Early Childhood Research Quarterly 31 (2015) 147–162

Contents lists available at ScienceDirect

Early Childhood Research Quarterly

Using a narrative- and play-based activity to promote low-income preschoolers' oral language, emergent literacy, and social competence

Ageliki Nicolopoulou [a,*], Kai Schnabel Cortina [b], Hande Ilgaz [c], Carolyn Brockmeyer Cates [d], Aline B. de Sá [e]

[a] Lehigh University, United States
[b] University of Michigan, United States
[c] Bilkent University, Ankara, Turkey
[d] New York University, United States
[e] Instituto Alfa e Beto, Rio de Janeiro, Brazil

ARTICLE INFO

Article history:
Received 12 August 2011
Received in revised form 9 January 2015
Accepted 18 January 2015
Available online 31 January 2015

Keywords:
Storytelling
Story-acting
Paley
School readiness
Low-income
Preschool

ABSTRACT

This study examined whether a storytelling and story-acting practice (STSA), integrated as a regular component of the preschool curriculum, can help promote three key dimensions of young children's school readiness: narrative and other oral-language skills, emergent literacy, and social competence. A total of 149 low-income preschoolers (almost all 3- and 4-year-olds) participated, attending six experimental and seven control classrooms. The STSA was introduced in the experimental classrooms for the entire school year, and all children in both conditions were pre- and post-tested on 11 measures of narrative, vocabulary, emergent literacy, pretend abilities, peer play cooperation, and self-regulation. Participation in the STSA was associated with improvements in narrative comprehension, print and word awareness, pretend abilities, self-regulation, and reduced play disruption. For almost all these measures, positive results were further strengthened by the frequency of participation in storytelling by individual children, indicated by number of stories told (NOST). The STSA is a structured preschool practice that exemplifies child-centered, play-based, and constructivist approaches in early childhood education, and that can operate as a curriculum module in conjunction with a variety of different preschool curricula. This study confirmed that it can contribute to promoting learning, development, and school readiness for low-income and otherwise disadvantaged children.

© 2015 Elsevier Inc. All rights reserved.

The study reported here examined whether an activity combining voluntary storytelling with group story-acting, carried out as a regular part of the preschool curriculum, can promote the abilities of preschool children from low-income and otherwise disadvantaged backgrounds in three major areas that contribute to their readiness for success in formal education: narrative and other oral language skills, emergent literacy, and social competence. The research questions framing this analysis bear on larger debates about the most effective and developmentally appropriate practices by which preschool education can help to promote young children's school readiness.

The commitment to promoting school readiness, a goal affirmed for several decades by educators, researchers, and policymakers in the U.S. (Meisels, 1999), has been fueled by a mixture of optimism and alarm. On the one hand, there is increasing confidence that during the first five years of life, preschool education can and should play a positive role, along with early care and socialization, in laying critical foundations for later learning and development (National Research Council & Institute of Medicine, 2000; National Research Council, 2001). On the other hand, there is concern that many young children, especially from low-income and otherwise disadvantaged backgrounds, enter school not ready to benefit effectively from formal education (Dickinson, McCabe, & Essex, 2006; Hart & Risley, 1995). Although there is no firm consensus on the precise components of school readiness, there is widespread (though not universal) recognition of the importance and interconnectedness of the three broad areas noted earlier.

Few would question the crucial role of reading and writing in all aspects of education. It is now widely accepted that young children's acquisition of early literacy-related skills plays a key role in preparing for and facilitating their transition to literacy, and is powerfully affected by the experiences, resources, stimulation,

* Corresponding author at: Psychology Department, Lehigh University, 17 Memorial Drive East, Bethlehem, PA 18015 3068, United States. Tel.: +1 610 525 4330; fax: +1 610 758 6277.
E-mail address: agn3@lehigh.edu (A. Nicolopoulou).

http://dx.doi.org/10.1016/j.ecresq.2015.01.006
0885-2006/© 2015 Elsevier Inc. All rights reserved.

and support that they encounter before beginning formal education (Snow, Burns, & Griffin, 1998). Extensive research also suggests that, in this respect, training children in the kinds of technical skills related most obviously and directly to literacy – such as letter and word recognition and phonological processing – is important but not sufficient. Young children must also master a broader range of cognitive and language skills, since reading for comprehension requires more than simple decoding (Dickinson, McCabe, Anastosopoulos, Peisner-Feinberg, & Poe, 2003; NICHD Early Child Care Research Network, 2005; Snow, 1999; Whitehurst & Lonigan, 2001). In particular, a growing body of research has argued convincingly that children's acquisition of certain oral-language skills in their preschool years, including narrative skills, is an important foundation of emergent literacy and long-term school success (Dickinson & Tabors, 2001; Griffin, Hemphill, Camp, & Wolf, 2004; Kendeou, van den Broek, White, & Lynch, 2009; Lynch et al., 2008; Reese, Suggate, Long, & Schaughency, 2010).

Furthermore, there are good reasons to believe that social competence, including self-regulation and the ability and willingness for cooperation, also constitutes a key dimension of school readiness (Denham, 2006; Dickinson et al., 2006; Raver & Zigler, 1997). Promoting these abilities and dispositions in young children is widely regarded as desirable, not only for its own sake and as preparation for school life, but also because elements of social competence play important roles in enabling and promoting cognitive development, learning, and academic success (Coolahan, Fantuzzo, Mendez, & McDermott, 2000; Dickinson et al., 2006; Raver, Garner, & Smith-Donald, 2007). This concern for promoting preschoolers' social competence has found practical expression in programs like the REDI (Research-based, Developmentally Informed) Head Start intervention (Bierman et al., 2008) and the Chicago School Readiness Project (CSRP; Raver et al., 2011).

Though there is widely shared agreement about the value of using preschool education to promote school readiness, especially for low-income and otherwise disadvantaged children, the concrete practical implications for the preschool curriculum have been more contentious. One response has been a broad push to emphasize the transmission of specific academic skills through direct instruction (Kagan & Kauerz, 2007). In many circles, this emphasis on more didactic, academic, and skill-based approaches to preschool education has been linked to a rejection of more child-centered, play-oriented, and constructivist approaches (Hirsh-Pasek, Golinkoff, Berk, & Singer, 2009; Zigler & Bishop-Josef, 2004). Pressure to generate good scores on narrowly skill-focused standardized tests has further accelerated the "pushing down" of didactic/academic instruction into early childhood education and the squeezing-out of more playful and child-centered forms of learning (Miller & Almon, 2009). Those pressures have been especially strong for preschools and kindergartens serving low-income children.

Other researchers and educators have argued that, although teacher-directed and skill-based instruction can be valuable for certain purposes in the preschool years, the tendency to rely on it exclusively has become too one-sided, unbalanced, and developmentally inappropriate. Furthermore, the polarization between teacher-directed, skill-based approaches and more child-centered, play-based, and constructivist approaches too often treats these approaches as mutually exclusive. There is also a need for educational practices that are simultaneously "child regulated" and "teacher guided" (Golbeck, 2001), which can mobilize children's engagement, enthusiasm, and creativity while promoting their learning and development. Indeed, there is evidence to suggest that early childhood education can be most effective when it successfully combines both types of educational activities (Graue, Clemens, Reynolds, & Niles, 2004). This is especially true if one considers long-term, not just short-term, effects (Schweinhart & Weikart, 1997).

Growing uneasiness with recent trends helps to explain the widespread interest generated by the Tools of the Mind curriculum (Bodrova & Leong, 2009). This Vygotskian-inspired curriculum seeks to promote intellectual skills – in language, literacy, and mathematics – and social competence in an integrated way. It makes extensive use of play and combines child initiative and cooperation with teacher guidance and support, with a pervasive emphasis on the promotion of self-regulation. So far, evaluations of its effectiveness have yielded mixed results (more encouraging from Barnett et al., 2008; more disappointing from Lonigan & Phillips, 2012; Wilson, Farran, Lipsey, & Turner, 2012), and it is probably too soon to draw firm conclusions one way or another.

