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Relationships between preschoolers' oral language and phonological awareness

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Abstract

This study examines the relationship between complex oral language and phonological awareness in the preschool years. Specifically, the authors investigate the relationship between concurrent measures of oral narrative structure (based on measures of both story retell and generation), and measures of blending and elision in a sample of 89 children between 4 and 6 years of age. A hierarchical linear regression was conducted to determine whether oral narrative structure explained unique variance in skill in

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blending and elision over and above that explained by vocabulary and after controlling for a number of factors known to contribute to phonological awareness outcomes (age, nonverbal reasoning ability, phonological memory, letter knowledge, word reading). The results of the study support the authors' hypothesis of an association between narrative structure and phonological awareness, and between vocabulary and phonological awareness. The findings are interpreted within a theoretical framework that posits that common structural and processing demands underlie oral narrative discourse and phonological awareness.

Keywords
Emergent literacy, oral narrative discourse, phonological awareness, vocabulary

The emergent literacy framework is predicated on the assumption that children come to the formal school setting with knowledge, skills, and attitudes that set the stage for the eventual mastery of conventional forms of literacy (Storch & Whitehurst, 2002; Teale & Sulzby, 1986; Whitehurst & Lonigan, 1998). Researchers identify two statistically distinct strands of knowledge that emerge in the preschool years to support the acquisition of conventional literacy (National Institute of Child Health and Human Development [NICHD] Early Child Care Research Network, 2005). The first of these is a range of code-related skills comprising awareness of the conventions of print, alphabet knowledge, letter and name writing ability, letter-sound knowledge, and phonological awareness (Storch & Whitehurst, 2002; Whitehurst & Lonigan, 1998). Previous research attests to the wide variety of home language and literacy experiences that promote these skills (Levya, Reese, & Wiser, 2011; Sparks & Reese, 2012).

There is general agreement that emergent literacy skills are implicated in the initial print-driven phase of literacy acquisition (Lonigan, Burgess, & Anthony, 2000; National Early Literacy Panel [NELP], 2008). In particular, the critical role played by phonological awareness in the acquisition of decoding skill has received considerable attention in the empirical literature (Ehri et al., 2001; Share, 1995; Torgesen et al., 1999). Phonological awareness refers to the ability to attend to, isolate, and manipulate the sound structure of oral language (Wagner, Torgesen, & Rashotte, 1999). Research demonstrates a progression in the order in which children acquire phonological awareness, such that awareness of larger speech segments (words, syllables) precedes awareness of smaller segments (onset-rimes, phonemes) (Goswami, 1999; Lonigan, Burgess, Anthony, & Baker, 1998; Schuele & Boudreau, 2008).

The second strand of knowledge emerging in the preschool years that supports conventional literacy is oral language. Oral language encompasses receptive and expressive vocabulary, knowledge of morpho-syntax, and narrative discourse, defined as the ability to understand and tell stories (Pellegrini & Galda, 1993). Research has demonstrated a predictive relationship between preschool oral language skills and reading comprehension in the middle elementary grades, by which time decoding skills are typically well on their way to becoming automated and reading shifts from a predominantly print-driven

endeavor to a meaning-making endeavor (Griffin, Hemphill, Camp, & Wolf, 2004; NELP, 2008; Storch & Whitehurst, 2002).

It is widely acknowledged among researchers that code-related skills that emerge in the preschool years are anchored in oral language (Dickinson & Tabors, 2001; NICHD Early Child Care Research Network, 2005; Storch & Whitehurst, 2002). In particular, growth in phonological awareness has been linked to growth in vocabulary in preschool children (Carroll, Snowling, Hulme, & Stevenson, 2003; Lonigan, 2007; McDowell, Lonigan, & Goldstein, 2007). The lexical restructuring model has been proposed to account for this relationship. The model posits that phonological representations become more fully specified as breadth of vocabulary increases in order to avoid confusion of similar sounding lexical items (Metsala, 1999). Beyond vocabulary, however, relatively little is known about the specific oral language skills that support the development of phonological awareness in the early years. This gap in the research literature was noted in the NELP's (2008) report, leading the authors to recommend more 'careful study' (p. 78) of the role of a broader range of oral language skills in early reading development. The recommendation was motivated by research evidence suggesting that preschool complex oral language skills, such as narrative discourse skills, have more substantial predictive relations with both decoding and reading comprehension in the initial learning-to-read phase than does vocabulary. In the present study, we sought to determine whether a similar relationship existed at an earlier point in the development of reading. Therefore, we investigated whether a particular preschool complex oral language competency (i.e., oral narrative discourse) predicted concurrent phonological awareness outcomes, after controlling for a number of variables known to contribute to skill in phonological awareness. Specifically, we aimed to determine whether narrative story structure explained variance in skill in blending and elision, over and above that explained by vocabulary. Knowledge of the ways specific complex oral language competencies support the emergence of phonological awareness could potentially enhance our understanding of the processes that drive the development of reading in its earliest stages. Moreover, an understanding of the possible interplay between particular aspects of complex oral language and phonological awareness in the preschool years could directly inform early childhood educational and clinical practice.

