated noun phrase, clausal density, mental state talk) and discourse features (i.e., proper character introduction, degree of decontextualization, perspective taking), and examined the dimensionality of these features. We

tested three alternative models: (1) a unidimensional model where all the linguistic and discourse features were hypothesized to tap a single construct; (2) a two-factor model with the linguistic-feature factor and the discourse-feature factor; and (3) a bi-factor model composed of a general factor that taps common variance across the linguistic and discourse features and two specific factors, the linguistic-feature and the discourse-feature specific factor. We hypothesized that a bi-factor structure would be supported (Kim et al., 2015; Language and Reading Research Consortium, 2015b).

Method

Participants

The participants for this study were 330 second grade students (M_{age} = 7.33) from 58 classrooms in the Southeastern part of the United States (Kim, 2017). Children's performance on the linguistic and discourse features described below was reported in a recent article (Cho & Kim, 2023). The sample consisted of 53% boys. There were approximately 55% Caucasian, 35% African American, 4% Hispanic, 1% Asian American, and 5% multiracial or other ethnicity students. A large proportion (73%) of the students were eligible for free or reduced-price lunch. Only around 1% of the students were identified as English language learners, as determined by the state-wide assessments conducted annually. Children with exceptionality, the majority of whom received speech services, consisted of 21% of the sample.

Measures

Oral discourse production was measured by picture description tasks. In this task, all children were presented with three pictures to describe twice, once in a contextualized condition and the other in a decontextualized condition (Cho & Kim, 2023; also see De Temple et al., 1991). The three pictures were a girl in a chair, child with crayons, a girl pulling a cow (see

Appendix A). In the contextualized condition, the assessor said, “Look at the picture carefully and describe the picture to me” while they were looking at the same picture at the same time. In the decontextualized condition, the assessor said, “I want you to pretend that you are describing the picture to a friend that cannot see the picture. Pretend the friend will listen to your description on the tape recorder later, so please describe this picture in a way that your friend could draw the picture just by listening to your description.” The order of the presentation of each condition was counterbalanced for two groups, such that for one group, children responded to the decontextualized condition first for pictures 1 and 3, followed by the contextualized condition, whereas for picture 2, it was the other way around. The other group responded in the reverse order of conditions for each picture. The pictures were presented in an identical order across the two groups. Note that all children provided data in both conditions.

Children’s description of the pictures was digitally recorded (wav. File) and transcribed verbatim following the Systematic Analysis of Language Transcription (SALT; Miller & Iglesias, 2012) guidelines. First, the transcripts were segmented into communication units (C-units) (Loban, 1976). Then, some general descriptive indexes (e.g., total number of C-units and words, total number of different words) were generated automatically through SALT standard measures report (Miller & Iglesias, 2012). SALT transcripts were also transported to CLAN software as CHAT files (MacWhinney, 2000).

Six linguistic features examined in this study are shown in Table 2.1. The following linguistic features were automatically generated using the CLAN software’s frequency command (MacWhinney, 2000): adverbs (i.e., words that modify verbs, adjectives, or other adverbs), pronominals (e.g., he, you, they), coordinating conjunctions (e.g., and, but, for, or, nor, so, yet), conjunctions other than the coordinating ones (e.g., if, when, while, since), and mental state talk

(e.g., think, know, feel, forget). We also coded two additional linguistic features using the transcript: elaborated noun phrases and types of clauses (see Table 2.1). Elaborated noun phrases included simple designating noun phrase, simple descriptive noun phrase, complex noun phrase, noun phrase with noun post modification, complex noun phrase with post modification. Types of clauses included non-clause, independent clause, participial phrase, and subordinating clause.

Three discourse features were also coded (see Table 2.1) and they included proper character introduction (e.g., whether or not an indefinite article, a name, or a reference to the previous character was used in introducing a character for the first time), degree of decontextualization (e.g., description, evaluation, prediction), and perspective taking (e.g., none, own, dual perspective). Across the five features of manual coding, interrater reliability, or exact agreement ranged from 91% to 99% (Cho & Kim, 2023).

Based upon the frequency counts, composite scores across the six picture description tasks were created for the following indexes: adverb, conjunction, coordinating conjunction, pronominal, mental state talk, and elaborated noun phrase. Then, they were divided by the total number of words to control for length. Moreover, type token ratio was generated by calculating the mean across the six tasks, and clausal density was calculated by the total number of independent and subordinating clauses (including participial phrases) divided by the number of C-units. The proportion of proper character introduction was calculated by dividing the number of proper character introductions out of twelve (i.e., the total number of characters that could be introduced across the six conditions). Lastly, a total degree of decontextualization score was generated by adding the number of low degree of decontextualization multiplied by 1, the number of mid degree of decontextualization multiplied by 2, and the number of high degree of decontextualization multiplied by 3. Similarly, a total perspective taking score was generated by

summing the total number of own-side perspectives multiplied by 1 and the number of dual perspectives multiplied by 2. This way, degree of decontextualization and perspective taking scores reflected the greater weight put to more complex levels. Then, the two scores were divided by the total number of C-units to account for length. Hereafter, all the proportion scores will be referred to by their names.

Procedure

Children were individually assessed by trained research assistants in a quiet place in the schools. Children were presented with three pictures.

Table 2.1
Manual Coding of Linguistic and Discourse Features

	Type	Example
Elaborated noun phrase	simple designating noun phrase	a boy, that doll, her cow, many trees
	simple descriptive noun phrase	a tall tree
	complex noun phrase	the big red house
	noun phrase with noun post modification	the girl that drew the picture
	complex noun phrase with post modification	the brown cat that is sleeping, a girl wearing a pajama sleeping
Type of clause	Non-clause	He white shirt
	Independent clause	His is floor dirty
	Participial phrase	She's on the chair reading a book
	Subordinating clause: nominal, relative, adverbial	I think Bob is lazy. The teacher who gave the assignment was Mr. Jones It looks like he is trying to read.
Proper character introduction	Proper	a girl, a boy and his dad
	Improper	the boy
Degree of decontextualization	Low: description, conveying meaning	She has green shoes. Do you know what a car is?
	Mid: characters' psychological states, evaluation, recalling	The girl is trying to get it out of the water. I like that book. They look more like converse/s.
	High: predictions, print or story conventions	She's about to pull that cow out of the water. Once upon a time …
Perspective taking	None: unopinionated description	There is a girl and a cow.
	Own: portrays one's own perspective	I like the girl's red dress.
	Dual: portrays perspectives not of themselves	She feels left out.

Data Analysis Strategy

For data analysis, we included only the children who produced at least one word across the six conditions (i.e., three pictures in two conditions, respectively). To address the research questions, confirmatory factor analysis was conducted. Prior to the confirmatory factor analysis, outliers (i.e., values that exceeded 3 times the interquartile range) were identified: conjunctions, clausal density, elaborated noun phrases, mental state verbs, degree of decontextualization, perspective taking. They were winsorized to meet the assumptions of multivariate normality.

To examine the dimensionality of oral discourse production, unidimensional, two-dimensional, and bi-factor models, were tested and compared (see Figure 2.1). The unidimensional model consisted of the nine linguistic and discourse features described above. The two-dimensional model and the bi-factor model consisted of two factors: linguistic feature (i.e., adverb, conjunctions other than coordinating ones, pronominals, clausal density, elaborated noun phrase, mental state talk) and discourse feature (e.g., degree of decontextualization, perspective taking, proper character introduction). We used maximum likelihood estimation with robust standard errors (MLR) using Mplus Version 8.8 (Muthén & Muthén, 1998) due to slight nonnormality of the data (i.e., proportion values close to zero for variables such as proportion of conjunctions, pronominals, mental state verbs).

The decision on the best dimensional representation was based on the overall model fit criteria and further fit comparisons. Typically, RMSEA below .08, SRMR equal to or less than .05, and CFI and TLI equal to or greater than .95 indicate an excellent model fit, and TLI and CFI greater than .90, and SRMR equal to or less than .10 are considered to be acceptable (Kline, 2011). For model comparisons, we used the Satorra–Bentler rescaled chi-square difference test for comparing nested models (S–B χ^2; Satorra & Bentler, 1994). After the model fit comparisons,

we calculated McDonald's coefficient omega (ω; McDonald, 1999) which is a measure of factor reliability when data is modeled in a bifactor structure (Reise, 2012).

Results

Descriptive Statistics and Preliminary Analysis

Descriptive statistics for all the linguistic and discourse features are reported in Table 2.2. The mean of total C-units was 38.46 (*SD* = 21.19) and the mean total of words was 273.68 (*SD* = 159.64) across the six conditions. The average type token ratio was 0.62 (*SD* = 0.10). The mean of adverbs, conjunctions, coordinating conjunctions, pronominals, and mental state verbs were all below 0.10, while the mean of noun phrase elaboration, involving a few consecutive words, was 0.20 (*SD* = 0.04). Average clausal density was 0.99 (*SD* = 0.22) which means that on average, each C-unit contained a single clause. Regarding discourse features, the mean proper character introduction was 0.55 (*SD* = 0.31). Moreover, the mean degree of decontextualization score was 1.09 (*SD* = 0.17) and the average perspective taking score was 0.17 (*SD* = 0.21).

Table 2.2
Descriptive Statistics of Linguistic and Discourse Features (N=330)

	Mean	SD	Min	Max	Skewness	Kurtosis
Linguistic Features						
Number of Total C-Units	38.46	21.19	6.00	146.00	1.26	5.91
Number of Total Words	273.68	159.64	26.00	1091.00	1.44	6.38
Type Token Ratio	0.62	0.10	0.39	0.92	0.44	2.99
Proportion of Adverbs	0.04	0.02	0.00	0.12	0.87	4.00
Proportion of Conjunctions	0.01	0.01	0.00	0.07	2.75	12.79
Proportion of Coordinating Conjunctions	0.09	0.04	0.00	0.30	0.84	6.32
Proportion of Pronominals	0.05	0.03	0.00	0.14	0.54	2.88
Proportion of Mental State Verbs	0.01	0.01	0.00	0.08	2.52	11.63
Proportion of ENPs	0.20	0.04	0.08	0.38	0.80	5.08
Clausal Density	0.99	0.22	0.05	1.80	-1.05	7.45
Discourse Features						
Proportion of Proper Character Intro	0.55	0.31	0.00	1.00	-0.15	1.81
Degree of Decontextualization Score	1.09	0.17	0.68	2.35	2.69	14.84
Perspective Taking Score	0.17	0.21	0.00	1.30	2.17	8.86

Note. SD = Standard Deviation; ENP = Elaborated Noun Phrase

Table 2.3 presents bivariate correlations among all linguistic and discourse features. The correlation coefficients ranged from weak to strong and were statistically significant at $p < .05$, except for those involving type-token ratio and coordinating conjunctions. Given that significant correlations among indicators are a prerequisite for confirmatory factor analysis, we decided to exclude the two indexes (i.e., type-toke ratio, coordinating conjunctions) for further examination. Interestingly, noun phrase elaboration had a weak positive relation to proper character introduction ($r = .17$) but was significantly and negatively related to all other linguistic and discourse features ($-.48 \leq rs \leq -.36$). Proper character introduction had a moderate negative relation to pronominals ($r = -.42$) and had weak negative relations to all other linguistic and discourse features ($-.35 \leq rs \leq -.20$) other than elaborated noun phrases. Mental state talk had weak to moderate relations to both linguistic features ($.33 \leq |r| \leq .56$) and discourse features ($.22 \leq |r| \leq .52$) regardless of the directionality.

Table 2.3
Correlation Among Linguistic and Discourse Features (N=330)

	TTR	Adverb	Conj	Coord	Pronom	ENP	Clausal Density	Mental	Cha Intro	DoD score
TTR	--									
Adverb	0.15**	--								
Conj	0.07	0.36***	--							
Coord	-0.22***	-0.28***	-0.15**	--						
Pronom	0.04	0.28***	0.32***	-0.07	--					
ENP	0.25***	-0.38***	-0.40***	-0.04	-0.37***	--				
Clausal Density	-0.21***	0.31***	0.43***	-0.20***	0.34***	-0.48***	--			
Mental	0.02	0.33***	0.56***	-0.04	0.39***	-0.45***	0.35***	--		
Cha Intro	-0.16**	-0.28***	-0.26***	0.09	-0.42***	0.11*	-0.20***	-0.22***	--	
DoD score	0.10	0.44***	0.52***	-0.23***	0.30***	-0.43***	0.47***	0.49***	-0.31***	--
PT score	0.26***	0.42***	0.51***	-0.23***	0.30***	-0.36***	0.38***	0.52***	-0.35***	0.86***

Note. TTR = Type Token Ratio; Conj = Conjunctions other than coordinating conjunctions; Coord = Coordinating Conjunction; Pronom = Pronominal; ENP = Elaborated Noun Phrase; Mental = Mental state talk; Cha Intro = Proportion of Proper Character Introduction; DoD = Degree of Decontextualization; PT = Perspective Taking. *$p < .05$. **$p < .01$. ***$p < .001$.