Tools of the Mind is a full-scale alternative curriculum. The storytelling and story-acting practice (STSA) evaluated by the present study also exemplifies child-centered, play-based, and constructivist approaches to early childhood education, but it is considerably more modest in scope. The present study considered its potential value as a curriculum module that can operate in conjunction with a variety of different preschool curricula. A combination of theoretical considerations and practical experience suggested that it has the potential to promote young children's school readiness abilities across the domains of oral language, including narrative; emergent literacy; and social competence. It has been used in preschools serving both middle-class and low-income children, but more frequently in the former; so this study focused on assessing its value for children from low-income backgrounds. The rest of this section will introduce this curriculum module and explain the theoretical rationale for expecting it to have those beneficial effects; review the very sparse research that has so far attempted to study its effects; then move on to the present study.

The storytelling and story-acting practice: its developmental and educational promise

The curriculum module under consideration is an activity combining storytelling and story-acting – also described as story dictation and dramatization – developed by the teacher and writer Vivian Paley (1990) and used in many preschool and kindergarten classes in the United States and abroad (Cooper, 2005, 2009; McNamee, McLane, Cooper, & Kerwin, 1985; Nicolopoulou, 1997a, 2002). Although this practice is conducted with variations in different places, its main outlines tend to be consistent. At a certain period during the day (usually a time when children can choose freely between different available activities), any child who wishes can dictate a story to a designated teacher or teacher's aide, who writes down the story as the child tells it. Although children are not required to compose any specific type of story or guided toward suggested topics, these are usually fictional or fantasy stories. Later that day, each of these stories is read aloud by the teacher to the entire class, assembled for group time, while the child/author and other children, whom he or she chooses, act out the story.

This is an apparently simple activity with complex and potentially powerful effects. Several features are especially worth noting. Although this is a structured and teacher-facilitated activity, the children's storytelling is voluntary, child-initiated, and relatively spontaneous. Because this practice runs through the entire school year and the children control their own storytelling, it provides them with the opportunity to work over, refine, and elaborate their narratives and to use them for their own diverse purposes – cognitive, symbolic, expressive, and social-relational (Nicolopoulou, 1996; Nicolopoulou, Brockmeyer, de Sá, & Ilgaz, 2014; Richner &

Nicolopoulou, 2001). At the same time, having their stories written down by an adult and then later read to the class can help familiarize children with writing and its uses in a concrete and engaging manner (Nicolopoulou, McDowell, & Brockmeyer, 2006).

Furthermore, the way that this STSA combines a story*telling* with a story-*acting* component has several important implications. Children typically enjoy storytelling for its own sake, but the prospect of having their story acted out, together with other children whom they choose, offers them additional motivations to compose and dictate stories. And one result of having the stories read to and dramatized for the entire class at group time is that the children tell their stories not only to adults, but primarily to each other; they do so not in one-to-one interaction, but in a shared public setting. Children are thus given opportunities to borrow elements from each other's stories and rework them, facilitating narrative cross-fertilization. (They also draw on and rework elements from storybooks, from various media of popular culture including TV and video games, and from their own experiences: Nicolopoulou, 1997b; Nicolopoulou, Scales, & Weintraub, 1994; Nicolopoulou et al., 2014; Richner & Nicolopoulou, 2001.) When the STSA is established as a regular part of the classroom activities, all children typically participate over time in three interrelated roles: (1) composing and dictating stories; (2) taking part in the group enactment of stories (their own and those of other children); and (3) listening to and watching the performance of the stories of other children. Thus, the children's storytelling and story-acting are embedded in the ongoing context of the classroom miniculture and the children's everyday group life, with their strong relational and emotional significance (see Nicolopoulou, 2002, from which this account has been partly drawn). Furthermore, the STSA includes elements of play and narrative, two symbolic activities of special interest to children, in an integrated way. Some reasons why that might be valuable are suggested by Vygotsky's theory of play and its developmental and educational significance.

Vygotsky: play, self-regulation, and development

Paley does not seem to have comprehensively or exclusively based her classroom practices on Vygotsky's theory, as does the *Tools of the Mind* early childhood curriculum (Bodrova & Leong, 2009), and she offers only intermittent remarks about the theoretical influences on her work. But an awareness and appreciation of Vygotsky is apparent throughout her writings. A careful consideration of the logic of her STSA, in particular, brings out strong affinities with important Vygotskian ideas, especially with Vygotsky's theory of play (McNamee et al., 1985; Nicolopoulou, 1997a; Nicolopoulou, de Sá, Ilgaz, & Brockmeyer, 2010). And Vygotsky's theory offers further grounds for expecting that participation in this practice might help to promote young children's learning and development. We therefore offer a brief exposition of that theory and consider some of its implications. (For more extensive treatments, see Nicolopoulou, 1993; Nicolopoulou & Cole, 1993. Some formulations in the discussion that follows are also drawn from Nicolopoulou et al., 2014.)

In characterizing play, Vygotsky stresses the presence of two essential and interconnected components: (1) an imaginary situation, and (2) the rules inherent in the imaginary situation. In this respect, fantasy or pretend play and games with rules can be seen as two poles of a single continuum: from an explicit imaginary situation with implicit rules (pretend play) to an implicit imaginary situation with explicit rules (games with rules). When a child pretends to be a mother or father, for example, she or he cannot adopt just any behavior but must try to grasp the implicit rules of maternal or paternal behavior as perceived and understood by the child or others. An important cognitive effort is involved here. "What passes unnoticed by the child in real life becomes a rule of behavior in play" (Vygotsky, 1933/1967, p. 9). That is even more true for the coordinated activity of social pretend play.

From this perspective, play fuses elements often treated as contradictory: imagination and spontaneity on the one hand, and rule-governed action on the other. Play is enjoyable, flexible, and intrinsically voluntary, but it is also an *essentially* rule-governed activity. Systems of rules are central to constituting the playworld itself, and at the same time these rules derive their force from the child's enjoyment of, and commitment to, the shared activity of the playworld. Indeed, as Vygotsky emphasized, a crucial aspect of the significance of play is that it is one of the first activities in which children self-consciously impose rules *on themselves*, rather than merely receiving them from others. This is the case, he argues, because the child learns that achieving the satisfactions sought in the imaginary situation requires adhering to the rules implicit in that situation. The rules of play thus become "rules of self-constraint and self-determination" (Vygotsky, 1933/67, p. 10). In terminology used by much current research, play requires and promotes *self-regulation*. And play is always a *learning* activity because it requires learning and grasping these rules, seeing that they form a system, elaborating on them, and mastering the possibilities of the form of practice that they help constitute. Moreover, inserting elements from the larger culture into the symbolic universe of the playworld forces the child to try to make sense of them, even as they are stylized and transformed. Even more fundamentally, increasing capacities for self-regulation in thought and in action are closely linked and mutually reinforcing (an idea supported by recent research in several areas, including Ursache, Blair, & Raver, 2012).

In short, according to Vygotsky, play is not simply frivolous. If properly understood, it can serve as a prototype of a form of activity constituted by shared and voluntarily accepted rules, within which children (or adults) can experience an intrinsic (rather than merely instrumental) motivation to strive for mastery of the possibilities inherent in that practice. And in childhood, especially early childhood, play is a crucial matrix for development (Vygotsky, 1933/1967, p. 16). Research drawing directly or indirectly on Vygotskian ideas has therefore argued that play activities simultaneously require and help to promote both cognitive abilities and capacities for social competence, such as cooperation and self-regulation (Berk, 1994; Bodrova & Leong, 2003; Creasey, Jarvis, & Berk, 1998; Diamond, Barnett, Thomas, & Munro, 2007; Hirsh-Pasek et al., 2009).

Further implications and possible applications

Vygotsky's illuminating analysis of play suggests that we should not abandon efforts to mobilize elements of play and imagination in education. But if that argument is accepted, it does not necessarily follow that simply alternating didactic/academic instruction with free-play periods would be sufficient. It is also important to design structured educational practices that effectively integrate the play element into the curriculum in ways that can promote children's development and education. Paley's STSA offers one concrete example of how this goal can be pursued.