From a theoretical perspective, the work of Bialystok (1986, 1993, 1999) provides a framework to support an association between narrative story structure and phonological awareness. The framework is premised on two assumptions: (a) that metalinguistic awareness is continuous with children's developing language proficiency, an assumption corroborated by empirical data (e.g., Chaney, 1992; Farrar, Ashwell, & Maag, 2005); and (b) that common underlying cognitive processes, referred to as representational analysis and cognitive control, support all language use (Bialystok, 1993). Representational analysis refers to the ability to represent the structure of language; cognitive control refers to the ability to attend to relevant aspects of a representation in problem solving. These processes work in tandem to enable children to progress along the language continuum from simple, contextualized conversation, to complex decontextualized discourse, to the highly analyzed language that is required for metalinguistic tasks (Bialystok, 1999). Phonological awareness tasks, which require children to selectively attend to the sound

structure of language while disregarding meaning, place particularly high demands on both representational analysis and cognitive control.

Storytelling, like phonological awareness, requires selective attention to structure insofar as successful storytelling is dependent on the narrator's attention to story structure (McKeough, Tourigny, Bird, & Romaine, 2008). In the research literature, attention to story structure is assessed in terms of the narrator's ability to incorporate the discrete elements of story grammar (e.g., character, setting, problem, resolution) into a storytelling to produce an organizationally coherent whole that adequately conveys the temporal sequencing of actions and events and the causal relationships among them (Mandler & Johnson, 1977; Stein, 1982; Stein & Albro, 1997). Thus, it is possible that children's narrative skill reflects their awareness of large-segment, discourse-level language structure. Furthermore, the emergence of narrative discourse skill precedes that of phonological awareness (Roth, 2009; Schuele & Boudreau, 2008). This developmental progression, in conjunction with their structural parallels and common processing demands, raises the possibility that large-segment awareness implied by narrative skill may contribute to the emergence of awareness of the smaller sound segments of language tapped by tasks of later developing phonological awareness. The influence of larger-segment awareness on later developing smaller-segment awareness has been demonstrated in the literature within the domain of phonological awareness (Goswami, 1999; Lonigan et al., 1998; Schuele & Boudreau, 2008). It has also been demonstrated empirically across the domains of vocabulary and phonological awareness (e.g., Metsala, 1999; Walley, Metsala, & Garlock, 2003). We propose a similar influence across the domains of narrative discourse and phonological awareness.

A relatively small body of research has examined the interrelationships between broad measures of oral language and phonological awareness in the years prior to formal reading instruction (Chaney, 1992, 1994; Cooper, Roth, Speece, & Schatschneider, 2002; Lonigan et al., 2000; NICHD Early Child Care Research Network, 2005; Snow, Tabors, Nicholson, & Kurland, 1995). For example, Chaney (1992, 1994) found that performance on the Preschool Language Scale, a standardized, comprehensive test of receptive and expressive language, predicted concurrent scores on a composite phonological awareness measure in a sample of typically developing 3-year-old children. Working with a slightly older sample, Cooper et al. (2002) reported that kindergarten general oral language skill, a composite made up of expressive and receptive vocabulary, syntax, and morphology, accounted for significant, unique variance in scores on a concurrent measure of phonological awareness comprising blending and elision. In a large-scale study conducted by the NICHD Early Child Care Research Network (2005), a comprehensive measure of language examining skill in syntax, morphology, vocabulary, and communicative ability was administered to children at 36 months of age. Performance on the comprehensive language measure was found to predict phonological awareness, as measured by a word completion task, at 54 months.

Taken together, these studies provide preliminary evidence that preschool oral language may exert a significant influence on the development of phonological awareness. However, since composite measures tapping a broad range of oral language skills were used, it is difficult to tease apart the contribution of component skills. In addition, because vocabulary was a component of the composite measures used in some of these studies,

little clear evidence is available to quantify the contribution of complex oral language to the development of phonological awareness, over and above the well-documented contribution of vocabulary. To date, we are aware of only two studies that have examined the relation between phonological awareness and complex oral language competency. In a study involving verbally precocious infants and toddlers, Dale, Crain-Thoreson, and Robinson (1995) found that mean length of utterance (MLU) of a spontaneous language sample at 24 months predicted outcomes on a phoneme deletion task at 4.5 years. Similarly, Farrar et al. (2005) found that among typically developing preschoolers, MLU at 27 months was significantly correlated with rhyme awareness at 4 years, after controlling for vocabulary. Taken together, these studies suggest that grammatical complexity may be implicated in the development of phonological awareness.