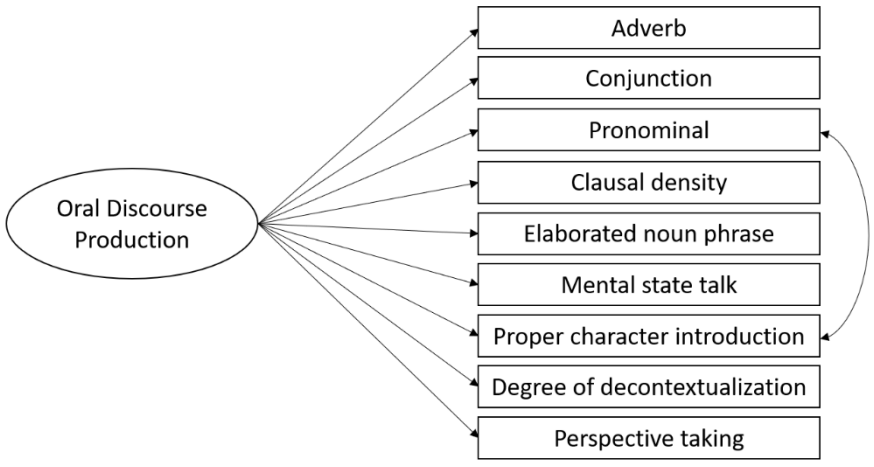
Dimensionality of Oral Discourse Production

The three confirmatory factor models in Figure 2.1 were fitted to the data. Note that in testing all the models, we correlated the residual variances between the indicators of pronominal usage and character introduction. This was based on the rationale that the two indicators shared variances that were not captured by the factors, as proper character introduction depends on using pronominals only in appropriate occasions (i.e., not overusing them when characters have not yet been properly introduced) (Barnes et al., 2014). Moreover, in running the two-dimensional model, we tested whether the indicator of mental state talk belonged better in the linguistic factor or the discourse factor. Mental state talk has often been used as an indicator of theory of mind, a higher-order thinking skill that portrays one's understanding of their own and others' mental and emotional states (Symons et al., 2005). However, the results of cross loading the mental state talk indicator onto both the linguistic and discourse factors showed that it was a significant indicator only for the linguistic factor. Based on the understanding that the sheer amount of mental state talk in children's oral language production may not signal complex thinking at the discourse level (Howard et al., 2008), we decided to include mental state talk in the linguistic factor for the two-dimensional and bi-factor models.

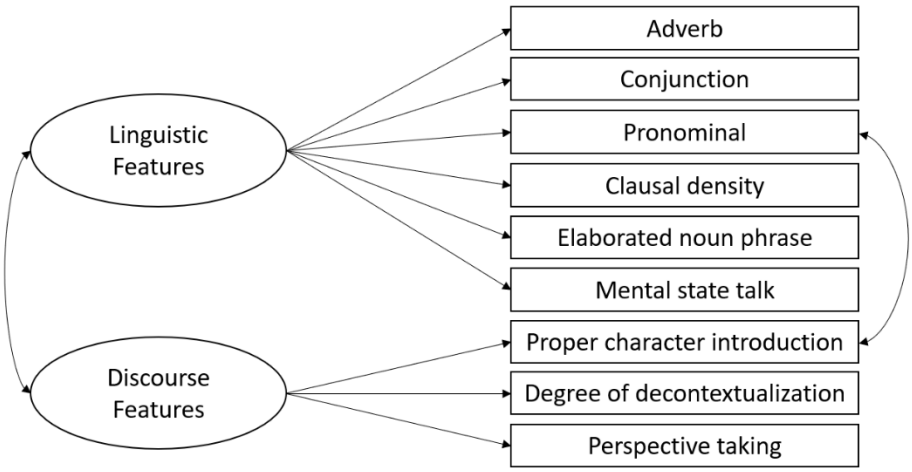
Figure 2.1

Alternative Models of the Dimensionality of Oral Discourse Production Examined in the Study

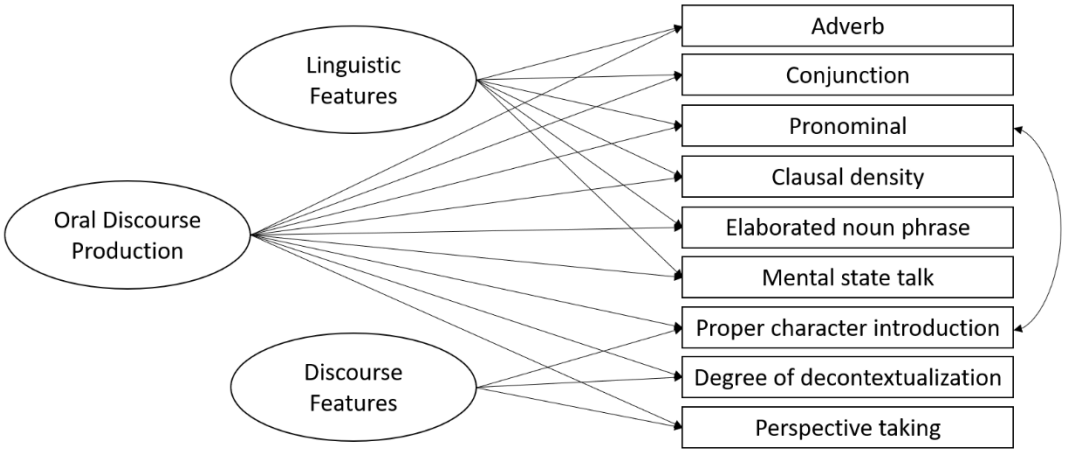
a



b



c



Note. a Uni-dimensional model, b two-dimensional model, c bi-factor model

Table 2.4 presents model fit indices and model comparisons. The unidimensional model did not have a good fit to the data. Although the two-dimensional model had an acceptable fit, the bi-factor model provided significant improvement compared to the two-dimensional model, $\chi^2(8) = 61.25$, $p < .001$, based on the scaled Satorra-Bentler chi-square difference test (Satorra & Bentler, 1994), and was selected as the final model.

Table 2.4

Model Fit Information for the Dimensionality Analyses

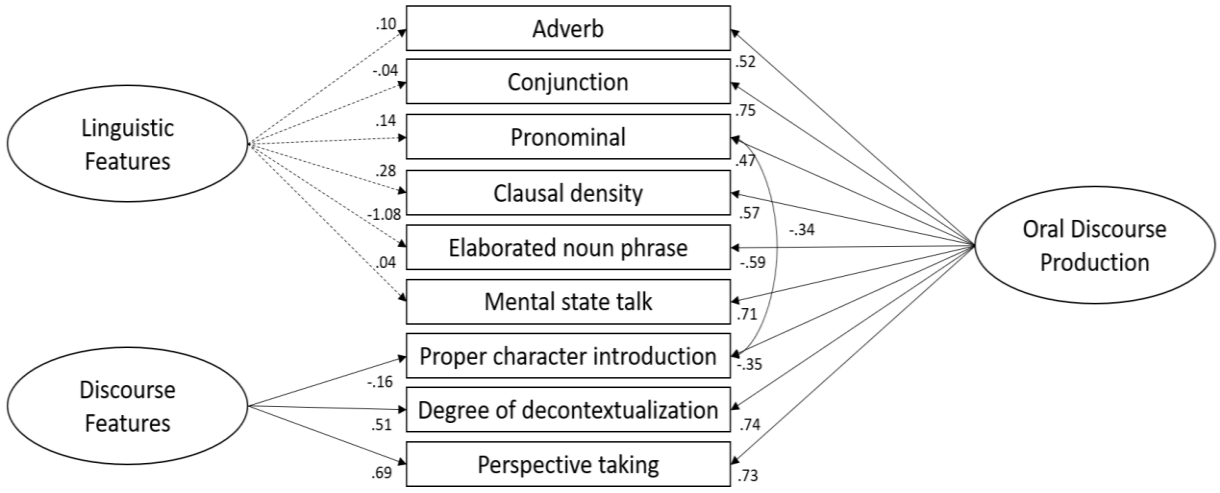
Model	χ^2	*df*	*p*	MLR scaling factor	RMSEA (90% CI)	SRMR	CFI	TLI	Comparison	Adjusted $\Delta\chi^2$
Uni	230.931	26	.00	1.41	.155 [.137, .173]	.089	.812	.740		

Two	98.955	25	.00	1.41	.095 [.076, .115]	.048	.932	.902	2 vs. 1	$\Delta\chi^2(1)$ = 131.976**
Bi	37.047	17	.00	1.40	.060 [.033, .086]	.027	.982	.961	3 vs. 2	$\Delta\chi^2(8)$ = 61.248**

Note. Uni = Unidimensional; Two = Two-dimensional; Bi = Bi-factor; df = degrees of freedom; MLR = Maximum Likelihood Ratio; RMSEA = Root-Mean-Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index.
*p < .05. **p < .01.

Standardized loadings of the bifactor model are presented in Figure 2.2. For the general factor, the loadings of the linguistic indicators were moderate to large in the positive direction ($.47 \leq \lambda \leq .75$). There were two exceptions to the positive loadings. Moderate negative factor loadings were found for elaborated noun phrases (λ = -.59) and proper character introduction (λ = -.35). The negative loadings indicated that the general factor captured lower scores on the two indicators. The general factor had a factor reliability of .71, using McDonald's coefficient omega (ω; McDonald, 1999), which showed that the nine indicators consistently reflected a single common source (Reise, 2012).

Figure 2.2
Standardized Loadings of the Bi-Factor Model of Oral Discourse Production



Note. Standardized factor loadings. Solid lines represent statistically significant paths and dashed lines show statistically nonsignificant paths.

Regarding the specific linguistic factor, none had statistically significant loadings beyond what was captured in the general factor ($p > .05$). Moreover, the specific linguistic factor was not reliable ($\omega = .01$; McDonald's omega criterion of at least .70). The indicators of the specific discourse factor were all significant ($p < .05$). However, the specific discourse factor was not reliable ($\omega = .33$).

Discussion

As children enter school and are increasingly more exposed to diverse discourse settings (Rowe & Weisleder, 2020), they continue to develop language skills, discourse knowledge and higher order thinking skills. The examination of the dimensionality of oral discourse language in early elementary school is important as it reveals the nature of relations among different linguistic and discourse features. Dimensionality of oral discourse language has been studied for diverse age groups of children (see the literature review section). However, the majority of the studies were limited to examining language skills and not including discourse level skills and/or incorporating discrete measures of oral language skills not in discourse context. To address this gap, we examined the linguistic and discourse features in second graders' oral discourse production and their dimensionality.

Overall, we found that the bi-factor model of oral discourse production, consisting of the general factor and the two specific factors, described the data best. The current findings are convergent with the previous study that found the bi-factor structure of oral discourse language in Spanish, consisting of specific factors of word knowledge (i.e., vocabulary, comprehension monitoring) and integrative language knowledge (e.g., inference, listening comprehension) for prekindergarten Spanish English dual language learners (Language and Reading Research Consortium, 2015b). It is also in alignment with the study examining discourse skills (i.e.,

listening comprehension, oral retell and production for Korean speaking first graders (Kim et al., 2015). However, the present study differs from and extends previous work by examining oral discourse *production*, incorporating linguistic and discourse features.

The current finding of a bi-factor model advances theoretical understanding of how oral discourse language can be understood as both unidimensional and multidimensional for children in lower elementary grades. Specifically, the linguistic and discourse features shared a common variance and also displayed specific variances that were independent of the common variance. Previous studies using measures of vocabulary, grammar, and listening comprehension have shown that oral language can be described as a single dimension for English-speaking children in second grade (Language and Reading Research Consortium, 2017; Tomblin & Zhang, 2006). Moreover, the finding of the specific linguistic and discourse feature factors is in line with the theoretical understanding that various subcomponents are involved in oral discourse language (Kim, 2016). The specific factors highlighted the role of not only language skills or linguistic features but also discourse knowledge or discourse features, which has been discussed to be crucial to discourse processing (Kim, 2016; Kintsch, 1988). Although the specific factors were not reliable, the fact that the bi-factor model had substantially better fit than the unidimensional or two-dimension models indicate that the specific factors of linguistic and discourse features in addition to the general factor is meaningful in describing the dimensionality of oral discourse production for English-speaking second graders.

Looking closely at the current findings, the general factor captured all aspects of the included linguistic and discourse features. The majority of linguistic and discourse features (i.e., adverb, conjunction, pronominal, clausal density, mental state verb, perspective taking, degree of decontextualization) had positive loadings whereas two features—elaborated noun phrases and

proper character introduction—had negative loadings. Theoretically speaking, positive loadings are expected for all features. Nonetheless, the reasons for the two negative loadings may be attributed to the discourse task where children were asked to describe simple pictures to a target audience. For example, instead of using noun phrase elaborations, second graders may have resorted to pronominalizations when describing animate characters or objects in the pictures, as is oftentimes done in conversational discourse settings (Eisenberg et al., 2008). The reason for the negative factor loading in proper character introduction is unclear, and future research is needed to offer plausible explanations.

The current bi-factor model also had two specific factors representing distinct aspects of linguistic and discourse features over and above the general factor. While none of the factor loadings were statistically significant for the linguistic factor, all the factor loadings for the specific discourse feature factor were over and above the general factor. This means that the indicators of the specific discourse feature factor accounted for an additional portion of the variance over and above the general factor, while the indicators of the specific linguistic factor did not. For the specific discourse feature factor, the perspective taking and degree of decontextualization had moderate and positive loadings, while proper character introduction had a small negative loading. This can be explained by how perspective taking and degree of decontextualization represents sophistication in thinking (Cho et al., 2021; Curenton et al., 2008), whereas proper character introduction concerns perspective taking at the surface level through adjusting language according to discourse context (Cho & Kim, 2023). However, note that the specific discourse feature factor was not a reliable factor over and above the general oral discourse language factor. Thus, results should be interpreted with caution regarding how consistently the specific factors are identified.