Furthermore, the interrelated features of play emphasized by Vygotsky's analysis are equally characteristic of their narrative activity (Nicolopoulou, 1997a): both represent the union of expressive imagination with rule-governed cultural form in the context of social life. In important respects, in fact, it is useful to see both pretend play and storytelling as modes of narrative activity, on a continuum ranging from the discursive exposition of narratives in storytelling to the enactment of narrative scenarios in pretend play. While the analytical distinction between the two is important, pretend play and storytelling are often interwoven and mutually

enriching in children's experience and development (Nicolopoulou, 2007; Paley, 1990). Another key feature of Paley's STSA, therefore, is that it integrates these two forms of children's narrative activity in a potentially fruitful way. The logic of this analysis suggests, once again, that the combination of the two major components of this practice, individual storytelling and the dramatic enactment of those stories by and for the classroom peer group, may be critical for its operation and effectiveness.

Previous research on this storytelling/story-acting practice

Although versions of this STSA have been widely adopted, and it has attracted considerable interest in schools of education as well as among teachers and other practitioners, there have been very few systematic attempts to assess its effects on young children's learning and development. Paley's rich ethnographic accounts of the workings of this activity in her preschool and kindergarten classrooms over the years (summed up especially in Paley, 1990) remain indispensable. They suggest that it helped promote children's cognitive and language skills as well as their socioemotional development. But Paley's insightful examinations of children's developing abilities in and through their play and narrative activities do not include systematic measures of those child outcomes or comparisons between her classrooms and control classrooms that were not using her STSA. Child outcome measures or controlled comparisons, and usually both, are also missing from most other work concerned with the educational and developmental value of this activity, including research that is useful in other respects and for other purposes (Cooper, 2005; Fein, Ardila-Rey, & Groth, 2000; Groth & Darling, 2001; Nicolopoulou et al., 2006).

So far, the only research that has systematically examined whether this STSA promotes skills and capacities related to young children's school readiness has been a handful of studies by McNamee et al. (1985) and Nicolopoulou (1996, 2002). These studies were encouraging, but all had important limitations. An exploratory study by Nicolopoulou (1996) made a very preliminary attempt to assess the impact of this practice on young children's narrative development by comparing the quality of stories generated through the STSA in one middle-class preschool classroom with findings about the story production of children at similar ages reported by other research in narrative development. The positive results were suggestive, but hardly conclusive. A stronger study using a controlled comparison, reported in Nicolopoulou (2002), studied a Head Start class of children from low-income backgrounds in which the STSA was introduced and conducted for an entire school year; a control class in the same Head Start program continued its usual curriculum. The results confirmed that participation in the STSA significantly enhanced the development of the children's narrative skills (as measured by a narrative production task) and other decontextualized oral language skills (as measured by the Expressive Vocabulary Task). But that study was limited in size.

The one other study that used controlled comparisons, McNamee et al. (1985), included ten classrooms from five different preschool, kindergarten, and day care sites, with one experimental and one control class in each. (The sample was ethnically diverse, but other demographic information such as socioeconomic status was not provided.) The study focused on examining whether the story-*dramatization* portion of the STSA was critical to its effectiveness in promoting narrative development. During a 12-week intervention period, the experimental classes implemented the full Paley-style STSA, with both story dictation and story dramatization, twice per week. In the control classes, there was also story dictation twice per week, but the stories were never acted out. In both types of classes, adult-authored stories were read to the class twice a week, and in the experimental classes these were also acted out. The results confirmed both the effectiveness of the STSA for promoting narrative development and the importance of the story-acting portion of the practice. Applebee's scale of narrative complexity and coherence was applied to stories composed and dictated by the children – specifically, to the first 20 and last 20 stories dictated in each class. Among 3-year-olds, improvements in scores for both experimental and control classes over the intervention period were similar and relatively small. For both 4- and 5-year-olds, however, children in the experimental classes showed substantially more narrative improvement than those in the control classes. Two secondary findings were also reported. Unsurprisingly, children in classes with story-acting borrowed considerably more elements from each other's stories than children in the control classes (though information about what they borrowed was sketchy). The complexity of children's conversations with adult story-takers during story dictation, and indications of children's awareness of the writing process, also increased in the experimental classes more than in the control classes – an intriguing analysis that, again, may be worth fleshing out more fully. The key finding was that participation in this practice strongly promoted young children's narrative development, but only if both the storytelling and the story-acting components were included.

McNamee et al. (1985) was an ambitious, conceptually sophisticated, and very promising study, but it also had some methodological and statistical weaknesses. In particular, its statistical analysis was limited. The strongest analysis, concerning narrative development, relied on percentage-difference comparisons without tests of significance. In addition, choosing the first 20 and last 20 stories in each class to analyze, combined with the use of straight percentages rather than mean proportions, leaves open the possibility that changes reported between the beginning and end of the intervention period might reflect different distributions of child storytellers at different times rather than, or in addition to, narrative development by individual children. In this and other respects, it is hard to fully assess the validity of the analysis because relevant information about procedures and about the sample (e.g., the amounts of turnover or attrition in classes during the intervention period, total numbers of stories told, variations in stories per child) is missing or incomplete. It is also worth noting that in terms of child outcomes, the key findings of both McNamee et al. (1985) and Nicolopoulou (2002) focused on one dimension of school readiness: oral language skills, primarily narrative skills.

The present study

The present study sought to follow up the previous research and to go beyond its limitations both substantively and methodologically. It examined whether this STSA, integrated as a curriculum module within the regular preschool curriculum, can enhance the abilities of low-income preschool children in three major dimensions of young children's school readiness: (a) narrative and other oral language skills, (b) skills related more directly to emergent literacy, and (c) social competence. This curriculum module was introduced for an entire school year into six preschool classrooms in an established child-care program serving children from low-income backgrounds, and seven other classrooms in the same program were used as controls. We expected that participation in the STSA would promote key elements of the children's school readiness in all three areas just outlined. We also expected, as a corollary, that the more frequently individual children participated in this activity (indicated by the number of stories they told), the greater these effects would be for them.

Table 1
Means (and standard deviations) for Early Language & Literacy Classroom Observation (ELLCO) by year and condition.

Year 1	Experimental ($n = 3$) *M (SD)*	Control ($n = 3$) *M (SD)*	*F*	*p*
Literacy Env. Checklist (range: 1–41)	15.33 (4.04)	21.67 (3.79)	3.92	.119
Classroom Observations (range: 16–80)	42.00 (3.64)	36.67 (4.73)	2.49	.190
Literacy Activities Rating Scale (range: 0–13)	2.67 (2.31)	2.33 (2.52)	.03	.874
Year 2	**Experimental ($n = 3$) *M (SD)***	**Control ($n = 4$) *M (SD)***	***F***	***p***
Literacy Env. Checklist (range: 1–41)	20.33 (2.31)	18.25 (4.03)	.63	.465
Classroom Observations (range: 16–80)	35.33 (3.01	37.00 (10.23)	.07	.800
Literacy Activities Rating Scale (range: 0–13)	5.33 (1.16)	3.75 (2.50)	1.00	.362

Method

Research sites

The study was conducted in preschool classrooms in six centers which were part of a child care/preschool organization serving low-income children from diverse ethnic backgrounds in a medium-sized urban area in the northeastern U.S. Using a randomized waitlist design, six classrooms were assigned to be experimental (or intervention) classrooms in which the STSA was introduced and conducted throughout the school year. Seven other classrooms, which continued their usual activities without change, were used as controls. The study was conducted over two years (2005–2007), but each participating classroom was studied for one year, and no child was included in the study for more than one year. There were three experimental and three control classrooms in the first year, three experimental and four control classrooms in the second. At the end of the first year we invited the three teachers of the control classes to continue in the study for the second year, with their new classes being used as experimental classes. Two accepted, but the third teacher left this child care/preschool organization; her replacement requested that her class be used as a control class, since this was her first year with this organization (though not her first year as a preschool teacher). The other four classes participating in the second year were new, and were randomly assigned to experimental or control conditions, with an effort to (roughly) equalize the overall number of children in each condition.

All classrooms provided full-time, full-year, preschool education and care for a minimum of 6.5 hours per day, 5 days per week, 52 weeks per year. In principle, the basic instructional program was the Teaching Strategies Creative Curriculum, but normal practices did not include substantial amounts of structured educational activities. Scores on the Early Language and Literacy Classroom Observation Toolkit (ELLCO; Smith & Dickinson, 2002) administered to all the classrooms in the middle of each year (February/March) indicated that, except for the STSA, there were no significant differences in classroom language and literacy activities across conditions and across years (see Table 1). On average, classrooms in both conditions and both years were rated as medium in the Literacy Environment Checklist (range: 15–22 from a possible range of 1–41), medium on Classroom Observations (range: 35–42 from a possible range of 16–80), and low on Literacy Activities (range: 2.33–5.33 from a possible range of 0–13).