Recently, research has examined the predictive relationship between preschool narrative discourse, and concurrently developing skill in phonological awareness. Narrative discourse represents an important domain of complex oral language that has been shown to relate to general academic and reading achievement in older children, as well as to early mathematical ability (Cain & Oakhill, 1996; Catts, Fey, Zhang, & Tomblin, 1999; Feagans & Appelbaum, 1986; Griffin et al., 2004; Justice, Bowles, Pence, & Gosse, 2010; O'Neill, Pearce, & Pick, 2004). In the research literature, one of two procedures is typically used to elicit an oral narrative. In story retell, an experimenter narrates a story before requiring the child to retell the same story. In story generation (or storytelling) children are instructed to compose their own story based on a prompt, a series of illustrations, or a wordless picture book. The results reported in the current study are based on both story retell and generation tasks.

A relatively small body of empirical work has examined the relationship between narrative discourse and phonological awareness in the preschool years (Kendeou, van den Broek, White, & Lynch, 2009; Lynch et al., 2008; Storch & Whitehurst, 2002; Tabors, Roach, & Snow, 2001). In their study, Tabors et al. (2001) reported a small but significant correlation between narrative production and a composite emergent literacy measure that included phonological awareness. Storch and Whitehurst (2002) used structural equation modeling to map the relationship between performance on an oral language measure comprised of receptive and expressive vocabulary and narrative retell, and a measure of print-related skills that included word segmentation and rhyme identification. Their final model posited direct, concurrent paths between oral language and code-related skills in pre-kindergarten and kindergarten. More recently, Lynch et al., (2008) found small but statistically significant correlations between the accuracy of responses to comprehension questions, a measure of narrative discourse comprehension, and initial sound recognition in their sample of 4-year-old preschool children. Finally, Kendeou et al. (2009) reported that at age 4, oral language skills (a composite comprised of receptive vocabulary and narrative retell) predicted a significant proportion of variance in initial sound recognition. Taken together, these studies provide evidence of a potential association between narrative discourse and phonological awareness in the years preceding formal literacy instruction. However, with the exception of the Lynch et al. (2008) study, they use composite measures that fail to isolate the specific contribution of narrative discourse. This limitation highlights the need for more research in this area. The purpose of the present study, therefore, was to investigate the relationship between measures of oral narrative

discourse and phonological awareness. To do so, hierarchical linear regression was used to examine associations among concurrent measures of vocabulary, narrative story structure derived from oral narrative retell and narrative generation tasks, and blending and elision among a sample of 4- and 5-year-old children.

The current study

The study asked whether oral language abilities contribute to the prediction of skill in phonological awareness. We assessed 4- and 5-year-old children's expressive vocabulary and narrative discourse skill, as well as skill in blending and elision. Blending involves combining discrete units of sound to create words. Elision involves deleting discrete units of sound from words to create new words. Two narrative retells measures were used, one standardized, the other experimental. An experimental narrative generation measure was also administered. The decision to assign narrative as an independent variable and phonological awareness as the dependent variable was based on empirical considerations. First, since previous research has demonstrated an effect of segment size on the development of phonological awareness (Schuele & Boudreau, 2008), we expected larger-segment, discourse-level awareness to support the emergence of smaller-segment phonological awareness. Second, the direction of influence between oral language and code-related emergent literacy skills has been argued to flow from the former to the latter since oral language skills develop earlier than code-related skills (Storch & Whitehurst, 2002). Indeed, previous studies that examined the relationship between narrative discourse and phonological awareness have assumed this direction of influence (Kendeou et al., 2009; Storch & Whitehurst, 2002). However, it is important to keep in mind that the direction of the relationship could be opposite to that which is proposed and remains to be determined by future research.

Based on the results of previous studies relating narrative discourse and phonological awareness (e.g., Kendeou et al., 2009; Storch & Whitehurst, 2002), we hypothesized that a specific aspect of kindergarten narrative discourse (story structure) would make a significant contribution to the prediction of concurrent skill in blending and elision. Story structure is captured in scores reflecting the inclusion of story grammar elements in a narration. More specifically, it was hypothesized that children's ability to incorporate the elements of story grammar into their narrations would account for variance in outcomes on tasks of blending and elision, over and above vocabulary.

Method

Participants

A total of 89 children (47 females) between 46 and 71 months (M = 57.83, SD = 6.52) participated in the study. The children were part of a larger research project examining the efficacy of a professional development program for preschool educators. This study enrolled 129 children. Twenty-eight children were excluded from the current analysis because their parents reported that a language other than English was heard and spoken most often by the child in the home, three were excluded because they were in childcare for the full day, and nine were excluded because they did not tell all three stories.

Table 1. Summary characteristics of the participants.