Practical implications of the results are that it informs the design and choice of oral language assessments and instruction/intervention that are appropriate to early elementary students (Dockrell & Marshall, 2015). As we found the bi-factor model where the general oral language factor was the only reliable factor, it can be inferred that measuring various linguistic and discourse features examined in the study using a picture description task essentially taps into one single underlying construct. This suggests that addressing or targeting instruction to any linguistic or discourse feature may make changes to the construct of oral discourse production measured by a picture description task. Also noteworthy is that assessment and instruction can target not only linguistic features but also discourse features in oral discourse production as there were distinct specific factors as well. Furthermore, practitioners can make use of the linguistic and discourse features identified in the present study to glean insights on children's oral discourse production. For example, language sample analysis on the specified features may be conducted to understand development of children's oral discourse production, keeping in mind that all features inform one general oral language skill for early elementary students.

Limitations and conclusion

There are several limitations to be noted for future research. First, the current study examined oral discourse language in the specific picture description task for second graders. As the current finding may be specific to the discourse context and the grade level examined, future studies can examine the structure of oral discourse language in other genres (e.g., opinion, narrative), discourse settings, and for children in various developmental stages. Second, the models were built based on a certain set of linguistic and discourse features and are by no means comprehensive or conclusive. Future studies may consider incorporating additional or alternative features (e.g., language and cognitive skills, linguistic and discourse level features) as indicators

of oral discourse language. Lastly, mental state talk was considered as an indicator of the specific linguistic factor despite the fact that it has oftentimes been examined in relation to discourse-level skills such as theory of mind (Kim et al., 2021; Milligan et al., 2007). Future studies can examine the different layers of traits that mental state talk may portray depending on the discourse context.

Despite these limitations, this study advanced the discussion on the dimensionality of oral discourse language in early elementary grades. This study makes a theoretical contribution by showing that various linguistic and discourse features in oral discourse production primarily measures common variance. Moreover, the present findings may inform future work in the design and choice of language assessments for children in early elementary grades. Future studies are warranted to investigate oral discourse production in diverse discourse settings, age groups, and languages, using different types of measures.

References

Anthony, J. L., Davis, C., Williams, J. M., & Anthony, T. I. (2014). Preschoolers' oral language abilities: A multilevel examination of dimensionality. *Learning and Individual Differences*, *35*, 56–61. https://doi.org/10.1016/j.lindif.2014.07.004

Barnes, A. E., Kim, Y.-S., & Phillips, B. M. (2014). The relations of proper character introduction to narrative quality and listening comprehension for young children from high poverty schools. *Reading and Writing*, *27*(7), 1189–1205. https://doi.org/10.1007/s11145-013-9481-0

Bornstein, M. H., Hahn, C.-S., & Putnick, D. L. (2016). Stability of core language skill across the first decade of life in children at biological and social risk. *Journal of Child Psychology and Psychiatry*, *57*(12), 1434–1443. https://doi.org/10.1111/jcpp.12632

Bornstein, M. H., Hahn, C.-S., Putnick, D. L., & Suwalsky, J. T. D. (2014). Stability of core language skill from early childhood to adolescence: A latent variable approach. *Child Development*, *85*(4), 1346–1356. https://doi.org/10.1111/cdev.12192

Bornstein, M. H., & Putnick, D. L. (2012). Stability of language in childhood: A multiage, multidomain, multimeasure, and multisource study. *Developmental Psychology*, *48*(2), 477–491. https://doi.org/10.1037/a0025889

Cho, M. & Kim, Y.-S. G. (2023). Do Second Graders Adjust Their Language by Discourse Context? *Language, Speech, and Hearing Services in Schools.*1-15. https://doi.org/10.1044/2022_LSHSS-22-00100

Cho, M., Kim, Y.-S. G., & Olson, C. B. (2021). Does perspective taking matter for writing? Perspective taking in source-based analytical writing of secondary students. *Reading and Writing*, *34*(8), 2081–2101. https://doi.org/10.1007/s11145-021-10136-7

Curenton, S. M., Craig, M. J., & Flanigan, N. (2008). Use of decontextualized talk across story contexts: How oral storytelling and emergent reading can scaffold children's development. *Early Education and Development*, *19*(1), 161–187. https://doi.org/10.1080/10409280701839296

Curenton, S. M., & Justice, L. M. (2004). African American and Caucasian preschoolers' use of decontextualized language: Literate language features in oral narratives. *Language, Speech, and Hearing Services in Schools*, *35*(3), 240–253. https://doi.org/10.1044/0161-1461(2004/023)

De Temple, J. M., Wu, H., & Snow, C. E. (1991). Papa pig just left for pigtown: Children's oral and written picture descriptions under varying instructions. *Discourse Processes*, *14*(4), 469–495. https://doi.org/10.1080/01638539109544797

Dockrell, J. E., & Marshall, C. R. (2015). Measurement issues: Assessing language skills in young children. *Child and Adolescent Mental Health*, *20*(2), 116–125. https://doi.org/10.1111/camh.12072

Eisenberg, S. L., Ukrainetz, T. A., Hsu, J. R., Kaderavek, J. N., Justice, L. M., & Gillam, R. B. (2008). Noun phrase elaboration in children's spoken stories. *Language, Speech, and Hearing Services in Schools*, *39*, 145–157. https://doi.org/10.1044/0161-1461

Howard, A. A., Mayeux, L., & Naigles, L. R. (2008). Conversational correlates of children's acquisition of mental verbs and a theory of mind. *First Language*, *28*(4), 375–402. https://doi.org/10.1177/0142723708091044

Karlsen, J., Hjetland, H. N., Hagtvet, B. E., Braeken, J., & Melby-Lervåg, M. (2021). The concurrent and longitudinal relationship between narrative skills and other language skills in children. *First Language*, *41*(5), 555–572. https://doi.org/10.1177/0142723721995688

Kim, Y.-S. G. (2016). Direct and mediated effects of language and cognitive skills on comprehension of oral narrative texts (listening comprehension) for children. *Journal of Experimental Child Psychology*, *141*, 101–120. https://doi.org/10.1016/j.jecp.2015.08.003

Kim, Y.-S. G. (2017). Why the simple view of reading is not simplistic: Unpacking component skills of reading using a direct and indirect effect model of reading (DIER). *Scientific Studies of Reading*, *21*(4), 310–333. https://doi.org/10.1080/10888438.2017.1291643

Kim, Y.-S. G. (2020). Hierarchical and dynamic relations of language and cognitive skills to reading comprehension: Testing the direct and indirect effects model of reading (DIER). *Journal of Educational Psychology*, *112*(4), 667–684. https://doi.org/10.1037/edu0000407

Kim, Y.-S. G. (2023). Dimensionality of comprehension and retell of narrative and informational texts, and the relations of language and cognitive skills to identified dimensions. Manuscript submitted for publication.

Kim, Y.-S. G., & Graham, S. (2022). Expanding the Direct and Indirect Effects Model of Writing (DIEW): Reading–writing relations, and dynamic relations as a function of measurement/dimensions of written composition. *Journal of Educational Psychology*, *114*(2), 215–238. https://doi.org/10.1037/edu0000564

Kim, Y.-S. G., Park, C., & Park, Y. (2015). Dimensions of discourse level oral language skills and their relation to reading comprehension and written composition: An exploratory study. *Reading and Writing*, *28*(5), 633–654. https://doi.org/10.1007/s11145-015-9542-7

Kim, Y.-S. G., Petscher, Y., Uccelli, P., & Kelcey, B. (2020). Academic language and listening comprehension—Two sides of the same coin? An empirical examination of their

dimensionality, relations to reading comprehension, and assessment modality. *Journal of Educational Psychology*, *112*(7), 1367–1387. https://doi.org/10.1037/edu0000430

Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction-integration model. *Psychological Review*, *95*(2), 163–182. https://doi.org/10.1037/0033-295X.95.2.163

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling* (3rd ed.). Guilford Press.

Language and Reading Research Consortium. (2015a). The dimensionality of language ability in young children. *Child Development*, *86*(6), 1948–1965. https://doi.org/10.1111/cdev.12450

Language and Reading Research Consortium. (2015b). The dimensionality of Spanish in young Spanish-English dual-language learners. *Journal of Speech, Language & Hearing Research*, *58*(3), 754–766. https://doi.org/10.1044/2015_JSLHR-L-13-0266

Language and Reading Research Consortium. (2017). Oral language and listening comprehension: Same or different constructs? *Journal of Speech, Language & Hearing Research*, *60*(5), 1273–1284. https://doi.org/10.1044/2017_JSLHR-L-16-0039

Loban, W. (1976). *Language development: Kindergarten through grade twelve* (NCTE Committee on Research Report No. 18). National Council of Teachers of English. https://eric.ed.gov/?id=ED128818

Lonigan, C. J., & Milburn, T. F. (2017). Identifying the dimensionality of oral language skills of children with typical development in preschool through fifth grade. *Journal of Speech, Language & Hearing Research*, *60*(8), 2185–2198. https://doi.org/10.1044/2017_JSLHR-L-15-0402

Lundine, J. P., & McCauley, R. J. (2016). A Tutorial on Expository Discourse: Structure, Development, and Disorders in Children and Adolescents. *American Journal of Speech-Language Pathology*, *25*(3), 306–320. https://doi.org/10.1044/2016_AJSLP-14-0130

MacWhinney, B. (2000). *The CHILDES project: Tools for analyzing talk.* (3rd ed.). Lawrence Erlbaum Associates.

Massonnié, J., Llaurado, A., Sumner, E., & Dockrell, J. E. (2022). Oral language at school entry: Dimensionality of speaking and listening skills. *Oxford Review of Education*, *48*(6), 743–766. https://doi.org/10.1080/03054985.2021.2013189

McDonald, R. P. (1999). *Test theory: A unified approach*. Erlbaum.

Metsala, J. L., Sparks, E., David, M., Conrad, N., & Deacon, S. H. (2021). What is the best way to characterise the contributions of oral language to reading comprehension: Listening comprehension or individual oral language skills? *Journal of Research in Reading*, *44*(3), 675–694. https://doi.org/10.1111/1467-9817.12362

Miller, J., & Iglesias, A. (2012). *Systematic analysis of language transcripts (SALT)* (research version 2012) [Computer software]. SALT Software, LLC.

Milligan, K., Astington, J. W., & Dack, L. A. (2007). Language and theory of mind: Meta-analysis of the relation between language ability and false-belief understanding. *Child Development*, *78*(2), 622–646. https://doi.org/10.1111/j.1467-8624.2007.01018.x

Mouzaki, A., Spyropoulou, E., Ralli, A., Antoniou, F., Diamanti, V., & Papaioannou, S. (2020). The dimensionality of oral language ability: Evidence from young Greek children. *Journal of Speech, Language & Hearing Research*, *63*(8), 2732–2751. https://doi.org/10.1044/2020_JSLHR-19-00008

Muthén, B., & Muthén, L. (1998). *Mplus*. Chapman and Hall/CRC.

Nelson, N. W., Plante, E., Anderson, M., & Applegate, E. B. (2022). The Dimensionality of Language and Literacy in the School-Age Years. *Journal of Speech, Language, and Hearing Research*, *65*(7), 2629–2647. https://doi.org/10.1044/2022_JSLHR-21-00534

NICHD Early Child Care Research Network. (2005). Pathways to reading: The role of oral language in the transition to reading. *Developmental Psychology*, *41*(2), 428–442. http://dx.doi.org/10.1037/0012-1649.41.2.428

Pinto, G., Tarchi, C., Accorti Gamannossi, B., & Bigozzi, L. (2016). Mental state talk in children's face-to-face and telephone narratives. *Journal of Applied Developmental Psychology*, *44*, 21–27. https://doi.org/10.1016/j.appdev.2016.02.004

Protopapas, A., Simos, P. G., Sideridis, G. D., & Mouzaki, A. (2012). The components of the simple view of reading: A confirmatory factor analysis. *Reading Psychology*, *33*(3), 217–240. https://doi.org/10.1080/02702711.2010.507626

Reise, S. P. (2012). The Rediscovery of Bifactor Measurement Models. *Multivariate Behavioral Research*, *47*(5), 667–696. https://doi.org/10.1080/00273171.2012.715555

Rowe, M. L., & Weisleder, A. (2020). Language development in context. *Annual Review of Developmental Psychology*, *2*(1), 201–223. https://doi.org/10.1146/annurev-devpsych-042220-121816

Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.), *Latent variables analysis: Applications for developmental research* (pp. 399–419). Sage Publications, Inc.

Schleppegrell, M. J. (2001). Linguistic features of the language of schooling. *Linguistics and Education*, *12*(4), 431–459. https://doi.org/10.1016/S0898-5898(01)00073-0

Snow, C. E. (2010). Academic language and the challenge of reading for learning about science. *Science*, *328*(5977), 450–452. https://doi.org/10.1126/science.1182597

Snow, C. E., Cancino, H., Gonzalez, P., & Shriberg, E. (1987). Second language learners' formal definitions: An oral language correlate of school literacy. *Center for Language Education and Research University of California, Los Angeles*, 37.