Participants

At the beginning of each school year, parental consent forms were obtained for 97–100% of the children in every class being studied. This yielded a total of 216 children, almost all 3- and 4-year-olds (mean ages in months in September: 48.59 experimental and 48.94 control). There were 119 children in the first year, 52 experimental and 67 control, and 97 in the second year, 59 experimental and 38 control. (For more details on these and other demographic characteristics, see Table 2.)

This sample was ethnically diverse and otherwise not demographically unusual for low-income preschool classrooms in the northeastern U.S. About half of these children were Non-Hispanic White (49%), 24.5% Hispanic, 24% African American, and 2.5% from other ethnic minorities. (For statistical analyses, the categories of African American, Hispanic, and Other were combined as Minority: thus, 1 = Non-Minority; 2 = Minority.) Although some children spoke Spanish as well as English, English was the dominant language for all children who participated in the study (information obtained from the child-care/preschool program, confirmed by classroom teachers, and supported by our own observations). All the children came from low-income families. More than half were poor enough to qualify for Head Start (62% of experimental

Table 2
Percentage (& number of cases) of sample demographic characteristics by condition.

	Experimental ($n = 111$)	Control ($n = 105$)	T/χ^2	*p*
Child characteristics				
Total mean age (months) in September	48.59	48.94	$T = .65$	.516
Age			$\chi^2_{(2)} = 2.16$	.334
3-Year-olds	43% (48)	43% (45)		
4-Year-olds	52% (58)	48% (50)		
5-Year-olds	5% (5)	10% (10)		
Gender			$\chi^2_{(1)} = 1.19$	.274
Boys	47% (52)	54% (57)		
Girls	53% (59)	46% (48)		
Race/ethnicity			$\chi^2_{(3)} = 4.89$	.180
Non-hispanic white	43% (45)	55% (54)		
Hispanic	25% (26)	24% (23)		
African American	31% (32)	18% (18)		
Other	2% (2)	3% (3)		
Language			$\chi^2_{(1)} = .37$	.541
English only	91% (95)	93% (91)		
Bilingual	10% (10)	7% (7)		
Family characteristics				
Household Structure			$\chi^2_{(1)} = 7.33$	.007
Single parent	72% (76)	54% (53)		
Both parents	28% (29)	46% (45)		
Siblings			$\chi^2_{(2)} = 6.66$	.036
0	35% (37)	34% (33)		
1–2	52% (55)	63% (62)		
≥3	12% (13)	3% (3)		
Head start eligibility			$\chi^2_{(1)} = .81$	.368
Yes	62% (65)	56% (54)		

Note: Demographic data were missing for up to 10% of children for some variables.

and 56% of control); the fees for these children were covered by federal and state funds through a partnership between the local Head Start program and this child care/preschool organization. Most of the rest also received some financial aid, in the form of subsidies funded by the federal and/or state governments or other sources. Head Start eligibility vs. non-eligibility was used as a rough indicator to capture relative levels of socio-economic status for this population. (Parents gave permission for the organization to share this information with us.) Although children in the experimental and control conditions were broadly similar in other demographic characteristics, there were a few exceptions. Children in the experimental condition were more likely to come from single-parent (i.e., single-mother) families than children in the control condition (72% vs. 54%).

Predictably, there was attrition in these classes, often for reasons connected with poverty, insecure employment, and family instability. A total of 149 children (81 experimental and 68 control) who remained in their class for the full year (and thus received both pretests at the beginning and posttests at the end of the school year, as explained below) were included in the study for purposes of analysis. The attrition rate was higher for control classes (35%) than for experimental classes (24%), but the difference between the rates for these two conditions was not statistically significant, $\chi^2_{(1)} = .04$, $p = .841$.

There were variable-specific missing data in the spring for various reasons (e.g., the child was sick or absent for part of the two to three weeks of data collection). To confirm that these data could be considered missing at random, we carried out comparisons between mean fall scores of children with complete data in both fall and spring and of children for whom some spring data were missing (see Table 3). Given that only one out of 11 test results was significant, there was no basis for concern that variable-specific missing data were problematic. Therefore, we treated those missing data as random in subsequent analyses and used the full-information maximum-likelihood estimates in HLM analysis (as recommended by Raudenbush & Bryk, 2002, p. 199).

Intervention: the storytelling/story-acting practice

The STSA was conducted by the teachers in the intervention classrooms, usually with cooperation by research assistants from the study. It generally occurred about twice per week, although the average frequency was greater overall during the second year than during the first year (as discussed below). After pretesting (in September–October) was completed, the STSA was introduced in the intervention classrooms by the first author and remained in operation throughout the school year until the end of April. The control classes carried on with their usual activities. Prior to the introduction of the STSA, teachers and their teachers' aides in the intervention classes were trained as a group for two hours in carrying out the activity and also received a detailed manual for guidance. All classrooms in both conditions were visited twice per week by teams of two trained research assistants, usually a graduate and an undergraduate student in psychology. They assisted in carrying out either the STSA or normal classroom activities in the intervention classrooms and carrying out normal classroom activities in the control classrooms (e.g., helping children with art or puzzles, doing literacy-related activities including bookreading, playing with small groups of children). Teachers and teachers' aides in both types of classrooms welcomed the help that research assistants provided, which furnished one incentive to participate in the study. The research assistants also monitored the operation of the STSA and other classroom activities, and the graduate assistants provided teachers in the intervention classrooms with further consultation and advice about the STSA during weekly meetings. (The first author also visited classrooms occasionally for the same purposes.)

How the STSA was conducted

The storytelling part of the STSA took place during "choice time," when children were free to engage in different activities available to them. The teacher or a research assistant made herself available to take stories from children who wanted to compose and dictate them. These story dictations were voluntary and largely self-initiated; no child was required to compose a story, though some of the more reticent ones were occasionally encouraged (but not prodded) to do so. Children were allowed to tell any kind of story they wished, but there was a limit of one page per story to allow as many children as possible to be accommodated each day. The story-taker wrote down the story verbatim with minimal intervention, repeating the child's words as she was writing them and reading the story back to the child when it was completed. Story-takers occasionally requested necessary clarifications on points relevant to enacting the story, and they might ask questions like "What happened next?" or "Is that the end?" if children paused during their dictation. (In some other versions of this practice, story-takers sometimes play a more active editorial role.) After completing the story, the child first chose which character he or she wanted to play and then picked other children in the classroom to act in other roles. The names and roles of the actors were recorded along with the story. The story-taker usually took down 2–4 stories during each session. If there were several children present who wanted to tell a story, a waiting list was created so that these children could go on with their other activities. Some children, however, waited and listened while other children told their stories. If not all children on the waiting list could be accommodated that day, they would be offered a chance the next day that stories were being recorded.

The story-acting portion of the STSA took place during group time, with the entire class assembled. The classroom teacher always led this activity. One by one, all the stories dictated during that day were read aloud and enacted in the order dictated. The teacher first read the story while all the children listened. Then she called out the names and roles of the child-actors, who stood outside the area designated as the stage. As the story was read once again, it was acted out by the child-author and the other child-actors. This process was repeated until all the stories dictated during that day had been enacted.

In each classroom, the story-taker (teacher or research assistant) wrote the stories down in a single class "storybook" as the child dictated the story, also indicating the author, the date of dictation, and which children were chosen to act which roles in the story performance. This provided a record of how often the STSA took place and how many children participated in it as either tellers or actors. The classroom storybooks were given to us at the end of the year for analysis. (Parents had signed consent forms to make the stories of their children available to us.) With very few exceptions (three children in year 1; four children in year 2), all children in the intervention classes participated in the storytelling portion of the STSA. Except for one child who was very shy and refused to participate in this and most other activities, the non-storytellers were children who came to class later in the day (closer to noon), after the storytelling had already taken place. All children in the intervention classes participated in story-acting.