Child characteristic	Min.–max.	*M* (*SD*)
Age in months	46–71	57.83 (6.52)
Nonverbal reasoning SS	75–130	102.53 (11.61)
Expressive vocabulary SS	61–145	96.57 (14.76)
		Median
Maternal education	0–7	5
Frequency storybook reading	0–4	2
Gender	*n*	
Male	42	
Female	47	
Grade		
Junior kindergarten (4 yrs)	45	
Senior kindergarten (5 yrs)	44	
Home language exposure		
English only	49	
English + other language	40	

Notes: A median maternal education score of 5 corresponds to a 2-year, post-secondary diploma. A median frequency score of 2 for storybook reading corresponds to four to six times/week.

The data reported in this study were collected in late fall, prior to the program implementation. The study received necessary ethical approval prior to the commencement of recruitment of subjects. Informed consent to participate was received from the parents of all children and verbal assent was received from each child at the time of testing. A summary of the participant characteristics is given in Table 1.

All children were recruited through the childcare centers in which they spent one half of their day. The other half of their day was spent in junior or senior kindergarten classrooms. Junior (JK) and senior kindergarten (SK) programs are publicly funded, play-based, early learning programs that implement government mandated curricula targeting specific learning outcomes. Junior kindergarten is intended for 4-year-olds, while senior kindergarten is intended for 5-year-olds. The educators responsible for recruiting the children completed a shortened version of the Speech and Language Assessment Scale (SLAS) (Hadley & Rice, 1993) to evaluate the children's receptive and expressive language skills. All children in the sample received a rating of 3 or above (i.e., normal development) on the SLAS, indicating typical language development.

As part of the recruitment process, the parents completed a questionnaire requesting demographic information, including maternal education level and detailed information about the home language and literacy environment. Maternal education was rated on an eight-point scale with 0 representing grade 8 or less and 7 a graduate degree. As a measure of the quality of the home literacy environment, the frequency of shared storybook reading in the home was included in the preliminary analyses to determine if home literacy contributed to phonological awareness outcomes. The latter item was scored on a five-point rating scale with 0 representing not at all, 2 representing four to six times/

week, and 4 representing more than once daily. As well, parents were asked to complete a book titles recognition task that was adapted from the work of Sénéchal, LeFevre, Hudson, and Lawson (1996). The task is a measure of parents' knowledge of children's storybooks and is assumed to index child exposure to shared reading in the home (Sénéchal et al., 1996). Parents were given a list of 52 storybook titles (45 real titles and 17 foils), and were asked to check off the titles that they knew to be real. A score was calculated by subtracting the number of foils incorrectly identified as real titles from the number of real titles correctly identified (i.e., total score = number correct – incorrect). Finally, 45% of parents reported that their child had some exposure to a language other than English at home. However, all parents identified English as the language their child heard and spoke the most (i.e., at least 75% and 90% of the time, respectively). The ethnic composition of the sample was as follows: 38% Caucasian, 20% Asian, 18% African heritage, 14% Southeast Asian, 7% Hispanic, and 3% Arabic.

Measures

The children were tested individually on a battery of language and literacy measures in two separate sessions lasting approximately 30 minutes each. The order of presentation of the tests within each session was fixed; however, the order in which the two sessions were conducted was random. Trained research assistants who were blind to the design and broader goals of the study tested all children in their childcare setting.

Nonverbal reasoning ability. The Matrices subtest of the Kaufman Brief Intelligence Test, Second Edition, (KBIT-2) (Kaufman & Kaufman, 2004) was administered to obtain a measure of nonverbal intelligence. The test requires children to choose one of five pictures that is associated with a stimulus picture or to complete 2 × 2 analogies presented in the form of illustrations/figures (e.g., bird is to cage as fish is to aquarium).

Phonological memory. The Memory for Digits subtest of the Comprehensive Test of Phonological Processing (CTOPP) (Wagner et al., 1999) was used as a test of verbal memory. The experimenter orally presented strings of numbers of increasing length. The children were asked to repeat them in the order in which they were heard. The strings ranged in length from two to eight digits.

Alphabet knowledge. The Alphabet Knowledge subtest of the Phonological Awareness Literacy Screen (PALS) (Invernizzi, Sullivan, Meier, & Swank, 2004) was used to assess letter-naming ability. The 26 uppercase letters of the alphabet were presented in sequence in a fixed random order. The children were asked to name the letter.

Word reading. The Word Identification subtest of the Woodcock Reading Mastery Test (Woodcock, 1998) was administered according to standardized procedures. The children were required to read isolated words of increasing difficulty.