Symons, D. K., Peterson, C. C., Slaughter, V., Roche, J., & Doyle, E. (2005). Theory of mind and mental state discourse during book reading and story-telling tasks. *British Journal of Developmental Psychology*, *23*(1), 81–102. https://doi.org/10.1348/026151004X21080

Tomblin, J. B., Xuyang, Z., Weiss, A., Catts, H., & Weismer, S. E. (2004). Dimensions of Individual Differences in Communication Skills Among Primary Grade Children. In M. L. Rice & S. F. Warren (Eds.), *Developmental Language Disorders: From Phenotypes to Etiologies* (pp. 53–76). Erlbaum. https://doi.org/10.4324/9781410610881-9

Tomblin, J. B., & Zhang, X. (2006). The dimensionality of language. *Journal of Speech, Language & Hearing Research*, *49*, 1193–1208. https://doi.org/10.1044/1092-4388

CHAPTER 3

Contributions of Oral Language Skills to Oral Discourse Production

Abstract

This study examined the direct and indirect relations of children's domain-general cognitive skills, foundational language skills (vocabulary and grammatical knowledge) and higher-order cognitive skills (e.g., inference) to oral discourse production. A total of 330 English-speaking second graders (M_{age} = 7.33, 53% boys, 55% White) were assessed on working memory, attentional control, vocabulary, grammatical knowledge, knowledge-based inference, perspective taking, and comprehension monitoring, and oral discourse production. Their oral discourse production was measured by picture description tasks which were transcribed verbatim and coded for linguistic and discourse features. The results from structural equation models showed that domain-general cognitive skills and foundational language skills contributed to oral discourse production indirectly through higher-order cognitive skills, inference, in particular. These results highlight that language and cognitive skills underpin oral discourse production and that they have direct and indirect relations to oral discourse production.

Keywords: inference, oral discourse language, production, mediation, indirect effect

Introduction

Oral discourse skills include both listening comprehension (receptive mode) and oral language production (productive mode) (Kim, 2016; Language and Reading Research Consortium, 2017). Oral discourse skills are foundational for communication in everyday lives and for written discourse skills such as reading comprehension and written compositions (e.g., Gough & Tumner, 1986; Juel et al., 1986; Kim, 2020a; Kim & Schatschneider, 2017). There is a large body of research on written discourse skills, and the literature on the receptive mode of oral discourse skill, listening comprehension, is growing (e.g., Kendeou et al., 2008; Kim, 2016; Kim & Phillips, 2014; Lepola et al., 2012). Oral discourse production has also been studied for young children using language sample analysis (e.g., Curenton & Justice, 2004; Griffin et al., 2004; Grimminger et al., 2020; Snow et al., 1995). However, only a limited number of studies have examined language and cognitive predictors of oral discourse production (Bornstein et al., 2014; Kim et al., 2021; Strasser & Río, 2014). Furthermore, no studies have yet examined the structural relations among the language and cognitive predictors to oral discourse production.

In this study, we investigated the structural relations (i.e., direct and indirect relations) of oral language and cognitive skills (i.e., working memory, attentional control, vocabulary, grammatical knowledge, inference, perspective taking, comprehension monitoring) to oral discourse production for second graders. Oral discourse production was measured by picture description tasks, which were coded for their linguistic (e.g., elaborated noun phrase, clausal density) and discourse features (e.g., proper character introduction, perspective taking). The results of this study will enhance our theoretical understanding of the structural relations among the oral language skills in their contributions to oral discourse production and yield practical implications regarding instruction and assessment in oral discourse language for second graders.

Literature Review

Theoretical Models of Discourse Processing

According to the construction-integration model (Kintsch, 1988), processing of discourse or text (including both oral and written language) goes through the phases of constructing initial propositions based on linguistic input, followed by integration of initial propositions into a coherent whole. In this process, the linguistic input of the text is first represented, followed by representation of elementary and local propositions. Then, the propositions are integrated with one's background knowledge and discourse context to form a situation model. The situation model in the form of discourse comprehension or production is thus built upon various language and cognitive skills depending on the stages of the discourse process (Kim, 2016, 2023).

Building upon the construction-integration model (Kintsch, 1988), the direct and indirect effects model of text comprehension (DIET; Kim, 2016) states that language and cognitive skills contribute to discourse comprehension and production. First, domain-general cognitive skills or executive functions such as working memory and attentional control are important to the discourse process. Working memory is the capacity to store and manipulate information and is needed for temporarily remembering words and phrases and for holding such linguistic input while processing new ones (Unsworth & Engle, 2007). Attentional control, or one's ability to pay selected attention to focal stimuli and not get distracted by irrelevant ones, is important in encoding linguistic input and deriving literal meaning from them (Stevens et al., 2006). These skills are necessary for processing linguistic information for the construction and integration processes (Daneman & Merikle, 1996; Kim, 2016). Prior studies have shown that working memory is positively related to discourse skills such as comprehension (Florit et al., 2013; Kim, 2015, 2016; Montgomery et al., 2009). Researchers also found significant positive relations of

attentional or inhibitory control, measured through various rating scales and assessments, to listening comprehension (Kim, 2015, 2016; Strasser & Río, 2014) and general oral language construct (Berninger et al., 2017).

Next, foundational language skills such as vocabulary and grammatical knowledge contribute to the discourse process in constructing the surface code and text-based presentations (Kim, 2016). Abundant prior literature has shown that vocabulary and grammatical knowledge are strongly and positively related to listening comprehension (e.g., Kim, 2015, 2016; Kim et al., 2021; Kim & Phillips, 2014; Lonigan & Milburn, 2017; Snow et al., 1995).

Lastly, higher-order cognitive skills such as inference, reasoning, perspective taking, and comprehension monitoring are essential to the discourse process, particularly for the integration process (Kim, 2016). Inferencing refers to a broad ability to elicit meaning that is not explicit in the text, such as knowledge-based inference, text-based inference, and inferring characters' thoughts and emotions (Graesser et al., 1994). It is crucial for all discourse processing as one uses their background knowledge and textual cues to form a coherent representation of the subject being discussed (McNamara & Magliano, 2009; Strasser & Río, 2014). Perspective taking refers to an understanding of one's own and others' mental and emotional states, which is one type of inferencing skill (Astington et al., 2002; Wellman et al., 2001). Studies showed that perspective taking as measured by theory of mind was related to oral discourse comprehension beyond knowledge-based inferencing skill (Kim, 2015, 2016, 2017), and it is therefore a separate higher-order cognitive skill worthy of examination. Comprehension monitoring is the ability to think about and evaluate one's own text comprehension and it is often operationalized as detecting inconsistencies (Cain et al., 2004). This is important for the discourse process as it

allows one to evaluate inconsistencies in propositions, which is required for integrating propositions to establish a coherent whole (Kim, 2016).

Relations of Language and Cognitive Skills to Oral Discourse Production

All the reviewed language and cognitive skills contribute to discourse processing in oral and written forms in both productive and receptive modes (Kim, 2016). In the present study, we focus on the contributions of these language and cognitive skills to oral discourse production. Oral discourse production can be examined through language sample analysis where various linguistic and discourse features of the spoken output can be identified. Linguistic features primarily concern the use of words and sentences, such as the number of certain parts of speech or clausal density. Discourse features include one's thinking process reflected in the production, such as one's adjustment of their language according to discourse context (Cho & Kim, 2023). For example, how one properly introduces characters using nouns and pronouns is a discourse feature that shows one's ability to adjust language according to their understanding of their audience and discourse setting (Barnes et al., 2014). Moreover, sophistication or complexity in thinking can be portrayed through how one engages in different levels of talk (e.g., description, evaluation, imagination; Curenton et al., 2008) and takes multiple agents' perspectives (e.g., own-side perspective [portraying one's own perspective]; dual perspective [portraying perspectives other than one's own]; Cho & Kim, 2023) in discourse production.

Studies have examined the relations of domain-general cognitive skills to linguistic and discourse features of oral discourse production. The relations between working memory or attentional control and oral discourse language features in narrative retell and story generation have been reported. For example, preschoolers' task orientations (e.g., behavior, attention, emotional expressions) were associated with their narrative picture book retell at age 6 and 9,

measured by the number of story elements (e.g., characters, setting, initiating event, problem, solution, resolution; Lepola et al., 2020). Relatedly, children's auditory attentional control was related to plot structure in story generation task, as measured by the percentage of correctly described plot elements such as setting, initiating event, and outcomes (Duinmeijer et al., 2012). Furthermore, secondary students with higher working memory skills, measured by backward digit span task, had significantly higher average length of clauses in cartoon description tasks (Kormos & Trebits, 2011).

Researchers have also examined the relations between foundational language skills—vocabulary and grammatical knowledge—and oral discourse production, although the majority were focused on vocabulary and there were mixed results. For example, Kim and Schatschneider (2017) found that first graders' vocabulary and grammatical knowledge were moderately related to their oral retell of texts, and vocabulary was independently related to oral retell over and above higher-order cognitive skills. Grammatical knowledge was also related to the number of episodes in story production for kindergarten children (Roth et al., 2002). There were weak positive correlations between verbal intelligence score and the mean length of utterance units and number of different word roots in storytelling for 4-year-old children (Bornstein et al., 2014). Similarly, weak to moderate relations between kindergarteners' vocabulary and their syntactic complexity in production of narratives and word definition tasks were found (Snow et al., 1995).

Interestingly, there was no significant relations between vocabulary and oral discourse language features. Snow and colleages (1995) examined oral discourse in the context of picture descriptions for children in kindergarten, and children's vocabulary was not related to linguistic features (e.g., total number of words, number of adjectives, locatives). Kim and colleagues (2011) also found that the correlations between preschoolers' vocabulary scores and the types of

utterance (e.g., labeling, description, evaluation) they used in joint book-reading with their parents were not significant. Such findings may suggest that adjusting language according to discourse contexts is independent of one's lexical knowledge (Dickinson & Snow, 1987) or that the relations between vocabulary skill to oral language features differ by the type of discourse task and the indexes used to represent oral language use. In other words, the contributions of vocabulary skill may depend on the characteristics of the measure of oral discourse production such as the type of task and linguistic and discourse features derived. Thus, more research is needed to resolve conflicting findings on the relations of vocabulary to oral discourse production.

Lastly, the contributions of higher-order thinking skills to oral discourse production have been investigated. Researchers have shown that children's perspective taking as measured by theory of mind is positively related to discourse comprehension (Kim, 2015, 2016, 2017; 2020b; Tompkins et al., 2020) and to the use of mental state talk, which is a set of words that attribute thoughts, emotions, and desires to people in spoken oral discourse language (Bretherton & Beeghly, 1982; Pinto et al., 2016; Ruffman et al., 2002). However, the relative contribution of theory of mind to discourse skills is expected to differ by text features such as genre (Kim, 2016). Specifically, because theory of mind serves as an interpretive mechanism through which one understands various characters' and authors' mental and emotional states (Pinto et al., 2016; Symons et al., 2005; Tompkins et al., 2020), it is posited to be more important for discourse skills for narrative texts than for informational texts. This was indeed supported for students in Grade 4 (Kim et al., 2021). Studies have also found positive relations between inference making and oral narrative/expository retell or comprehension (Kim & Schatschneider, 2017; Lepola et al., 2020; Tompkins et al., 2013) and between comprehension monitoring and story comprehension and retell tasks (Kim, 2015; Kim & Phillips, 2014; Strasser & Río, 2014).

To sum up, language and cognitive skills have been found to have positive relations to oral discourse language. However, there were some notable gaps. First, only a limited number of studies have examined the contributions of higher-order cognitive skills and grammatical knowledge to oral discourse *production*. Second, oral language production has oftentimes been examined in the discourse context of narrative retell or story generation. Given this, more research incorporating a comprehensive set of oral language skills and examining various discourse context in oral discourse production is needed to enhance our understanding of oral discourse language.

Direct and Indirect Relations of Language and Cognitive Skills to Oral Discourse Production

While the vast majority of previous studies examined the relations of individual language and cognitive skills to oral discourse language, seldom have they investigated structural relations among the skills in their contributions to oral discourse production. According to the DIET model (Kim, 2016), language and cognitive skills do not all have direct relations to discourse skills. Instead, they have hierarchical relations, or direct and indirect relations. Specifically, domain-general cognitive skills are important to foundational language skills, and foundational language skills are necessary for higher-order cognitive skills, which, in turn, predict discourse skills (see Kim, 2016, for detailed theoretical account).

Evidence indeed supports these relations. Prior studies have shown that working memory is positively related to vocabulary (Kim, 2015, 2016; Morra & Camba, 2009), grammatical knowledge (Kim, 2015, 2016, 2017; Verhagen & Leseman, 2016), inference (Language and Reading Research Consortium et al., 2019), theory of mind (Duh et al., 2016), and comprehension monitoring (Strasser & Río, 2014). Similarly, studies have found significant

positive relations between attentional or inhibitory control to vocabulary (Kim, 2016; Stephenson et al., 2008), syntactic knowledge (Kim, 2015, 2016), inference (Kim, 2020), theory of mind (Kim, 2015, 2016; Kim et al., 2021), and comprehension monitoring (Kim, 2015, 2016; Kim & Phillips, 2014). Studies have also shown the relations of vocabulary and grammatical knowledge to higher-order cognitive skills. Vocabulary has been shown to be related to inference (Kim, 2016; Language and Reading Research Consortium et al., 2019), theory of mind (Kim, 2016; Milligan et al., 2007), and comprehension monitoring (Kim, 2016; Strasser & Rio, 2014). Grammatical knowledge was found to be associated with inference (Kim, 2016; Gray et al., 2018), theory of mind (Kim, 2016, 2020), and comprehension monitoring (Kim, 2016; Kim & Schatschneider, 2017) as well. Given the significant relations, it is imperative that the structural relations among the oral language skills be accounted for in examining their contributions to oral discourse language.