Monitoring, support, and one procedural adjustment

The two research assistants in each team that visited each classroom (intervention and control) twice per week each wrote one or two pages of field notes dealing with their own actions and with activities in the classroom more generally. The presence of the research assistants and their field notes allowed us to

Table 3
Missing data analysis: comparison of fall score means based on data availability.

	Full data available for fall and spring *M* (*SD*)	Full data fall only (missing some spring scores) *M* (*SD*)	*t*	*p*
EVT	37.83 (9.1) *n* = 137	38.15 (10.4) *n* = 46	−.199	.842
Narrative comp	18.64 (10.9) *n* = 130	11.00 (–) *n* = 1	–	–
PALS-PWA	5.09 (2.76) *n* = 76	4.65 (3.10) *n* = 23	.651	.842
PALS-BSA	4.26 (3.8) *n* = 74	4.56 (4.05) *n* = 25	−.340	.734
PALS-RA	4.26 (3.58) *n* = 76	3.00 (3.41) *n* = 23	1.501	.842
Pretend abilities	12.98 (4.61) *n* = 123	10.70 (6.01) *n* = 44	2.286	.026
Peer play disruption	1.55 (2.21) *n* = 112	1.54 (2.17) *n* = 46	.026	.979
Peer play disconnect	1.33 (1.89) *n* = 112	1.57 (1.84) *n* = 46	−.714	.476
Peer play interaction	3.26 (2.39) *n* = 112	3.00 (2.38) *n* = 47	.624	.534
Self-regulation: inhibition	7.13 (3.86) *n* = 60	7.21 (4.87) *n* = 24	.930	.319
Self-regulation: assertion	3.82 (1.82) *n* = 60	3.42 (2.04) *n* = 24	.511	.521

monitor classroom activities, including the operation of the STSA, and to provide further input and training as needed to maintain fidelity in implementing the intervention. The basic minimum requirements for implementation were the following: the STSA was conducted every week during the period between pretesting and posttesting; children's story dictation was voluntary, and the story-taker facilitated it in a non-directive manner; the story-taker wrote down the child's story verbatim as it was being dictated, read it back to the child when it was completed, and indicated the author, the date of dictation, and the names and roles of the children selected for story-acting; and every story was enacted the same day it was dictated.

The frequency of the STSA was somewhat more variable. Teachers in the intervention classrooms were encouraged to conduct this activity as often as possible, but at least during the two days per week when the research assistants visited the classroom. Teachers could schedule the activity at their discretion, but in practice it was usually conducted on days when research assistants were present. In our ongoing discussions and year-end interviews with intervention teachers, they all reported that they enjoyed conducting the STSA, but most also welcomed help with story-taking from the research assistants. In other preschools where this activity is part of the normal curriculum, it occurs with differing frequencies, sometimes as often as every day (Cooper, 2009; Nicolopoulou, 1997b, 2002; Nicolopoulou et al., 1994; Paley, 1990); for this study, we thought that twice a week was a reasonable minimum to aim for. During the first year of the study, the activity did take place consistently two days per week in one intervention classroom, but it varied between once and twice per week in the other two intervention classrooms. For the second year of the study, we decided it would be better to insist on conducting the STSA uniformly twice per week, and during year 2 this was done consistently in all intervention classrooms. On days when the STSA was conducted, it usually generated about three recorded stories per day in year 1 and about three to four stories per day in year 2.

Data collection: pretest and posttest assessments

All children in both conditions were given pretests and posttests for 11 measures covering expressive vocabulary, narrative skills, emergent literacy, pretend abilities, and elements of social competence (peer play cooperation and self-regulation). Pretests were administered at the beginning of the school year (September/October) and posttests at the end (May). In the intervention classrooms, the STSA was conducted during the entire period between pretesting and posttesting. At the end of each year, we also received the storybook for each classroom, containing all stories generated as part of the activity, the author and date of dictation for each story, and the names and roles of children selected to act during the story performance.

Testing was carried out by trained graduate students and undergraduates. For most of these measures, children were tested individually in a quiet room adjacent to their classroom by researchers. Two observational measures, assessing peer play and self-regulation, were carried out in the classroom itself.

Oral language measures

Two tasks were administered to capture children's oral language skills.

Vocabulary skills: Expressive Vocabulary Test (EVT). Early vocabulary development has been shown to be an important foundation for emergent literacy (Whitehurst & Lonigan, 2001). Of the vocabulary tests available for use with young children, we selected the *Expressive Vocabulary Test* (Williams, 1997), which measures children's abilities to retrieve and use appropriate words ("*What do you see*?," while the child is shown a colorful picture) and also to generate synonyms ("*Tell me another word for____?")*. The EVT thus appeared useful for capturing a combination of vocabulary knowledge and vocabulary-related oral-language skills that can contribute to school readiness. A previous study (Nicolopoulou, 2002) found that participation in the STSA significantly increased children's EVT scores. The EVT has good test–retest reliability (r_{tt} = .77) over intervals ranging from 8 to 203 days for preschool-aged children (Williams, 1997). Raw scores were used in the analysis.

Narrative comprehension. A narrative task we developed was used to measure children's narrative comprehension abilities. This task was an adaptation of the Test of Narrative Language (Gillam & Pearson, 2004) and included three subtasks: telling the child a story (a) without picture cues, (b) with four sequenced pictures, and (c) with a single complex picture. In each subtask, the child was first told the story and was then asked seven

comprehension questions, both factual and inferential. Each correct answer received two points and a partially correct answer one point. In this paper, we report the total narrative comprehension scores by adding the scores for all story types (range 0–42; Cronbach's alpha fall/spring = .91/.84; all Cronbach's alpha reliability coefficients were calculated from the study data).

Emergent literacy measures

Three subscales of the *Phonological Awareness Literacy Screening: PreK (PALS;* Invernizzi, Sullivan, Meier, & Swank, 2004) were used to assess skills that have been shown to predict future reading success: *Beginning Sound Awareness* (asks child to respond verbally by sounding out the first sound of a word; Cronbach's alpha fall/spring = .94/.93), *Rhyme Awareness* (asks child to point to a picture that rhymes with a stimulus word; Cronbach's alpha fall/spring = .91/.94), and *Print and Word Awareness* (asks a number of questions measuring children's book, word, and syllable knowledge; Cronbach's alpha fall/spring = .81/83). The scores per subscale range from 0 to 10 and are reported separately. To be administered this test, a child had to be at least 4 years of age at the beginning of the school year, since the PALS is not designed for use with children below that age.

Pretend abilities measure

The capacity for imaginative pretense measured by this task does not fit neatly or exclusively into any one of the three major dimensions of school readiness targeted for consideration in this study. There is evidence that it is related at least indirectly to the development of narrative skills, emergent literacy, and social competence (Sachet & Mottweiler, 2014). It was included in the analysis of child outcomes primarily because of its link to the development of social competence, since the cognitive and symbolic abilities it entails are considered to be among the necessary foundations for children's social pretend play and self-regulation (Harris, 2000; Sachet & Mottweiler, 2014). We adopted a widely used task with three subtasks originally designed by Overton and Jackson (1973): Children were asked to pretend (i.e., to imagine and enact) three simple acts (a) directed toward oneself (e.g., sucking on a lollipop) and the same three acts, (b) directed toward another (e.g., puppet monkey) – the order of these two subtasks was systematically alternated. The third subtask (c) tested children's ability to pretend somewhat more complex actions (e.g., cutting a paper) which asked them to imagine two objects simultaneously (e.g., scissors and paper) and relate them to each other. A supporting prop (e.g., paper) was provided if the child was not able to perform these pretend actions without it. The total scores from the three subtasks ranged from 0 to 21; Cronbach's alpha fall/spring = .91/.86.

Social competence measures

These measured two clusters of skills related to elements of social competence: cooperation and self-regulation skills.