Phonological awareness. Two tests were used to assess phonological awareness. The Phonological Awareness subtest of the Test of Preschool Early Literacy (TOPEL; Lonigan,

Wagner, Torgesen, & Rashotte, 2007) was administered according to standardized procedures. The test includes measures of blending and elision. The blending task requires children to combine words (e.g., star + fish), onset-rimes (e.g., h + at, f + ox), or individual phonemes (e.g., f + i + sh) spoken by the experimenter to form a single word. For the elision task, children were asked to repeat a word presented by the experimenter. They were then required to delete specified units of sound within the word before saying it again (e.g., saying sunflower without flower, tease without /z/). Scores for phonological awareness represent the number of correct responses on the blending and elision subtests combined. The blending and elision subtests of the Comprehensive Test of Phonological Processing (CTOPP; Wagner et al., 1999) were also administered. The tasks are similar to their TOPEL counterparts, but the majority of items on both required phoneme level analysis. The raw scores of all subtests were combined to create a single phonological awareness score.

Vocabulary. The Expressive One Word Picture Vocabulary Test – III (Brownell, 2000) was administered according to standardized procedures. Children were asked to name a series of illustrations depicting a single object, a category of objects, a single action, or a category of actions. Scores for expressive vocabulary represent the number of items correctly named.

Narrative retell. Two narrative retell measures were administered in separate test sessions. One was a standardized test, the other experimental. The standardized test was the Renfrew Bus Story (Cowley & Glasgow, 1994). This test required that the child look at a series of 12 pictures illustrating a short story that was read aloud by the examiner. The child was then asked to retell the story with the support of the illustrations. The child's story was audiotaped for later transcription. The Bus Story narratives were awarded an information score, as per instructions in the test manual. The information score reflected inclusion of key elements of the story in sequence. Identical procedures were used to elicit a second retell based on the wordless picture book, *Frog, where are you?* (Mayer, 1969). A corresponding story script, available on the Systematic Analysis of Language Transcripts (SALT) website, was used to elicit the retell. Both the story and script were shortened to 16 illustrations in view of the young age of the participants. A scoring scheme was created to capture episodic structure. Points were awarded for the inclusion of specific information reflecting the elements of story grammar. Mention of characters, settings, internal responses, and reactions was awarded one point. Mention of initiating events, attempts, and consequences was awarded a maximum of two points. The scoring scheme appears in Appendix 1.

Narrative generation. Children's oral narrative skills were also assessed using a story generation task. In order to elicit a narrative, the children were presented with the wordless picture book *One frog too many* (Mayer & Mayer, 1975), which was shortened to 16 pages due to the young age of the children. The children were asked to look carefully at the pictures in the book, after which they were asked to tell their story. The child's story was audio recorded for later transcription by a research assistant. A scoring scheme was created that was parallel to the scoring scheme for the Frog Retell task (see Appendix 2).

Table 2. Descriptive statistics for predictor and outcome variables.

Variable (max.)	Min.	Max.	*M* (*SD*)
Nonverbal reasoning (46)	5	27	14.64 (3.85)
Phonological memory (21)	3	16	9.03 (2.46)
Book titles recognition test (45)	0	23	7.60 (6.01)
Alphabet knowledge (26)	2	26	21.43 (6.66)
Word reading (73)	0	60	5.37 (11.21)
Expressive vocabulary (170)	15	84	48.74 (13.29)
Narrative structure (101)	4	75	41.67 (15.55)
Phonological awareness (67)	0	58	25.44 (11.92)

Note: All scores are raw scores.

Transcription and scoring. A research assistant transcribed all narratives using the SALT software (Miller & Chapman, 2002). Twenty percent were randomly selected and transcribed independently by a second research assistant for reliability purposes. Both research assistants were blind to the objectives of the study. Inter-rater reliability was calculated at the word level and utterance boundary level. Reliability was calculated using the following formula: [number of agreements/(number of agreements + disagreements)] × 100 (Sackett, 1978). The calculation yielded agreement reliability of 86% for words (n = 2406 words) and 93% for utterance boundaries (n = 451 utterances) for the Renfrew Bus Story, 87% for words (n = 2273) and 92% for utterance boundaries (n = 437) for the Frog Retell, and 90% for words (n = 2670) and 92% for utterance boundaries (n = 456) for the Frog Generation.

The narratives were scored for story structure by the first author. Twenty percent were then randomly selected and rescored by a research assistant for reliability purposes. The inter-rater reliability for the Renfrew Bus Story was 93%. The corresponding reliabilities for the Frog Retell and Frog Generation were 93% and 95% respectively.

Results

Descriptive statistics for all dependent and independent variables are presented in Table 2. Preliminary analyses were conducted to determine potential group differences in performance on the basis of language status and gender. A series of independent samples t-tests revealed no statistical differences between children who were exposed exclusively to English in the home and those who were exposed to English and an additional language, on any of the dependent or independent variables, ts(87) = −1.27–.63, ps = .20–.96. Similarly, independent samples t-tests revealed no statistical differences in outcomes based on gender, ts (87) = −.81–.73, ps = .42–.97. Therefore, language exposure and gender were not included as control variables in the regression equations.

Table 3 presents the zero-order correlations of all predictor and outcome variables. Neither maternal education nor the measure of the home literacy environment (i.e., frequency of storybook reading in the home) correlated significantly with the variables of

Table 3. Pearson product moment correlations between predictor and outcome variables.