Present Study

Oral discourse production is supported by numerous language and cognitive skills and is manifested in the forms of diverse linguistic and discourse-level features. Although previous studies have investigated the relations among language and cognitive skills and oral discourse language, they were mostly limited to examining the receptive mode, listening comprehension. Furthermore, few studies examined the direct and indirect relations of language and cognitive skills to oral discourse production. The present study fills the gap in the literature by examining the structural relations among multiple language and cognitive skills to oral discourse production for second graders. The primary research question that guided the current study was how domain-general cognitive skills (i.e., working memory, attentional control), foundational language skills (i.e., vocabulary, grammatical knowledge), and higher-order cognitive skills (i.e.,

inference, perspective taking, comprehension monitoring) are directly and indirectly related to oral discourse production. We posited indirect relations of language and cognitive skills to oral discourse production. Specifically, we hypothesized that domain-general cognitive skills would be indirectly related to oral discourse production. No clear hypothesis was made regarding the direct contribution of foundational language skills to oral discourse production.

Method

Participants

A total of 330 second grade students (M_{age} = 7.33) from 58 classrooms in the Southeastern part of the United States participated in the study (Kim, 2017). Children's performance on linguistic and discourse features in oral discourse production was reported in a recent article (Cho & Kim, 2023). Boys consisted of 53% of the sample. There were around 55% Caucasian, 35% African American, 4% Hispanic, 1% Asian American, and 5% multiracial or other ethnicity students. Approximately 73% of the sample were eligible for free or reduced-price lunch. Approximately 1% were identified as English language learners, classified by the annual state-wide assessments. Approximately 21% were children with exceptionality, the majority of whom received speech services.

Measures

The following were assessed: oral discourse production, working memory, attentional control, vocabulary, grammatical knowledge, knowledge-based inference, perspective taking, and comprehension monitoring. Unless otherwise noted, children's responses were scored dichotomously (1 = correct, 0 = incorrect) for each item, and reliability estimates are from the sample.

Oral Discourse Production

Children's oral discourse production was measured by oral picture description tasks (see Appendix A) where children were presented with three pictures and asked to describe each picture twice, once in a contextualized (i.e., describing the picture to an examiner while looking at it together) and second in a decontextualized condition (i.e., pretending to describe the picture to a friend while sitting in front of the examiner). Children's discourse production was digitally recorded and transcribed verbatim using the Systematic Analysis of Language Transcription (SALT; Miller & Iglesias, 2012). The transcripts were segmented into communication units (C-units), which contain a subject and a verb, followed by any dependent clauses or phrases (Loban, 1976). The transcripts were also transported to Computerized Language Analysis (CLAN) software as CHAT files (MacWhinney, 2000).

Six linguistic and three discourse features were identified (see Table 3.1). Linguistic features included adverbs, conjunctions other than coordinating ones, pronominals, mental state talk, elaborated noun phrase, and clausal density. The following four linguistic features were automatically generated using the CLAN software's frequency command (MacWhinney, 2000): adverbs (i.e., words that modify verbs, adjectives, or other adverbs), pronominals (e.g., he, you, they), conjunctions other than the coordinating ones (e.g., if, when, while, since), and mental state talk (e.g., think, know, feel, forget). Manual coding was done for the two indexes: elaborated noun phrase and clausal density. Elaborated noun phrases (e.g., simple designating noun phrase, simple descriptive noun phrase, complex noun phrase, noun phrase with noun post modification, complex noun phrase with post modification) were counted in their frequency. Based upon the counts, composite scores across the six tasks were created and divided by the total number of words to control for length. Similarly, clausal density was calculated by adding

up the total number of independent and subordinating clauses (including participial phrases) across the six tasks and diving it by the number of total C-units.

Three discourse features were coded. First, proper character introduction was identified based on the following criteria. A proper code was assigned if the character was introduced using an indefinite article (e.g., a boy), a name (e.g., Mary), or a reference to the previous character (e.g., a girl and her cow). Improper code was given when the character introduction was done using definite article (e.g., the girl) or pronouns without any referent (e.g., he, them). The score for this index was calculated by dividing the number of proper character introductions out of twelve (i.e., the total number of characters that could be introduced across the six conditions = three pictures*two conditions). Second, degree of decontextualization was coded based on the complexity of thinking portrayed in each C-unit and consisted of the three categories: low, mid, and high. Low degree of decontextualization included descriptions or explanations of meaning of words. Mid degree consisted of statements addressing character's mental and emotional states, recalling information, or making evaluations. High degree of decontextualization encompassed prediction of what will happen, statements of hypothetical situations, or usage of story conventions (e.g., once upon a time). The score was calculated by adding the number of low degree units multiplied by 1, the number of mid degree units multiplied by 2, and the number of high degree units multiplied by 3. Lastly, perspective taking was coded by assigning each C-unit into one of three categories. No perspective taking units were those that were unopinionated descriptions of the pictures. Own perspective taking units portrayed student's own perspective by including some evaluative statements. Dual perspective taking was for those units that contained perspectives not of the student's own, such as those of the characters in the pictures. The score was generated by summing the total number of own-side perspectives (i.e., unit that portrays

one's own perspective) multiplied by 1 and the number of dual perspectives (i.e., unit that portrays perspectives not of themselves) multiplied by 2. This way, the scores for degree of decontextualization and perspective taking reflected the greater weight put to more complex levels. Then, the two scores were divided by the total number of C-units to account for length. Across the five categories of manual coding (i.e., elaborated noun phrase, clausal density, proper character introduction, degree of decontextualization, perspective taking), interrater reliability, or exact agreement ranged 91% to 99% (Cho & Kim, 2023).

Table 3.1

Coding and Descriptive Statistics of Linguistic and Discourse Features in Oral Discourse Production (N = 330)

	Definition/Type/Example	Mean	SD	Min	Max
Linguistic Features					
Adverb	Words that modify verbs, adjectives, or other adverbs	0.04	0.02	0.00	0.12
Conjunction	Conjunctions other than the coordinating ones (e.g., if, when, while, since)	0.01	0.01	0.00	0.07
Pronominal	Pronouns (e.g., he, you, they)	0.05	0.03	0.00	0.14
Mental state talk	Words that signal mental or emotional state (e.g., think, know, feel, forget)	0.01	0.01	0.00	0.08
Elaborated noun phrase	Simple designating noun phrase (e.g., a boy, that doll, her cow, many trees) Simple descriptive noun phrase (e.g., a tall tree) Complex noun phrase (e.g., the big red house) Noun phrase with noun post modification (e.g., the girl that drew the picture) Complex noun phrase with post modification (e.g., the brown cat that is sleeping)	0.20	0.04	0.08	0.38
Clausal density	Non-clause (e.g., He white shirt) Independent clause (e.g., His is floor dirty) Participial phrase (e.g., She's on the chair reading a book) Subordinating clause: nominal (e.g., I think Bob is lazy), relative (e.g., The teacher who gave the assignment was Mr. Jones), adverbial (e.g., It looks like he is trying to read.)	0.99	0.22	0.05	1.80
Discourse Features					
Proper character introduction	Proper (e.g., a girl, a boy and his dad) Improper (e.g., the boy)	0.55	0.31	0.00	1.00

Degree of decontextualization	Low: description, conveying meaning (e.g., She has green shoes) Mid: characters' psychological states (e.g., The girl is trying to get it out of the water), evaluation (e.g., I like that book), recalling (e.g., They look more like converse/s) High: predictions, print or story conventions (e.g., She's about to pull that cow out of the water; Once upon a time …) None: unopinionated description (e.g., There is a girl and a cow)	1.09	0.17	0.68	2.35
Perspective taking	Own: portrays one's own perspective (e.g., I like the girl's red dress) Dual: portrays perspectives not of themselves (e.g., She feels left out)	0.17	0.21	0.00	1.30

Note. All are proportion scores. SD = Standard Deviation

Working Memory

A listening span task was used, where children were presented with short three-word sentences entailing common knowledge (e.g., "Birds can fly") and asked if the heard sentence was correct (Yes/No; Daneman & Merikle, 1996; Kim, 2017). After hearing two or three sentences, the child was asked to recall the last words in the sentences. There were 4 practice items and 13 experimental items. Children's responses regarding the veracity of the statement were not scored, but the correctness of their recall of the last words were given a score of 0-2: 2 for correctly identifying the last words in correct order, 1 for correctly identifying last words in incorrect order, and 0 for incorrect responses. Test administration was discontinued after three consecutive incorrect responses. The total possible maximum score was 26. Cronbach' s α estimate was .74.

Attentional Control

The Strengths and Weaknesses of ADHD (attention-deficit/hyperactivity disorder) Symptoms and Normal Behavior Scale (SWAN; Swanson et al., 2012) was used for measuring children's attentiveness and hyperactivity. The SWAN is a behavioral checklist that contains 30

items evaluated on a 7-point scale, ranging from 1 (far below average) to 7 (far above average), making the total possible score 210. This allows for ratings of relative strengths (above average) as well as weaknesses (below average). Higher scores denote greater attentiveness and less hyperactivity. Children's teachers completed the SWAN checklist. Cronbach' s α estimate was .98.

Vocabulary

A standardized and normed task of Woodcock Johnson-III Picture Vocabulary task was used, where the child was asked to identify the object in the picture (Woodcock et al., 2001). Testing was discontinued after six consecutive incorrect responses. Cronbach' s α estimate was .69.

Grammatical Knowledge

A standardized and normed task of the Grammaticality Judgement task in the Comprehensive Assessment of Spoken Language was used to measure grammatical knowledge (Carrow-Woolfolk, 1999). The child was asked whether a heard sentence was grammatically correct and prompted to further correct the incorrect sentence. Testing discontinued after five incorrect items in a row. Cronbach' s α estimate was .94.

Inference

The Inference task of Comprehensive Assessment of Spoken Language (Carrow-Woolfolk, 1999) was used. In this task, the child heard two or three sentence scenarios and was asked a question that required inference based on their background knowledge. For example, the child heard, "Mandy wanted to wear last year's dress to school one day, but when she tried it on, she could not wear it. Why?" The correct responses should include refence to the fact that

Mandy has grown, and the dress does not fit anymore. Testing was discontinued after five consecutive incorrect items. Cronbach' s α estimate was .90.

Perspective Taking (Theory of Mind)

Perspective taking was measured through theory of mind tasks (Kim et al., 2021). Specifically, three developmentally appropriate second-order false belief scenarios were employed to examine the child's ability to infer a story character's mistaken belief about another character's knowledge (Kim & Phillips, 2014; Mahy et al., 2017). The child was presented with scenarios and illustrations of a bake sale, visit to the farm, and a birthday celebration, and were asked questions about characters' beliefs. There were six questions for each scenario, with a total of 18 items. Cronbach' s α estimate was .71.

Comprehension Monitoring

Comprehension monitoring was measured through an inconsistency detection task, where the child heard a short story and were asked to evaluate whether the story made sense (Cain et al., 2004; Kim & Phillips, 2014). If the child responded that the story did not make sense, they were asked to provide an explanation and fix the story so that it makes sense. There were two practice items and nine experimental items. Nine experimental items incorporated a random order of consistent and inconsistent stories. For the six inconsistent stories, the accuracy of children's explanations as well as the repair of the story were each dichotomously scored. Therefore, the total possible score was 21. Cronbach' s α estimate was .70.

Procedures

Children were individually assessed by trained research assistants in a quiet place in the schools. Assessments spanned over several sessions, each lasting 30-40 minutes (Kim, 2017).

Data Analysis Strategy

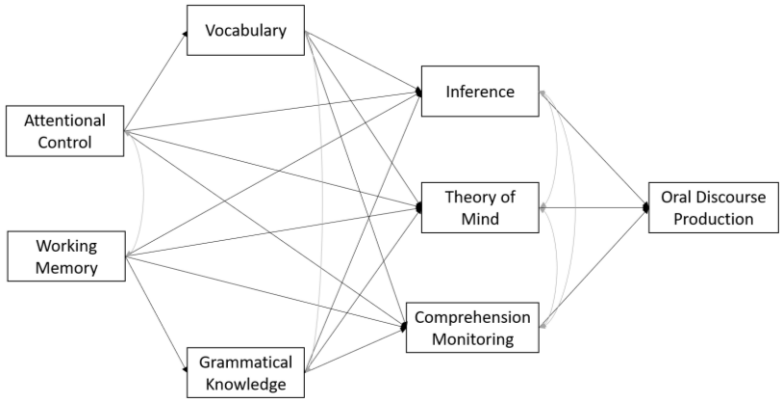
For data analysis, we included those children who produced at least one word across the six picture description conditions and had a score on at least one of the discrete language and cognitive skills measures. Our previous study found that all the nine linguistic and discourse features are best described to have a bi-factor structure that was composed of the general factor that captures common variance across all the features and linguistic specific factor (i.e., consisting of the indicators of adverb, conjunction, pronominal, clausal density, elaborated noun phrase and mental state talk) and discourse specific factor (i.e., composed of the indicators of proper character introduction, degree of decontextualization, and perspective taking) (Cho & Kim, manuscript in preparation). Only the general factor was reliable. Therefore, in the present study, we used factor scores from the general factor for oral discourse production.