Peer play assessment. This was used to evaluate children's capacity and willingness for cooperation with peers. We employed an observational play assessment measure adapted from the Penn Peer Interaction Scale, a rating instrument developed by Fantuzzo and colleagues for use by teachers of low-income urban children (Fantuzzo et al., 1995). Two three-minute observations per child were conducted within a period of a week by trained undergraduate and graduate students who observed a child in a set of specified settings that best afforded play interactions (e.g., free play corner). The observer wrote an account of the entire episode and then rated the child's behavior by checking "yes" or "no" for a total of 18 behavioral items; each "yes" was scored 1 and each "no" was scored −1. Three distinct sets of six items apiece constituted three factors: *play disruption* (e.g., disrupts the play of others, destroys others' things, starts fights and arguments; Cronbach's alpha fall/spring = .79/.68), *play disconnection* (e.g., wanders aimlessly, refuses to play when invited, is ignored by others; Cronbach's alpha fall/spring = .70/.63), and *play interaction* (e.g., shares toys with others, helps other children, comforts others when hurt; Cronbach's alpha fall/spring = .77/.68). These three categories are the same as those in the original Penn Peer Interaction Scale. The 18 items used for this measure were selected from the longer 34-item original PPIS scale by choosing those that loaded most strongly (at least $\lambda = .50$) on the three respective factors in a confirmatory factor analysis. Total scores for each subscale ranged from −12 to 12 and were reported separately. To ensure coding uniformity, we created detailed coding instructions to train the research assistants. Taking advantage of the fact that the episodes were written down, about 50% of them were coded by more than one observer (Cohen's kappa = .75). Disagreements were resolved through discussion by the two coders and the first author.

Self-regulation assessment. Children's self-regulation was evaluated with another observational measure we devised, based on Kashiwagi's teacher rating scale (Olson & Kashiwagi, 2000). The observations followed a procedure similar to that just described for the modified Peer Play Interaction Scale: trained undergraduate and graduate students observed each child for two three-minute periods on different days in a set of specified situations that required self-regulation (e.g., clean-up time or large-group time). After writing an account of the observed episode, the observer rated the child's behavior by checking "yes" or "no" (scored 1 or −1) for a total of 15 items, 10 measuring *self-inhibition* (e.g., accepts assigned roles in proper ways, able to wait patiently for his/her turn, able to inhibit own desires; total scores ranged from −20 to 20, Cronbach's alpha fall/spring = .81/.82), and 5 measuring *self-assertion* (e.g., initiates contact with others, able to say what s/he wants, able to ask to borrow things; total scores ranged from −10 to 10, Cronbach's alpha fall/spring = .51/.49). These items were selected from the 37-item original scale, using those that loaded most strongly (at least $\lambda = .70$) on these two factors in a confirmatory factor analysis. Although the Cronbach's alpha for the self-assertion subscale indicated relatively weak reliability, we retained the distinction between the two factors to remain conceptually consistent with Olson and Kashiwagi (2000), whose two-factor structure was confirmed by our data. To ensure coding uniformity, we created detailed coding instructions to train the research assistants. About 50% of the episodes were coded by more than one observer (Cohen's kappa = .77). Disagreements were resolved through discussion by the two coders and the first author.

Results

In all intervention classrooms, children participated enthusiastically in the STSA. There were always volunteers for storytelling on days when that option was available, and all children in all the intervention classrooms participated frequently in story-acting. Overall, the children in the intervention classes who were included in the study for purposes of analysis composed and enacted 551 stories. (Some illustrative examples are available as online supplementary material.) That number does not include an additional 70 stories from children who left the classroom before the posttests and thus were excluded from analysis. On average, each participating child told about four stories in year 1, $M = 3.7$ ($SD = 2.9$), and about six stories in year 2, $M = 6.3$ ($SD = 5.1$). The maximum number of stories recorded for individual children was 11 in year 1 and 30 in year 2. There were more stories during the second year, despite a slightly smaller number of participating children, because we had

Table 4
Descriptive statistics of pretests and posttests for oral language, emergent literacy, pretend, and social competence by experimental and control groups.

	Exp pretest		Exp posttest		Control pretest		Control posttest	
Measures	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Oral language (EVT: $n = 137$; Narr Comp: $n = 130$)								
EVT	37.31	(8.58)	44.78	(10.92)	38.05	(9.78)	44.73	(9.2)
Narrative comp total (range: 0–42)	18.65	(10.5)	24.00	(8.88)	18.62	(11.51)	22.84	(8.56)
Emergent literacy: PALS-PreK[a] ($n = 76$)								
PWA (range: 0–10)	4.86	(2.80)	7.21	(2.30)	5.38	(2.72)	6.09	(3.05)
BSA (range: 0–10)	4.90	(3.58)	7.78	(3.38)	3.45	(3.93)	6.64	(3.62)
RA (range: 0–10)	3.93	(3.62)	5.73	(3.83)	4.67	(3.47)	6.24	(4.00)
Pretend abilities ($n = 123$)								
Total pretend (range: 0–21)	12.70	(4.55)	15.26	(2.86)	13.35	(4.71)	14.35	(3.46)
Social competence: peer play ($n = 112$)								
Disruption (−12 to 12)	1.81	(2.56)	1.53	(1.70)	1.26	(1.72)	2.02	(2.25)
Disconnect (−12 to 12)	1.20	(1.89)	.97	(1.43)	1.47	(1.90)	.64	(1.18)
Interaction (−12 to 12)	3.51	(2.58)	3.85	(2.10)	2.98	(2.15)	2.85	(2.02)
Social competence: self-regulation[b] ($n = 60$)								
Inhibition (−20 to 20)	7.91	(3.98)	10.35	(3.81)	6.12	(3.53)	5.50	(2.96)
Assertion (−10 to 10)	3.38	(1.86)	3.18	(1.66)	3.38	(1.63)	2.45	(1.27)

[a] Administered only to 4- and 5-year-olds.
[b] Data from year 2 only.

taken steps which helped increase the frequency of the activity that year.

Preliminary analyses

Descriptive statistics for pre- and posttests of all 11 child ability measures (in oral language, emergent literacy, pretend, and social competence) for experimental and control classrooms are presented in Table 4. Correlations among these measures before and after the intervention are presented in Table 5. Note that the correlation coefficients are similar for pre- and posttest; the repeated measurement did not change the inter-correlations of subscales.

To examine pre-intervention differences between the experimental and the control groups, hierarchical linear models (HLM) were estimated, accounting for the nesting of children within classrooms and classrooms within centers. Child gender, majority/minority status, and Head Start eligibility were included as Level-1 covariates. Experimental vs. control condition, year, and the interaction between them were included as Level-2 covariates. Because classrooms were partly nested within centers, centers were included as dummy variables at Level 2. Center was treated as a fixed effect since they were recruited instead of randomly chosen. Hence, we controlled for variability across centers without attempting to formally generalize to the population of sites. No significant ($p \leq .05$) pretreatment experimental vs. control group differences emerged for the 11 measures of child abilities. Overall, the qualified randomization process appeared effective in creating equivalent groups prior to the intervention.

Post-intervention group differences

The first set of analyses examined the 11 measures for oral language, emergent literary, pretend, and social competence that were targeted by the study and measured using direct assessment of child abilities. Similar two-level hierarchical linear model (HLM) analyses were estimated as in the pre-intervention analyses to account for the nested structure of the data. Students (level 1) were nested within classrooms (level 2). Center was again included as a set of fixed-effect dummy variables. The critical independent variable Condition (experimental vs. control) was tested as level-2 predictor. Because of the possibility that the effects of the activity might be different in different years (due to greater mean frequency of implementation in year 2), we added Year of Study and the interaction Year X Condition as additional level-2 predictors. The posttest measure was modeled as level 1 dependent variable with pretest measure as a level-1 predictor to control for differences at pretest (autoregression). Effects of level-2 predictors are interpreted as effects on change over the course of the school year. Age, Gender, Head Start Eligibility, and Majority/Minority Status were introduced as control variables. A significance level of alpha = .05 was adopted to test all predicted positive effects of the treatment for one-tailed tests (see Table 6).

Table 5
Correlations among pretest (above the diagonal) and posttest (below the diagonal) measures for fall and spring.