	1	2	3	4	5	6	7	8	9	10
1. Age	–									
2. MEd	−.08	–								
3. Frequency SBR	−.16	.06	–							
4. Book titles recognition	.02	.14	.39**	–						
5. Nonverbal reasoning	.48**	−.02	−.11	−.00	–					
6. Phonological memory	.38**	.10	.14	.17	.47**	–				
7. Alphabet knowledge	.32**	.11	.06	.02	.24*	.24*	–			
8. Word reading	.44**	.08	−.10	.01	.34**	.31**	.34**	–		
9. Vocabulary	.42**	.13	.16	.27*	.35**	.40**	.34**	.27**	–	
10. Story structure	.54**	−.12	.03	.15	.47**	.34**	.27**	.23**	.67**	–
11. PA	.55**	.06	.12	.10	.56**	.50**	.30**	.54**	.60**	.63**

*$p < .05$; **$p < .01$.
Notes: MEd: maternal education; SBR: shared book reading; PA: phonological awareness.

interest. Thus, maternal education and exposure to storybook reading in the home were excluded from subsequent analyses. The correlation table yielded moderate to strong correlations between the outcome and all other predictor variables (rs = .30–.63) with the exception of the titles recognition checklist score, which yielded only a weak correlation with vocabulary ($r = .27$). The correlations between phonological awareness and vocabulary ($r = .60$) and phonological awareness and narrative story structure were particularly strong ($r = .63$).

The results of the fixed-order hierarchical regression analysis predicting phonological awareness are presented in Table 4.[1] Age, nonverbal reasoning ability, and the book titles recognition score were entered first into the regression equation as control variables in separate steps. Phonological memory, alphabet knowledge, and word reading were entered in that order in each of the subsequent steps since past research has demonstrated an association between each of these domains of competency and blending and elision outcomes (Dickinson, McCabe, Anastasopoulos, Peisner-Feinberg, & Poe, 2003; Ehri et al., 2001; Wagner, Torgesen, & Rashotte, 1994). Finally, vocabulary and narrative structure were entered in that order in the final two steps of the equation. The linear combination of measures was significantly related to phonological awareness, F (7, 81) = 21.16, $p < .001$. The model accounted for 65% of the variance. Age, nonverbal reasoning, phonological memory, word reading, vocabulary, and narrative story structure predicted significant portions of the variance in phonological awareness. Vocabulary accounted for a statistically significant 8% of the variance in phonological awareness outcomes. Narrative story structure, entered last in the equation, accounted for a further 3.6%. Furthermore, the final beta weights revealed that the story structure score made a unique contribution to the prediction equation, $t = 2.88$, $p = .002$, as did expressive vocabulary, $t = 2.04$, $p = .05$, and word reading, $t = 3.81$, $p = .000$. The results of the regression analysis indicate that in the preschool years, children's narrative story structure is uniquely predictive of phonological awareness outcomes over and above the contribution of vocabulary.

Table 4. Regression analysis summary predicting phonological awareness.

Variable	ΔR^2	β	*t*
Age in months	.298**	.046	.514
Book titles recognition	.007	−.027	−.382
Nonverbal reasoning	.118**	.172	2.035*
Phonological memory	.040*	.143	1.785
Alphabet knowledge	.006	−.015	−.211
Word reading	.062**	.295	3.813**
Expressive vocabulary	.080**	.197	2.035*
Narrative structure	.036**	.289	2.875**

*$p < .05$; **$p < .01$.

Discussion

The purpose of the present study was to examine the relationship between vocabulary, narrative discourse, and phonological awareness at a single point in time in 4- and 5-year-old children. We hypothesized that children's larger-segment awareness may support the emergence of awareness of the smaller sound segments of language tapped by tasks of phonological awareness. The results of the study supported our hypothesis. In particular, narrative story structure, a measure that reflected the inclusion of elements of story grammar in storytelling and retelling, was found to make a significant and unique contribution to concurrent skill in blending and elision, over and above the contribution of vocabulary, after controlling for a number of relevant variables. Both expressive vocabulary and narrative story structure were shown to account for unique variance in phonological awareness outcomes, suggesting that although the two were strongly intercorrelated ($r = .67$), the contribution of each to skill in blending and elision was somewhat distinct. The results of the current study, therefore, corroborate previous studies relating lexical-level knowledge to sublexical phonological awareness skills (e.g., Metsala, 1999). At the same time, they extend previous findings by demonstrating a similar relationship between discourse-level and sublexical-level skills. To our knowledge, this study is unique in demonstrating such a relationship and in teasing apart the contributions of lexical and discourse-level oral language measures to phonological awareness outcomes.