The research question was addressed by structural equation modeling, using maximum likelihood estimation with robust standard errors (MLR) due to slight nonnormality of the oral discourse language factor score and full information maximum likelihood (FIML) to handle all missing data. Three alternative models were tested and compared (see Figure 3.1). Key differences among the three models were whether or not domain-general cognitive skills and foundational language skills were allowed to have direct relations to oral discourse production. Model 1 was a complete mediation model where executive function/domain-general cognitive skills and foundational language skills were not directly related to oral discourse production. Model 2 allowed direct relations of executive functions/domain-general cognitive skills (i.e., attentional control, working memory) to oral discourse production, over and above the higher-order cognitive skills and vocabulary and grammatical knowledge. Model 3 allowed direct relations of vocabulary and grammatical knowledge to oral discourse production, over and above higher-order cognitive skills.

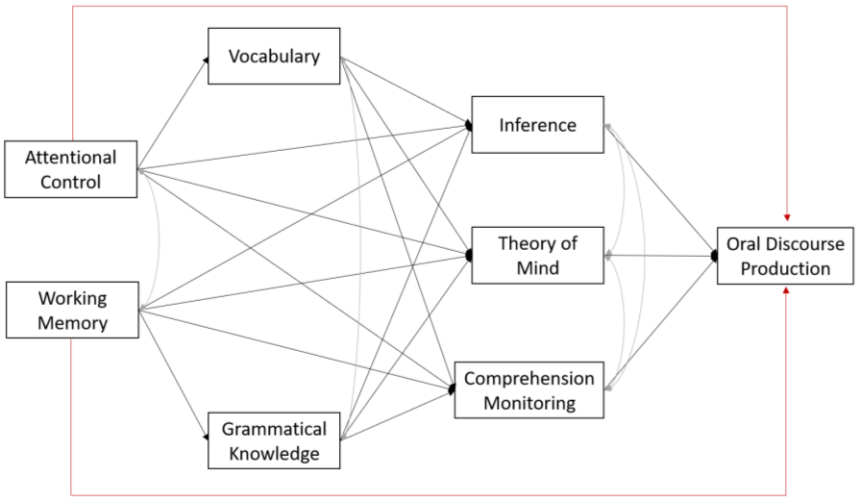
Figure 3.1

Three Alternative Models of Direct and Indirect Effects of Oral Discourse Production

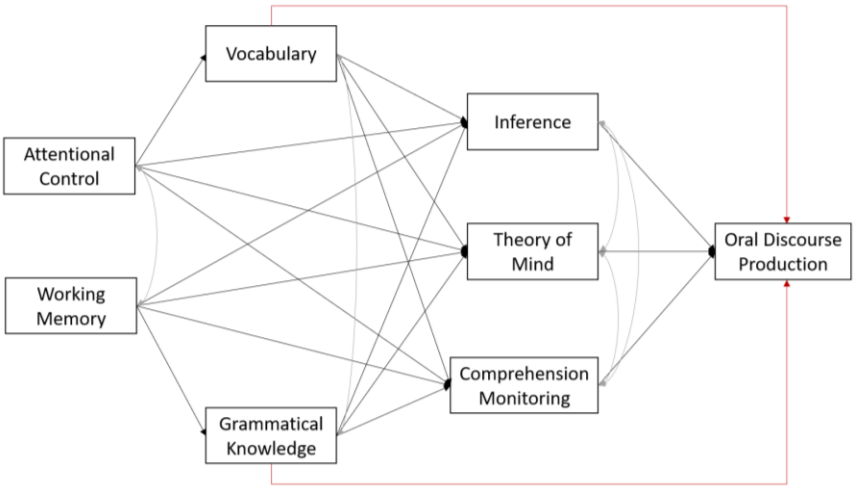
1



2



3



Note. Grey two-sided arrows represent covariances. Focal pathways are in red lines.

Model fit was evaluated using multiple indices. Typically, RMSEA below .08, SRMR equal to or less than .05, and CFI and TLI equal to or greater than .95 indicate an excellent model fit, and TLI and CFI greater than .90, and SRMR equal to or less than .10 are considered to be acceptable (Kline, 2011). For model comparisons, we used the Satorra–Bentler rescaled chi-square difference test for comparing nested models (S–B χ^2; Satorra & Bentler, 1994). All the analyses were conducted using Mplus Version 8.8 (Muthén & Muthén, 1998-2022).

Results

Descriptive Statistics and Preliminary Analysis

Prior to running the descriptive statistics, missing data was evaluated. There were only 4 cases of missing data (1% of the sample) for the measures of attentional control and comprehension monitoring respectively, while all the other measures had complete cases. Thus, full information maximum likelihood estimation was used in the structural equation models.

Table 3.2
Descriptive Statistics of Oral Discourse Production Factor Score and Language and Cognitive Skills (N =330)

	Mean	SD	Min	Max	Skewness	Kurtosis
Oral discourse production	0.00	0.91	-4.59	1.58	-1.61	6.50
Attentional control[a]	119.96	32.75	36.00	210.00	0.45	3.43
Working memory	7.40	4.14	0.00	20.00	0.13	2.91
Vocabulary	20.11	2.96	11.00	28.00	0.04	3.11
Grammatical knowledge	31.41	13.00	1.00	66.00	0.11	2.91
Inference	10.38	6.81	0.00	32.00	0.65	2.71
Theory of mind	8.18	4.24	0.00	18.00	-0.04	2.21
Comprehension monitoring[a]	6.95	3.03	1.00	16.00	0.40	2.59

[a]*n* = 326

Table 3.2 presents the descriptive statistics for oral discourse production factor score and the individual language and cognitive skills. All the language and cognitive skills variables exhibited sufficient variations around the means and had acceptable skewness and kurtosis values (i.e., skewness $\leq \pm 2$; kurtosis < 7). However, the kurtosis value of oral discourse

production factor score was close to 7, and therefore, the maximum likelihood estimation with robust standard errors (MLR) was used in the structural equation models.

Table 3.3
Correlations among Oral Discourse Production Factor Score and Language and Cognitive Skills

	1	2	3	4	5	6	7
1. Oral discourse production	—						
2. Attentional control	0.07	—					
3. Working memory	0.07	0.30***	—				
4. Vocabulary	0.07	0.14*	0.35***	—			
5. Grammatical knowledge	0.03	0.29***	0.43***	0.55***	—		
6. Inference	0.13*	0.23***	0.27***	0.51***	0.59***	—	
7. Theory of mind	0.03	0.31***	0.36***	0.43***	0.47***	0.49***	—
8. Comprehension monitoring	0.12*	0.33***	0.21***	0.29***	0.39***	0.43***	0.37***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3.3 shows the correlations among oral discourse production factor score and language and cognitive skills. Oral discourse production factor score was weakly but positively related to inference skills ($r = .13$, $p = .016$) and comprehension monitoring ($r = .12$, $p = .029$). It was not significantly related to any other language or cognitive skills. All the language and cognitive skills were significantly and positively related to one another (ps < .05).

Relations of Language and Cognitive Skills to Oral Discourse Production

Table 3.4
Model Fit Information for the Structural Equation Models

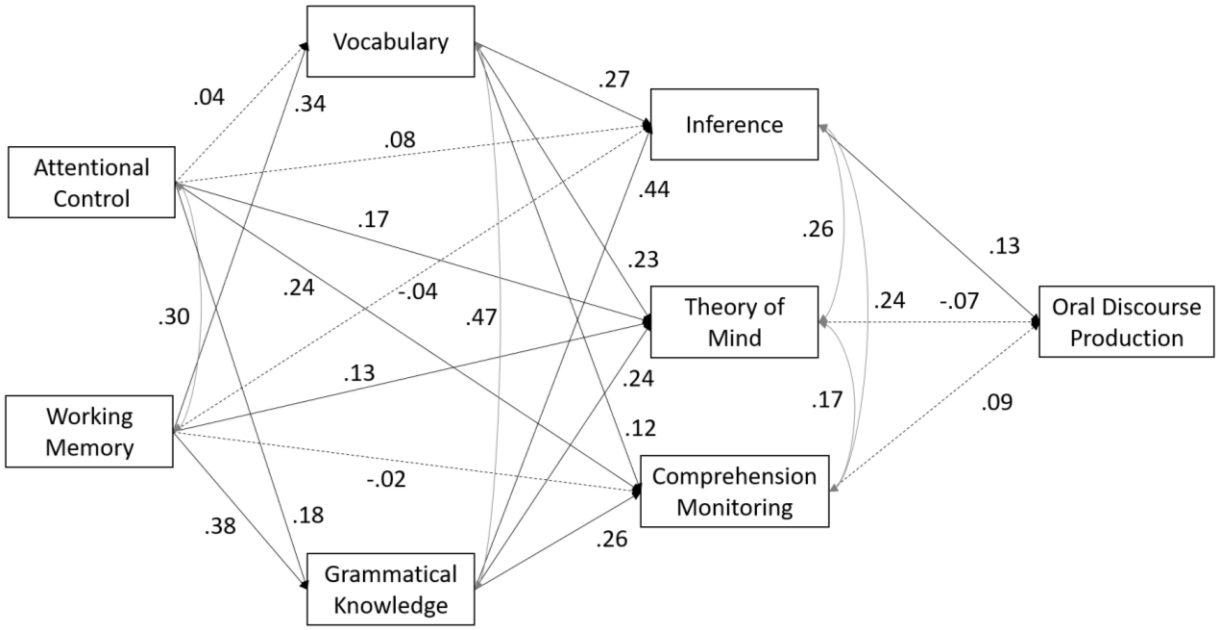
Model	$\chi 2$	*df*	*p*	MLR scaling factor	RMSEA (90% CI)	SRMR	CFI	TLI
1	4.235	4	.38	1.04	.013 [.00, .09]	.011	1.00	.997
2	3.042	2	.29	1.03	.040 [.00, .12]	.009	.998	.977
3	2.333	2	.31	1.04	.022 [.00, .11]	.011	.999	.993

Note. df = degrees of freedom; MLR = Maximum Likelihood Ratio; RMSEA = Root-Mean-Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; CFI = Comparative Fit Index; TLI = Tucker Lewis Index.
*$p < .05$. **$p < .01$.

Model fit information is presented in Table 3.4. All three models had excellent fit. However, Models 2 and 3 were not superior to Model 1 based on the scaled chi-square difference

test: 1 versus 2, $\Delta\chi^2(2) = 1.19$, $p = .27$; and 1 versus 3, $\Delta\chi^2(2) = 1.90$, $p = .17$. Therefore, Model 1 was chosen as the final model for parsimony (Figure 3.2).

Figure 3.2
Final Indirect Effects Model of Oral Discourse Production



Note. Standardized structural regression weights for the indirect effects model of oral language. Two-sided arrows represent covariances. Dotted lines represent non-significant paths.

Working memory was directly and moderately related to vocabulary ($\gamma = .34$, $p < .001$) and grammatical knowledge ($\gamma = .38$, $p < .001$), accounting for attentional control. Working memory was also directly but weakly related to higher-order cognitive skills such as theory of mind ($\gamma = .13$, $p = .011$), but not significantly related to inference and comprehension monitoring ($ps > .05$), after accounting for attentional control, vocabulary and grammatical knowledge. Attentional control was weakly related to grammatical knowledge ($\gamma = .18$, $p < .001$), but not vocabulary ($p > .05$), after accounting for working memory. Attentional control was also weakly associated with theory of mind ($\gamma = .17$, $p = .011$) and comprehension monitoring ($\gamma = .25$, $p < .001$), but not inference ($p > .05$), controlling for all other predictors. Foundational oral language

skills, vocabulary and grammatical knowledge, were significantly and positively related to all three higher-order cognitive skills: inference, theory of mind, and comprehension monitoring ($.12 \leq \gamma \leq .44$, *p*s < .05). Finally, inference ($\beta = .13$, $p = .035$) was independently related to oral discourse production, whereas theory of mind and comprehension monitoring were not (*p*s > .05), after accounting for all of the other predictors in the model.

Discussion

Many studies have investigated the direct contributions of domain-general cognitive skills, foundational language skills, and higher-order thinking skills to oral discourse language, oftentimes in the context of listening comprehension. However, oral discourse *production* is also a crucial oral discourse skill in daily and academic contexts including writing (Juel et al., 1986; Kim & Graham, 2022). In addition, examining the structural relations of language and cognitive skills to oral discourse language is important in showing the mechanisms through which various skills contribute to oral discourse language. In the present study, we examined the direct and indirect relations among language and cognitive skills to oral discourse production in second graders' picture description, based on DIET (Kim, 2016) as the theoretical framework.

Our findings revealed that domain-general cognitive skills (working memory and attentional control) and foundational language skills (vocabulary and grammatical knowledge) were not directly related to oral discourse production but had indirect contributions via higher-order cognitive skills. Specifically, working memory and attentional control were related to vocabulary and grammatical knowledge (although attentional control was not independently related to vocabulary), which, in turn, were related to higher-order cognitive skills of inference, theory of mind, and comprehension monitoring. Of the higher-order cognitive skills, inference was independently related to oral discourse production. These findings are in line with the DIET

model (Kim, 2016) regarding the hierarchical nature of the relations, specifically that domain-general cognitive skills predict foundational language skills, which in turn, predict higher-order cognitive skills, which sequentially predict oral discourse language.