Pretests / Posttests	1	2	3	4	5	6	7	8	9	10	11
1. EVT		.43**	.49**	.31**	.39**	.24**	.09	−.22*	.13	−.01	.10
2. Narr comp	.32**		.45**	.31**	.50**	.50**	.02	−.02	.19*	.03	.13
3. PALS-PWA	.48**	.51**		.34**	.21*	.40**	−.35**	−.17	.19	.04	−.08
4. PALS-BSA	.32**	.38**	.30**		.24*	.24*	−.09	−.25*	.15	.12	.20
5. PALS-RA	.51**	.41**	.54**	.39**		.19	.06	−.05	.12	.13	.01
6. Pretend	.14	.33**	.27**	.16	.24*		−.10	.00	.01	−.09	−.08
7. PP-disruption	−.02	−.09	−.03	−.01	−.02	.10		.05	−.29**	−.15	.12
8. PP-disconnection	−.12	−.26**	−.20	−.13	−.11	−.17	−.18*		−.36**	−.10	−.18*
9. PP-interaction	.15	.13	.23*	.16	.04	.19*	−.18*	−.39**		.20*	.35**
10. SR-inhibition	.10	.15	.17	.20	−.01	.14	−.16	−.12	.09		.25*
11. SR-assertion	.18*	.20*	.16	.08	.14	.23**	.04	−.19*	.21*	.26**	

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

Table 6
Hierarchical Linear Model (HLM) analyses predicting spring outcome scores by year and condition, controlling for majority/minority status, gender, Head Start eligibility, age, and fall score (autoregression).

	EVT *b*	Narr Comp *b*	PALS-PWA *b*	PALS-BSA *b*	PALS-RA *b*	Pretend *b*	PP-DR *b*	PP-DC *b*	PP-IN *b*	SR-IN *b*	SR-ASS *b*
Level 1											
Pre-post	22.86***	11.95**	8.68***	7.02*	2.77	11.74***	3.23**	1.05	4.58**	14.63***	3.08**
Maj/min status[a]	.87	.44	−1.61*	−.38	−.84	−.20	−.09	−.26	−.40	0.56	−.31
Gender	−2.93*	−0.88	−.46	1.62	.61	.07	−.25	−.18	−.34	−1.31	.49
Head start[b]	2.06	1.82	−.22	−1.08	1.53	−1.39*	−.69	.12	−.42	−2.87*	−.53
Age	2.03	1.22	−.50	.13	1.08	.65	.52	−.57**	.90*	0.52	.91*
Autoregression	.63***	.55***	.32**	.23†	.47***	.40***	.23**	.20**	.07	0.08	.05
Center d 1	−4.80	−2.79	1.26	−2.65	−1.56	−.40	−.23	.06	.48	−1.00	.23
Center d 2	−4.40	3.08	.40	−2.51	−2.31	−1.24	−.13	−.02	−.87	−0.36	1.11
Center d 3	−2.07	−2.22	.02	−1.79	−2.05	.66	−.43	.42	.76	−0.19	1.08
Center d 4	−1.86	−1.06	−.57	−2.44†	−1.74	−.32	−.1.20*	−.11	.71	−0.04	.20
Level 2											
Year	.30	−0.32	0.38	.06	.16	−.29	−.29	−.18	.07	–†	–†
Condition	1.16	0.61	0.69*	1.02*	.40	.72*	−.29	.16	.39	2.43**	.32
Interaction Y/C	1.62	2.33**	0.30	1.36*	.84	−.36	−.52*	−.29	−.38	–†	–†
ICC (Fall)	.10	.10	.13	.13	.00	.11	.09	.13	.08	.21	.22
ICC (Spring)	.19	.40	.10	.18	.08	.18	.07	.04	.09	.24	.15
Residual											
Level 1	46.13	24.86	5.67	11.43	11.71	6.26	3.27	1.49	4.04	10.15	2.02
Level 2	3.81	2.12	<.001	.03	.01	.01	.001	.21	1.72**	1.99*	.10

[a] Majority/minority status coded as 1 = "non-minority" and 2 = "minority".
[b] Head start eligibility coded as 1 = "yes" and 2 = "no".
* $p \leq .05$.
** $p < .01$.
*** $p < .001$.
† Year 2 only.

Oral language measures

Expressive vocabulary (EVT). The results did not support our hypothesis. While there was overall improvement on children's EVT scores from pre- to posttests ($b = 22.86$, $p < 001$), this did not differ as a function of Condition ($p = .27$) or Year X Condition interaction ($p = .22$).

Narrative comprehension. The results partly confirmed our hypothesis. Narrative comprehension scores for all children improved from pre- to posttests ($b = 11.95$, $p = .003$), and the improvement was greater for the experimental than for the control group, but that difference was significant only for year 2, Year X Condition interaction, $b = 2.33$, $p = .028$ ($M = 5.43$ and $M = 3.15$ pre- to post-intervention difference scores in year 2 for the experimental group and comparison group, respectively; effect size was moderate, Cohen's $d = .35$).

Emergent literacy skills. For all three subtests, children needed to be at least 4 years of age at the beginning of the year to be tested; this reduced the sample size to 76.

Print and word awareness. These results confirmed our hypothesis. While children's scores improved overall from fall to spring, $b = 8.68$, $p < 001$, this was differentiated by a significant Condition effect, $b = .69$, $p = .043$, indicating that the improvement was significantly more pronounced for the experimental than for the control group ($M = 2.35$ and $M = .71$ pre- to post-intervention difference scores for experimental and comparison groups, respectively; moderate to strong effect size: Cohen's $d = .58$).

Beginning sound awareness. These results confirmed our hypothesis only for the second year. Children's scores improved from fall to spring, $b = 7.02$, $p = .04$. Surprisingly, the overall improvement was greater for the control group than for the experimental group ($M = 2.88$ and $M = 3.19$ pre- to post-intervention difference scores for experimental and control groups, respectively), with a significant Condition effect, $b = 1.02$, $p = .049$. However, in year 2 there was a significantly greater improvement for the experimental than for the control group ($M = 3.27$ and $M = -.50$ pre- to post-intervention difference scores for year 2 for experimental and comparison groups, respectively; strong effect size: Cohen's $d = .74$), with a significant Condition X Year interaction, $b = 1.36$, $p = .045$.

Rhyming awareness. These results did not confirm our hypothesis. There was no significant improvement in rhyming scores from fall to spring for either Condition or Year.

Pretend abilities. The results supported our hypothesis. While children's pretend scores improved overall from fall to spring, $b = 11.74$, $p < .001$, children in the experimental group improved more than those in the control group ($M = 2.59$ and $M = 1.00$ pre- to post-intervention difference scores for experimental and comparison groups, respectively; moderate effect size: Cohen's $d = .31$), with a significant Condition effect, $b = .72$, $p = .039$.

Social competence measures

Peer play interaction assessment. This instrument measured three components: Play Disruption, Play Disconnection, and Play Interaction.

Peer play disruption. These results partly confirmed our hypothesis. A desirable effect here would be a decrease in disruption. Overall, mean levels of disruption decreased for the experimental group and increased for the control group (see Table 4), in accord with the hypothesis, but this overall Condition effect was not statistically significant (see Table 6). For year 1, however, the difference in outcomes between the experimental and control groups was statistically significant, with a significant Year X Condition interaction effect, $b = .52$, $p = .05$ ($M = -.54$ and $M = 1.30$ pre- to post-intervention difference scores for year 1 for the experimental and control group, respectively; Cohen's $d = .77$).

Table 7
Regression analyses for experimental group predicting spring outcome scores from number of stories told (NOST), controlling for autoregression, Head Start eligibility (HS), and age.

Measure	*b* fall score (autoregression)	*b* HS	*b* Age	*b* NOST	NOST ΔR^2
Narr comp	.72***	.10	.08	.16**	2.5%
EVT	.62***	.13*	.07	.06	
PALS-PWA	.44***	.08	−.11	.27**	7.5%
PALS-BSA	.18	−.13	.01	.22†	(4.7%)
PALS-RA	.47***	.26*	.07	.03	
Pretend	.55***	−.26**	.12	.08	
PPI-disruption	.27**	.21*	.20*	−.20**	3.8%
PPI-disconnection	.28**	.01	−.24**	.03	
PPI-interaction	.03	−.06	.04	.31***	9.2%
SR-inhibition	.02	−.10	−.15	.35***	11.7%
SR-assertion	.03	−.05	.23**	.15	

† $p < .06$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Peer play disconnection. These results did not confirm our hypothesis. Disconnection scores remained the same throughout the year.