The current findings are consistent with the widely held position that the two strands of knowledge that comprise emergent literacy, oral language and code-related skills, are interrelated in the preschool years. More importantly, they indicate that the strong relationship between preschool complex language and early conventional reading outcomes suggested by the work of the NELP (2008) may be rooted in a similar relationship between complex language and the precursor skills of conventional literacy that emerge prior to formal instruction. In particular, our findings point to the possibility that preschool oral narrative discourse may play an explanatory role in concurrent skill in phonological awareness, the precursor skill most closely associated with early reading achievement.

At the same time, our results are consistent with findings of previous studies that reported a predictive relationship between broad measures of oral language, some of which included a measure of narrative discourse, and phonological awareness in the

preschool years (e.g., Cooper et al., 2002; Kendeou et al., 2009; Storch & Whitehurst, 2002). Motivated by the call for 'careful study' (NELP, 2008, p. 78) of the role of complex oral language in early reading achievement recommended by the NELP (2008), the current study extended the work of previous studies by clarifying the relationships among vocabulary, narrative discourse, and phonological awareness. By examining relationships between specific skills through the use of single-construct measures of oral language rather than composite measures that encompass a range of linguistic competencies, it is possible to draw more fine-grained conclusions about the interplay between particular components of the two strands of emergent literacy skills.

Knowledge of the ways specific components of complex oral language support the emergence of phonological awareness has the potential to enhance our understanding of the processes that drive the development of reading in its earliest stages. Our results suggest that the influence of larger-segment awareness on smaller-segment awareness that has been demonstrated in the literature within the domain of phonological awareness (e.g., Schuele & Boudreau, 2008) and across the domains of vocabulary and phonological awareness (e.g., Metsala, 1999), may be at work across the domains of narrative discourse and phonological awareness. Moreover, the contribution of narrative structure was found to be significant, over and above that of vocabulary. These findings suggest that a comprehensive model describing the development of emergent literacy skills should take into account the role of oral language competency at the discourse level, as well as at the lexical level.

What are the cognitive underpinnings of the relationship between storytelling ability and phonological processing? It is evident that much more work needs to be done in an effort to fully answer this question. However, the work of Bialystok (e.g., Bialystok, 1999) provides a useful theoretical framework within which to interpret the results of the current study. The framework places both storytelling and phonological awareness on the higher end of the language-use continuum, and suggests that the structural parallels between the two, in conjunction with the common demands they place on the processing skills of representational analysis and control of attention, may account for the relationship between them.

An alternative, perhaps complementary, theory that explains the current findings posits that the cognitive processes underlying the two tasks may be largely grounded in reasoning relating parts to a whole (Devlin, 2000, cited in O'Neill et al., 2004). Tasks tapping phonological awareness require the child to consider the various components of the lexical item in isolation (be they syllables, onset-rimes, phonemes), as well as in relationship to one another. In the case of phonological awareness, the relationship between the component parts is primarily temporal. Similarly, story (re)telling tasks require the child to consider the constituent elements of the story (words, utterances, events) in isolation and in relation to one another. In this case, the relationships governing the component parts are both temporal and causal. Having identified the parts and the relation between them, blending and elision tasks, like narrative discourse tasks, require an aligning of the parts to create a whole. Essential to both is an understanding of the relationship of the parts to one another and to the whole. Within this explanatory framework, it is not surprising that performance on the task of nonverbal reasoning was found to make a significant contribution to the prediction equation for phonological awareness

since the matrices subtest of the KBIT required children to engage in the same part-to-whole reasoning required by the narrative and phonological awareness tasks.

This explanation is similar to one previously offered in the narrative literature, albeit in relation to somewhat different data. In discussing the finding that aspects of narrative competence measured at 3 and 4 years of age predict mathematical ability 2 years later, O'Neill et al. (2004) evoked the theoretical work of Devlin (2000, cited in O'Neill et al., 2004) who argued that mathematical reasoning requires, among other things, the ability to identify the constituent elements of a problem (abstract objects, in this case) and to follow the temporal and causal relationships among them in order to reach a resolution. O'Neill et al. (2004) reason, as we do here, that these same abilities underlie narrative competence and that they are reflected in measures of story structure. We take this argument one step further and suggest that similar abilities underlie phonological awareness. While tentative, this explanation of the narrative-phonological awareness connection opens the door to further research.

Limitations of the study and future research

A number of important limitations of our study must be addressed. First, the small sample size in the current study precluded investigation of differential patterns of prediction across the age groups represented in this study. Ouellette and Haley (2013, p. 10) emphasize the 'time sensitive nature' of prediction of phonological awareness. It would be of interest to explore potential differences in the patterns of prediction between 4- and 5-year-olds on the narrative indices and phonological awareness. Second, the current study explored relationships among sublexical, lexical and discourse-level units of language. It did not, however, consider the contribution of sentence-level skill. Inclusion of such a measure would have provided additional evidence to support or refute the relationship between narrative structure and phonological awareness. Future research is needed to determine the contribution of sentence-level processing relative to narrative discourse in phonological processing.