We found that inference made a significant direct contribution to oral discourse production, controlling for theory of mind, comprehension monitoring, and all other skills. The role of inference (e.g., text-based inference, knowledge-based inference, inference on character's thoughts and feelings) in discourse comprehension have been recognized in the field (Elleman, 2017; Graesser et al., 1994; McNamara & Magliano, 2009). For example, previous studies have shown that inference skills positively predicted performance on listening comprehension (Kim, 2016; Lepola et al., 2020; Tompkins et al., 2013). The present finding adds to this literature by showing that knowledge-based inference plays an important role in oral discourse production as measured by picture description tasks. In other words, describing or elaborating on a visual object draws on one's inferencing skills built upon their background knowledge.

To our surprise, domain-general cognitive skills and foundational language skills were not related to oral discourse production in their bivariate correlations (Table 3.3). The reasons for these findings are not clear. However, an important aspect that should be carefully considered in the interpretation of the findings is the measurement of the construct, oral discourse production. In the present study, oral discourse production was measured in picture description tasks, and children's spoken texts were coded on linguistic and discourse features. Previous studies of oral discourse production typically included oral retell and production of a story based on provided illustrations (Lepola et al., 2020; Roth et al., 2002; Tompkins et al., 2013). The relation between vocabulary and oral discourse production have been mixed in the field (Kim et al., 2011; Snow et al., 1995). In the present study, the child was asked to describe pictures in two different

conditions (in one condition, target audience was present and in the other condition, target audience was not), and picture description may not have tapped into linguistic and discourse demands in a similar way as oral story production tasks. For example, describing pictures may not have demanded use of sophisticated vocabulary to a great extent as compared to developing a story based on a picture. Similarly, picture description may not have rendered opportunities to draw on a high degree of perspective taking although the two conditions (presence or absence of target audience) were meant to differ in this regard. Future research is encouraged to investigate the mechanisms of the relations of oral language skills to oral discourse production as a function of various contexts and tasks.

Taken together, the present findings showed the direct relations of higher-order cognitive skills, knowledge-based inference in particular, to oral discourse production, and indirect relations of domain-general cognitive skills and foundational oral language skills. These are in line with theoretical frameworks for oral discourse skills (Kintsch, 1988; Kim, 2016). Regarding practical implications, theories and previous studies indicate that oral discourse production is a complex process, and thus, intervention or assessment on oral discourse production should attend to multiple language and cognitive skills. In particular, the present study suggests that instruction on inference is warranted as part of a comprehensive approach to improve oral discourse skills. This is supported by previous studies that have found that inference plays an important role for discourse processing and that instruction can improve inference skills (Elleman, 2017; Kendeou et al., 2008).

Limitations and conclusion

Although the present study advanced our understanding of the direct and indirect relations of the language and cognitive skills to oral discourse production in picture description

context, there are several limitations to be noted for future research. First, we used a picture description task and evaluated oral discourse production in terms of the few linguistic and discourse features to measure oral discourse production. However, oral discourse production can be measured using multiple tasks and evaluated in other ways (e.g., quality of oral discourse production, coherence of descriptions). Therefore, future research can replicate the present study by incorporating multiple tasks and identifying various aspects of oral discourse language. Second, the present study examined second graders' picture description. Future studies are needed to investigate oral discourse production and the contributions of language and cognitive skills to oral discourse production for individuals in different developmental phases (e.g., with younger and older children).

Despite these limitations, this study extends our understanding of oral discourse production by highlighting the direct contribution of inference and indirect contributions of language and cognitive skills. This study makes a theoretical contribution regarding the structural relations of language and cognitive skills to oral discourse production by supporting the hierarchical relations among the skills (Kim, 2016). Furthermore, the present results emphasize the role of inferencing skill based on background knowledge in oral discourse production and offer preliminary practical implications. Taken together, various language and cognitive skills play roles in oral discourse production, and instructional decisions should attend to these multiple skills.

References

Astington, J. W., Pelletier, J., & Homer, B. (2002). Theory of mind and epistemological development: The relation between children's second-order false-belief understanding and their ability to reason about evidence. *New Ideas in Psychology*, *20*(2–3), 131–144. https://doi.org/10.1016/S0732-118X(02)00005-3

Barnes, A. E., Kim, Y.-S., & Phillips, B. M. (2014). The relations of proper character introduction to narrative quality and listening comprehension for young children from high poverty schools. *Reading and Writing*, *27*(7), 1189–1205. https://doi.org/10.1007/s11145-013-9481-0

Berninger, V., Abbott, R., Cook, C. R., & Nagy, W. (2017). Relationships of attention and executive functions to oral language, reading, and writing skills and systems in middle childhood and early adolescence. *Journal of learning disabilities*, *50*(4), 434-449. doi: 10.1177/0022219415617167

Bornstein, M. H., Hahn, C.-S., Putnick, D. L., & Suwalsky, J. T. D. (2014). Stability of core language skill from early childhood to adolescence: A latent variable approach. *Child Development*, *85*(4), 1346–1356. https://doi.org/10.1111/cdev.12192

Bretherton, I., & Beeghly, M. (1982). Talking about internal states: The acquisition of an explicit theory of mind. *Developmental Psychology*, *18*(6), 906–921. https://doi.org/10.1037/0012-1649.18.6.906

Cain, K., Oakhill, J., & Bryant, P. (2004). Children's reading comprehension ability: Concurrent prediction by working memory, verbal ability, and component skills. *Journal of Educational Psychology*, *96*(1), 31–42. https://doi.org/10.1037/0022-0663.96.1.31

Carrow-Woolfolk, E. (1999). *CASL: Comprehensive assessment of spoken language.* Pearson Assessment.

Cho, M. & Kim, Y.-S. G. (2023). Do Second Graders Adjust Their Language by Discourse Context? *Language, Speech, and Hearing Services in Schools.*1-15. https://doi.org/10.1044/2022_LSHSS-22-00100

Curenton, S. M., Craig, M. J., & Flanigan, N. (2008). Use of decontextualized talk across story contexts: How oral storytelling and emergent reading can scaffold children's development. *Early Education and Development*, *19*(1), 161–187. https://doi.org/10.1080/10409280701839296

Curenton, S. M., & Justice, L. M. (2004). African American and Caucasian preschoolers' use of decontextualized language: Literate language features in oral narratives. *Language, Speech, and Hearing Services in Schools*, *35*(3), 240–253. https://doi.org/10.1044/0161-1461(2004/023)

Daneman, M., & Merikle, P. M. (1996). Working memory and language comprehension: A meta-analysis. *Psychonomic Bulletin & Review*, *3*(4), 422–433. https://doi.org/10.3758/BF03214546

Dickinson, D. K., & Snow, C. E. (1987). Interrelationships among prereading and oral language skills in kindergartners from two social classes. *Early Childhood Research Quarterly*, *2*(1), 1–25. https://doi.org/10.1016/0885-2006(87)90010-X

Duh, S., Paik, J. H., Miller, P. H., Gluck, S. C., Li, H., & Himelfarb, I. (2016). Theory of mind and executive function in Chinese preschool children. *Developmental Psychology*, *52*(4), 582–591. http://dx.doi.org/10.1037/a0040068

Duinmeijer, I., de Jong, J., & Scheper, A. (2012). Narrative abilities, memory and attention in children with a specific language impairment: Narrative and cognitive abilities in SLI. *International Journal of Language & Communication Disorders*, *47*(5), 542–555. https://doi.org/10.1111/j.1460-6984.2012.00164.x

Elleman, A. M. (2017). Examining the impact of inference instruction on the literal and inferential comprehension of skilled and less skilled readers: A meta-analytic review. *Journal of Educational Psychology*, *109*(6), 761–781. https://doi.org/10.1037/edu0000180

Florit, E., Roch, M., & Levorato, M. C. (2013). The relationship between listening comprehension of text and sentences in preschoolers: Specific or mediated by lower and higher level components? *Applied Psycholinguistics*, *34*(2), 395–415. https://doi.org/10.1017/S0142716411000749

Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *RASE: Remedial & Special Education*, *7*(1), 6–10. https://doi.org/10.1177/074193258600700104

Graesser, A. C., Singer, M., & Trabasso, T. (1994). Constructing inferences during narrative text comprehension. *Psychological Review*, *101*(3), 371–395. https://doi.org/10.1037/0033-295X.101.3.371

Gray, S., O'Connell, A. A., Restrepo, M. A., Yeomans-Maldonado, G., Bengochea, A., Mesa, C., Brinkley, S., Yeomans-Maldonado, G., Bengochea, A., & Mesa, C. (2018). The Dimensionality of Oral Language in Kindergarten Spanish–English Dual Language Learners. *Journal of Speech, Language, and Hearing Research*, *61*(11), 2779–2795. https://doi.org/10.1044/2018_JSLHR-L-17-0320

Griffin, T. M., Hemphill, L., Camp, L., & Wolf, D. P. (2004). Oral discourse in the preschool years and later literacy skills. *First Language*, *24*(2), 123–147. https://doi.org/10.1177/0142723704042369

Grimminger, A., Rohlfing, K. J., Carina, L. Ü. K. E., Liszkowski, U., & Ritterfeld, U. (2020). Decontextualized talk in caregivers' input to 12-month-old children during structured interaction. *Journal of Child Language*, *47*(2), 418-434. https://doi.org/10.1017/S0305000919000710

Juel, C., Griffith, P. L., & Gough, P. B. (1986). Acquisition of literacy: A longitudinal study of children in first and second grade. Journal of Educational Psychology, 78(4), 243–255. https://doi.org/10.1037/0022-0663.78.4.243

Kendeou, P., Bohn-Gettler, C., White, M. J., & van den Broek, P. (2008). Children's inference generation across different media. *Journal of Research in Reading*, *31*(3), 259–272. https://doi.org/10.1111/j.1467-9817.2008.00370.x

Kim, Y.-S. G. (2015). Language and cognitive predictors of text comprehension: Evidence from multivariate analysis. *Child Development*, *86*(1), 128–144. https://doi.org/10.1111/cdev.12293

Kim, Y.-S. G. (2016). Direct and mediated effects of language and cognitive skills on comprehension of oral narrative texts (listening comprehension) for children. *Journal of Experimental Child Psychology*, *141*, 101–120. https://doi.org/10.1016/j.jecp.2015.08.003

Kim, Y.-S. G. (2017). Why the simple view of reading is not simplistic: Unpacking component skills of reading using a direct and indirect effect model of reading (DIER). *Scientific Studies of Reading*, *21*(4), 310–333. https://doi.org/10.1080/10888438.2017.1291643

Kim, Y.-S. G. (2020a). Hierarchical and dynamic relations of language and cognitive skills to reading comprehension: Testing the direct and indirect effects model of reading (DIER). *Journal of Educational Psychology*, *112*(4), 667–684. https://doi.org/10.1037/edu0000407

Kim, Y.-S. G. (2020b). Theory of mind mediates the relations of language and domain-general cognitions to discourse comprehension. *Journal of Experimental Child Psychology*, *194*, 104813. https://doi.org/10.1016/j.jecp.2020.104813

Kim, Y.-S. G. (2023). Dimensionality of comprehension and retell of narrative and informational texts, and the relations of language and cognitive skills to identified dimensions. Manuscript submitted for publication.

Kim, Y.-S. G., Dore, R., Cho, M., Golinkoff, R., & Amendum, S. J. (2021). Theory of mind, mental state talk, and discourse comprehension: Theory of mind process is more important for narrative comprehension than for informational text comprehension. *Journal of Experimental Child Psychology*, *209*, 105181. https://doi.org/10.1016/j.jecp.2021.105181

Kim, Y.-S. G., & Graham, S. (2022). Expanding the Direct and Indirect Effects Model of Writing (DIEW): Reading–writing relations, and dynamic relations as a function of measurement/dimensions of written composition. *Journal of Educational Psychology*, *114*(2), 215–238. https://doi.org/10.1037/edu0000564

Kim, Y.-S. G., Kang, J. Y., & Pan, B. A. (2011). The relationship between children's spontaneous utterances during joint bookreading and their retellings. *Journal of Early Childhood Literacy*, *11*(3), 402–422. https://doi.org/10.1177/1468798411409301

Kim, Y.-S. G., & Phillips, B. (2014). Cognitive correlates of listening comprehension. *Reading Research Quarterly*, *49*(3), 269–281. https://doi.org/10.1002/rrq.74

Kim, Y.-S. G., & Schatschneider, C. (2017). Expanding the developmental models of writing: A direct and indirect effects model of developmental writing (DIEW). *Journal of Educational Psychology*, *109*(1), 35–50. https://doi.org/10.1037/edu0000129

Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction-integration model. *Psychological Review*, *95*(2), 163–182. https://doi.org/10.1037/0033-295X.95.2.163

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling* (3rd ed.). Guilford Press.

Kormos, J., & Trebits, A. (2011). Working memory capacity and narrative task performance. In P. Robinson (Ed.), *Task-Based Language Teaching* (Vol. 2, pp. 267–286). John Benjamins Publishing Company. https://doi.org/10.1075/tblt.2.17ch10

Language and Reading Research Consortium. (2017). Oral language and listening comprehension: Same or different constructs? *Journal of Speech, Language & Hearing Research*, *60*(5), 1273–1284. https://doi.org/10.1044/2017_JSLHR-L-16-0039

Language and Reading Research Consortium, Currie, N. K., & Muijselaar, M. M. L. (2019). Inference making in young children: The concurrent and longitudinal contributions of verbal working memory and vocabulary. *Journal of Educational Psychology*, *111*(8), 1416–1431. http://dx.doi.org/10.1037/edu0000342

Lepola, J., Kajamies, A., Laakkonen, E., & Niemi, P. (2020). Vocabulary, metacognitive knowledge and task orientation as predictors of narrative picture book comprehension:

From preschool to grade 3. *Reading and Writing*, *33*(5), 1351–1373. https://doi.org/10.1007/s11145-019-10010-7

Lepola, J., Lynch, J., Laakkonen, E., Silvén, M., & Niemi, P. (2012). The role of inference making and other language skills in the development of narrative listening comprehension in 4-6-year-old children. *Reading Research Quarterly*, *47*(3), 259–282. https://doi.org/10.1002/rrq.020

Loban, W. (1976). *Language development: Kindergarten through grade twelve* (NCTE Committee on Research Report No. 18). National Council of Teachers of English. https://eric.ed.gov/?id=ED128818

Lonigan, C. J., & Milburn, T. F. (2017). Identifying the dimensionality of oral language skills of children with typical development in preschool through fifth grade. *Journal of Speech, Language & Hearing Research*, *60*(8), 2185–2198. https://doi.org/10.1044/2017_JSLHR-L-15-0402

MacWhinney, B. (2000). *The CHILDES project: Tools for analyzing talk.* (3rd ed.). Lawrence Erlbaum Associates.

Mahy, C. E. V., Bernstein, D. M., Gerrard, L. D., & Atance, C. M. (2017). Testing the validity of a continuous false belief task in 3- to 7-year-old children. *Journal of Experimental Child Psychology*, *160*, 50–66. https://doi.org/10.1016/j.jecp.2017.03.010

McNamara, D. S., & Magliano, J. (2009). Chapter 9 Toward a Comprehensive Model of Comprehension. In *Psychology of Learning and Motivation* (Vol. 51, pp. 297–384). Academic Press. https://doi.org/10.1016/S0079-7421(09)51009-2

Miller, J., & Iglesias, A. (2012). *Systematic analysis of language transcripts (SALT)* (research version 2012) [Computer software]. SALT Software, LLC.

Milligan, K., Astington, J. W., & Dack, L. A. (2007). Language and theory of mind: Meta-analysis of the relation between language ability and false-belief understanding. *Child Development*, *78*(2), 622–646. https://doi.org/10.1111/j.1467-8624.2007.01018.x

Montgomery, J. W., Polunenko, A., & Marinellie, S. A. (2009). Role of working memory in children's understanding spoken narrative: A preliminary investigation. *Applied Psycholinguistics*, *30*(3), 485–509. https://doi.org/10.1017/S0142716409090249

Morra, S., & Camba, R. (2009). Vocabulary learning in primary school children: Working memory and long-term memory components. *Journal of Experimental Child Psychology*, *104*(2), 156–178. https://doi.org/10.1016/j.jecp.2009.03.007

Muthén, B., & Muthén, L. (1998). *Mplus*. Chapman and Hall/CRC.

Pinto, G., Tarchi, C., Accorti Gamannossi, B., & Bigozzi, L. (2016). Mental state talk in children's face-to-face and telephone narratives. *Journal of Applied Developmental Psychology*, *44*, 21–27. https://doi.org/10.1016/j.appdev.2016.02.004

Roth, F. P., Speece, D. L., & Cooper, D. H. (2002). A longitudinal analysis of the connection between oral language and early reading. *The Journal of Educational Research*, *95*(5), 259–272. https://doi.org/10.1080/00220670209596600

Ruffman, T., Slade, L., & Crowe, E. (2002). The relation between children's and mothers' mental state language and theory-of-mind understanding. *Child Development*, *73*(3), 734–751. https://doi.org/10.1111/1467-8624.00435

Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.), *Latent variables analysis: Applications for developmental research* (pp. 399-419). Thousand Oaks, CA, US: Sage Publications, Inc.

Snow, C. E., Tabors, P. O., Nicholson, P. A., & Kurland, B. F. (1995). SHELL: Oral language and early literacy skills in kindergarten and first-grade children. *Journal of Research in Childhood Education*, *10*(1), 37–48. https://doi.org/10.1080/02568549509594686

Stephenson, K. A., Parrila, R. K., Georgiou, G. K., & Kirby, J. R. (2008). Effects of home literacy, parents' beliefs, and children's task-focused behavior on emergent literacy and word reading skills. *Scientific Studies of Reading*, *12*(1), 24–50. https://doi.org/10.1080/10888430701746864

Stevens, C., Sanders, L., & Neville, H. (2006). Neurophysiological evidence for selective auditory attention deficits in children with specific language impairment. *Brain Research*, *1111*(1), 143–152. https://doi.org/10.1016/j.brainres.2006.06.114

Strasser, K., & Río, F. del. (2014). The role of comprehension monitoring, theory of mind, and vocabulary depth in predicting story comprehension and recall of kindergarten children. *Reading Research Quarterly*, *49*(2), 169–187. https://doi.org/10.1002/rrq.68

Swanson, J. M., Schuck, S., Porter, M. M., Carlson, C., Hartman, C. A., Sergeant, J. A., Clevenger, W., Wasdell, M., McCleary, R., Lakes, K., & Wigal, T. (2012). Categorical and dimensional definitions and evaluations of symptoms of ADHD: History of the SNAP and SWAN rating scales. *The International Journal of Educational and Psychological Assessment*, *10*(1), 51–70.

Symons, D. K., Peterson, C. C., Slaughter, V., Roche, J., & Doyle, E. (2005). Theory of mind and mental state discourse during book reading and story-telling tasks. *British Journal of Developmental Psychology*, *23*(1), 81–102. https://doi.org/10.1348/026151004X21080

Tompkins, V., Blosser, M. K., & Downing, M. (2020). False belief understanding and narrative comprehension in the preschool years. *Cognitive Development*, *56*, 100936. https://doi.org/10.1016/j.cogdev.2020.100936

Tompkins, V., Guo, Y., & Justice, L. M. (2013). Inference generation, story comprehension, and language skills in the preschool years. *Reading and Writing*, *26*(3), 403–429. https://doi.org/10.1007/s11145-012-9374-7

Unsworth, N., & Engle, R. W. (2007). The nature of individual differences in working memory capacity: Active maintenance in primary memory and controlled search from secondary memory. *Psychological Review*, *114*(1), 104–132. http://dx.doi.org/10.1037/0033-295X.114.1.104

Verhagen, J., & Leseman, P. (2016). How do verbal short-term memory and working memory relate to the acquisition of vocabulary and grammar? A comparison between first and second language learners. *Journal of Experimental Child Psychology*, *141*, 65–82. https://doi.org/10.1016/j.jecp.2015.06.015

Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development*, *72*(3), 655–684. https://doi.org/10.1111/1467-8624.00304

Woodcock, R. W., McGrew, K. S., & Mather, N. (2001). *Woodcock–Johnson III Tests of Achievement*. Itasca, IL: Riverside.

CHAPTER 4

Summary and Conclusions

This dissertation examined second graders' oral discourse production by conducting three studies using linguistic and discourse features generated from picture description tasks by 330 second grade students (53%) from the Southeastern part of the United States (see Kim, 2017). Study 1 examined the various linguistic and discourse cues that illustrated the extent to which primary grade students use their discourse knowledge in their oral discourse production. Study 2 investigated the dimensionality of oral discourse production, showing that the linguistic and discourse features in oral discourse production is best described as having an underlying general oral discourse production factor as well as the specific linguistic and discourse feature factors. Study 3 looked into the structural relations of oral language skills in their contributions to oral discourse production and found that domain-general cognitive skills and foundational language skills support oral discourse production by making an indirect contribution through the higher order cognitive skill of inference. Overall, this dissertation research makes an important contribution to the field regarding children's oral language development. The extensive and in-depth examination of oral discourse production in second grade students yields insights into children's growing discourse knowledge as well as language and cognitive skills.

While this dissertation research advanced the discussion around primary grade children's oral discourse production, there are several limitations to be noted to inform future research directions. To begin with, the examination of oral discourse production was limited to the discourse context of picture description. Although various kinds of oral responses could be elicited through picture descriptions, the prompt asking for descriptions may have restricted children's higher order thinking beyond simple descriptions. Therefore, findings in the studies

may not generalize to other discourse contexts such as narrative (e.g., story generation, story retelling) and opinion genres, and future studies are encouraged to explore children's use of oral discourse production in diverse tasks and genres. Second, the linguistic and discourse features identified in this research are by no means comprehensive or incontestable. Thus, additional or alternative features beyond the currently identified ones may be incorporated into future research. For this, researchers should use their discretion in the selection and identification of the linguistic and discourse features based on theoretical rationale. Lastly, this research exclusively examined second graders' performance on their oral production. As children in early primary grades are rapidly growing in their oral discourse language through exposure to various discourse contexts (Rowe & Weisleder, 2020), the current findings with second graders may not generalize to younger or older children. Therefore, future research can look into different grade levels and further conduct longitudinal analysis of the development of various aspects of oral discourse production.

Despite these limitations, this dissertation research contributed to enhancing our understanding of early elementary grade students' oral discourse production. The findings of the studies are unique in that they highlighted children's growing discourse knowledge, distinctness of discourse-level feature, and the contributions of higher-order thinking skills to oral discourse production (Curenton & Justice, 2008; Kim, 2020; Kintsch, 1988). The ability to adjust one's language according to the discourse context becomes crucial and necessary as early as in primary grades, and such skill will only become more important as students grow to be exposed to various discourse contexts in their everyday, academic, and professional lives (Rowe & Weisleder, 2020). The role of language skills and linguistic features in oral discourse production are also not to be neglected, as they serve as the foundation for portraying one's thinking skills

and knowledge of discourse context (Cho et al., 2022; Kim, 2020). In all, the combination of language and cognitive skills contribute to oral discourse language, which further contributes to written discourse skills such as reading comprehension and written composition (Kim & Schatschneider, 2017). Thereby, researchers, teachers, and educators should look into cultivating not only language skills but also thinking skills and discourse knowledge by providing instruction on adjusting language according to one's understanding of the situation demands of the discourse context from early on. This dissertation research takes a meaningful step in underscoring the importance of attending to multiple linguistic and discourse-level skills for children's oral language development.

References

Cho, M., Kim, Y.-S. G., & Wang, J. (2022). Perspective taking and language use in secondary students' text-based analytical writing. *Scientific Studies of Reading*. https://doi.org/10.1080/10888438.2022.2132864

Curenton, S. M., Craig, M. J., & Flanigan, N. (2008). Use of decontextualized talk across story contexts: How oral storytelling and emergent reading can scaffold children's development. *Early Education and Development*, *19*(1), 161–187. https://doi.org/10.1080/10409280701839296

Kim, Y.-S. G. (2017). Why the simple view of reading is not simplistic: Unpacking component skills of reading using a direct and indirect effect model of reading (DIER). *Scientific Studies of Reading*, *21*(4), 310–333. https://doi.org/10.1080/10888438.2017.1291643

Kim, Y.-S. G. (2020). Hierarchical and dynamic relations of language and cognitive skills to reading comprehension: Testing the direct and indirect effects model of reading (DIER). *Journal of Educational Psychology*, *112*(4), 667–684. https://doi.org/10.1037/edu0000407

Kim, Y.-S. G., & Schatschneider, C. (2017). Expanding the developmental models of writing: A direct and indirect effects model of developmental writing (DIEW). *Journal of Educational Psychology*, *109*(1), 35–50. https://doi.org/10.1037/edu0000129

Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction-integration model. *Psychological Review*, *95*(2), 163–182. https://doi.org/10.1037/0033-295X.95.2.163

Rowe, M. L., & Weisleder, A. (2020). Language development in context. *Annual Review of Developmental Psychology*, *2*(1), 201–223. https://doi.org/10.1146/annurev-devpsych-042220-121816

APPENDIX A

Picture Description Task

The child will describe each picture twice, once in a contextualized condition and the other in a decontextualized condition. Note that the order of the condition will vary by group.

Picture 1: Girl in chair

- Decontextualized condition

Script: “Picture 1. I am going to show you a picture. Look at the picture carefully. I want you to pretend that you are describing the picture to a friend that cannot see the picture. Pretend the friend will listen to your description on the tape recorder later, [show the audio-recorder to the student] so please describe this picture in a way that your friend could draw the picture just by listening to your description of the picture.”

- Contextualized condition

Script: “Keep looking at the same picture. Now, I would like you to describe the picture to me. Tell me as much about the picture as you can.”

Picture 2: Girl with Crayons

- Contextualized condition

Script: “Picture 2. I am going to show you a different picture. Look at the picture carefully because I would like you to describe the picture to me. Tell me as much about the picture as you can.”

- Decontextualized condition

Script: “Keep looking at the same picture. Now, I want you to pretend that you are describing the picture to a friend that cannot see the picture. Pretend the friend will listen to your description on the tape recorder later, [show the audio-recorder to the student] so please describe this picture in a way that your friend could draw the picture just by listening to your description of the picture.”

Picture 3: Cow

- Decontextualized condition

Script: “Picture 3. I am going to show you a different picture. Look at the picture carefully. I want you to pretend that you are describing the picture to a friend that cannot see the picture. Pretend the friend will listen to your description on the tape recorder later, [show the audio-recorder to the student] so please describe this picture in a way that your friend could draw the picture just by listening to your description of the picture.”

- Contextualized condition

Script: “Keep looking at the same picture. Now, I would like you to describe the picture to me. Tell me as much about the picture as you can.”