A further limitation of the current study relates to its design. Data were collected at a single point in time. Because of its concurrent nature, the study cannot address the question of causality between the variables or determine the direction of the relationship. Our decision to examine oral language predictors of phonological awareness was motivated by previous research (e.g., Schuele & Boudreau, 2008; Storch & Whitehurst, 2002). Given the well-documented reciprocal relationship between vocabulary and phonological awareness, we would hypothesize a reciprocal relationship between narrative discourse and phonological awareness. However, the direction of the relationship remains to be confirmed by longitudinal and intervention studies.

Finally, we cannot rule out the possibility that the relationship between narrative story structure and blending and elision is mediated by a third variable. One possible candidate is metalinguistic awareness. It may be the case that increases in young children's general ability to objectify and reflect upon language that manifest themselves in the late preschool period may support the emergence of awareness of its structural properties, mediating development in both narrative discourse skill and phonological awareness. Future research could explore this possibility by controlling for

metalinguistic awareness using tasks that tap the processes of analysis of representational structure and cognitive control.

Implications for practice

The results of the current study point to potential implications for home language and literacy practices and preschool and kindergarten instruction and intervention. They suggest the importance of providing children with home- and classroom-based language and literacy experiences that foster oral narrative competence from an early age. Previous research indicates the important contribution of oral narrative ability to literacy achievement in the elementary grades (Kendeou et al., 2009; Nation & Snowling, 2004; Oakhill & Cain, 2012; Reese, Suggate, Long, & Shaughency, 2010), and the association between early storytelling ability and later reading comprehension has been demonstrated in recent studies (Griffin et al., 2004; Paris & Paris, 2003; Tabors et al., 2001). The findings linking narrative discourse and later reading performance underscore the long-term value of creating opportunities for children to both hear and tell stories. Our findings suggest that the benefits of doing so may be more immediate. It is possible that teaching children to attend to the elements of story grammar may promote explicit knowledge of story structure and draw children's attention to the structure of language at the level of discourse. This knowledge in turn may have a facilitative effect on the emergence of awareness of language structure at the level of words and sounds. Previous research attests to the benefits of storybook reading as a context within which to develop skills in phonological awareness. In a study by Korat, Shamir, and Heibal (2013), children whose mothers received guidance on shared reading were shown to make significant progress in phonological awareness compared to children receiving only regular kindergarten literacy experiences. Future research is needed, however, to determine the precise nature of the relationship between oral narrative discourse and phonological awareness and to investigate the potential effects of narrative interventions specifically targeting story structure on the development of phonological awareness skills.

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Note

1. Initially, separate, fixed-order hierarchical linear regressions were run, entering one of the three narrative scores as a predictor in the final step. However, the separate regressions yielded virtually identical results and were deemed to be redundant. As a consequence, the three story structure scores were summed, creating a composite narrative story structure score and a single regression was run.

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Appendix 1. Story grammar scoring sheet for *Frog, where are you?* (story retell task).

SG element	Acceptable references	Score
Character 1	Boy	1
Character 2	Dog	1
Character 3	Frog	1
Setting	bedroom/bed/sleeping/one night/next morning	1
Initiating event	frog climbed out of jar/got out/jar was empty + boy & dog wake up & discover frog is gone	2
Internal response	Boy wants to find his frog	1
Attempt	Boy (and dog) look for frog/call for frog	2
Setting	go outside	1
Attempt	grabs branches which are not actually branches + they were deer antlers	2
Character 4	Deer (or any other animal)	1
Consequence	boy is carried on deer's head/picked up + falls over/ pushed over/thrown over a cliff	2
Consequence	falls/lands in water/pond/on top of one another (must mention falling + water/pond/lake/with a splash)	2
Initiating event	hears sound/frog	2
Attempt	boy quiets dog + looks behind/crawls over/climbs onto (log/branch/stick)	2
Consequence	Boy finds his frog with his family	2
Reaction	Frog wants to be boy's pet/boy is happy to have new pet	1

Appendix 2. Story grammar scoring sheet for *One frog too many* (story generation task).

SG element	Acceptable references	Score
Character 1	boy	1
Character 2	dog/turtle	1
Character 3	big frog	1
Character 4	little frog	1
Initiating event	boy opens present/pulls out little frog and introduces him to other animals	2
Internal response	big frog is jealous/doesn't like little frog	1
Attempt	tries to hurt little frog/bites little frog	2
Consequence	others are angry at big frog	2
Setting	pond/boat/raft/playing pirates	1
Attempt	big frog kicks little frog into the water	2
Consequence	others are angry with big frog	2
Attempt	others look for little frog	2
Consequence	little frog is not found/others leave/all are sad or angry	2
Setting	home/bedroom/bed	1
Initiating event	little frog returns	2
Reaction	everyone is happy/surprised/all are friends	1