Peer play interaction. These results did not confirm our hypothesis. While there was a significant increase for play interaction from fall to spring assessments, $b = 4.58$, $p = .011$, this increase did not differ as a function of Condition ($p = .23$) or Year X Condition interaction ($p = .26$).

Self-regulation assessment. This instrument measured two components, self-inhibition and self-assertion. Note that only the data for the second year of the study were analyzed here. Pretests and posttests were administered both years, but the posttest for the first year took place in February (instead of May), resulting in an overly restricted time interval between pre- and posttest. (The original intention was to carry out this assessment three times during the school year, but at the end of the year an unanticipated staff shortage precluded a third set of observations. In year 2, this assessment was administered twice, at the beginning and end of the year.)

Self-inhibition. The results supported our hypothesis. Self-inhibition scores increased for the experimental group but decreased for the control group, with a significant Condition effect, $b = 1.29$, $p = .029$ ($M = 2.44$ and $M = -.62$ pre- to post-intervention difference scores for experimental and comparison groups, respectively; moderate to strong effect size; Cohen's $d = .61$).

Self-assertion. The results did not support our hypothesis. While there was an overall increase of self-assertion from fall to spring, $b = 3.15$, $p < 05$, this did not vary as a function of Condition.

Summary. Overall, though not uniformly, the results supported our general hypothesis that children in the experimental group would show greater improvements than children in the control group for abilities falling in all three dimensions of school readiness targeted for consideration. Specifically, participation in the STSA was significantly associated with improvements in the following measures: in oral language skills, *narrative comprehension* (results positive in both years and significant in year 2); in emergent literacy, *print and word awareness*; in social competence, *greater self-inhibition* and *reduced play disruption* (play disruption was reduced in both years, and the association was significant in year 1); and *pretend abilities*, which for purposes of this study are linked primarily though not exclusively to social competence. Results for one other emergent literacy measure, *beginning sound awareness*, were positive and significant only in year 2.

Individual differences in outcomes by frequency of participation

To further probe the hypothesis that the observed differences in outcomes between the experimental and control groups were, in fact, the result of participation in the STSA, we performed an additional analysis to examine whether greater frequency of participation in this activity by individual children enhanced these effects. Focusing exclusively on the experimental group, we examined whether the Number of Stories Told (NOST) by each child over the course of the year predicted positive changes in the relevant outcomes for that child. We expected that higher NOST scores per child would be associated with greater improvements in outcome measures.

Strictly speaking, focusing on NOST captures only one aspect of participation in the STSA. Children also participated as actors in the story-acting portion of the activity, and all children in the class, including the audience, were exposed to the public reading-out and enactment of the stories each time they were performed. (It is worth noting that quietly watching and listening to a story enactment as a member of the audience requires, and may help promote, self-regulation.) However, even taking all those caveats into account, there are good reasons to believe that NOST is an especially useful indicator with which to compare different degrees of children's active involvement in the STSA. Greater frequency of storytelling gives children more practice in constructing and reconstructing their narratives. And while all children participated frequently as actors and as audience members, the frequency of storytelling varied more substantially between individual children.

Table 7 shows the specific effects of NOST on all 11 dependent measures after controlling for autoregression (fall pretest score for each variable), age, and Head Start eligibility (used as an indicator of relative socioeconomic status). We included age as a control variable to rule out spurious developmental effects, since older children tended to score higher on several outcomes and also to tell more stories ($r = .26$). We found that a greater number of stories told was a significant predictor of higher posttest scores on five measures, distributed across all three dimensions of school readiness targeted for consideration: in oral language, *narrative comprehension*, $b = .16$, $p = .002$ (explaining an additional 2.5% of the variance); in emergent literacy, *print and word awareness*, $b = .27$, $p = .009$ (explaining an additional 7.5% of the variance); in social competence, decrease in *play disruption*, $b = -.20$, $p = .013$ (additional 3.8% of variance), and increases in *play interaction*, $b = .31$, $p = .001$ (additional 9.2% of variance) and *self-inhibition*, $b = .35$, $p < 0001$ (additional 11.7% of variance). For one other emergent literacy measure, *beginning sound awareness*, results were positive but not quite significant ($b = .22$, $p = .059$). Thus, for almost every measure where the main analysis showed positive results, those

results were further strengthened by the frequency of individual participation in storytelling. (Pretend abilities were a curious exception. And this NOST analysis showed significant results for peer play interaction, whereas the main analysis did not.) These additional results provide further evidence to support our general hypothesis that participation in the STSA promoted the development of a range of abilities that contribute to school readiness.

Discussion

This study sought to examine the effects of a storytelling and story-acting practice (STSA) originally developed by Vivian Paley in order to assess its developmental and educational value for low-income, preschool children. Specifically, it examined whether this narrative- and play-based activity, operating as a regular component of the preschool curriculum, can promote participating children's abilities in three key, interconnected dimensions of their school readiness: narrative and other oral-language skills, emergent literacy, and social competence.

The STSA is structured and facilitated by teachers and, at the same time, exemplifies child-centered, play-based, and constructivist approaches in early childhood education. Its mode of combining voluntary composition and dictation of stories by individual children and the public enactment of those stories with and for their peers has several significant implications. One implication is that the children's stories are shared, not only with adults, but primarily with other children – not in one-to-one interaction, but in a *shared public arena* that offers children ongoing possibilities for narrative borrowing, experimentation, and cross-fertilization. In the process, it has been argued, the STSA helps build up a common culture in the classroom peer group that in turn helps to motivate and energize the children's participation, and it simultaneously requires and encourages capacities for self-regulation (McNamee, 1987; Nicolopoulou, 2002; Nicolopoulou et al., 2010). Some practitioners and proponents of the STSA have treated it as the core of a comprehensive "storytelling curriculum" (Cooper, 2005), but this study considered its potential as a more delimited curriculum module that can operate in conjunction with a variety of different preschool curricula. Previous analyses of the STSA, both theoretical and empirical, offered plausible reasons for expecting that it can effectively mobilize young children's energy, enthusiasm, and existing abilities to further promote their abilities in all three domains of school readiness just outlined. The present study focused, in particular, on examining its effectiveness for enhancing school readiness in low-income preschoolers.

Although this STSA has been widely adopted and has attracted enthusiastic supporters as well as a certain amount of research interest, so far only a handful of studies have attempted systematic assessments of its effects on young children's learning and development. The present study was the first such attempt to combine quantifiable measures of child outcomes, systematic comparisons between intervention and control classrooms, a respectable number of such classrooms, and rigorous statistical analysis. Furthermore, whereas the two previous outcome assessment studies that used controlled comparisons, McNamee et al. (1985) and Nicolopoulou (2002), focused on the STSA's effects on children's oral language skills, the present study also included systematic examination of its effects on two other dimensions of school readiness – skills related more directly to emergent literacy and social competence skills.

Over a two-year period, this curriculum module was introduced for one school year apiece into six preschool classrooms in a child care/preschool program serving children from low-income backgrounds; seven other classrooms in the same program were used as controls. Children in experimental and control classrooms were administered pretests and posttests of 11 measures used to capture skills relevant to school readiness. Hierarchical linear model (HLM) analyses found that children in the experimental classes improved significantly more than those in the control classes on measures distributed across the targeted dimensions of school readiness. Furthermore, for almost every measure where this HLM analysis showed positive results, those results were strengthened further by an additional analysis which examined the effects of greater frequency of storytelling by individual children in the experimental group. The present study thus provides evidence to confirm the expectation that this STSA can help promote school readiness in low-income preschool children. On the other hand, results were not positive for all measures, and some positive results were not as strong as expected. The sections that follow will outline and consider the overall pattern of results and its implications for this study and future research.

Promoting oral language abilities

Substantial bodies of research have established that young children's early mastery of the oral language abilities examined in this study, narrative skills and vocabulary, helps lay important foundations for their acquisition of literacy and long-term school success (Dickinson & Tabors, 2001; Kendeou et al., 2009; Lynch et al., 2008; Oakhill & Cain, 2007; Whitehurst & Lonigan, 2001). Previous studies of the STSA found that preschool children's participation in this activity was associated with advances in the quality of stories they composed and dictated as part of the activity itself (McNamee et al., 1985; Nicolopoulou, 1996). And a study of low-income preschoolers (Nicolopoulou, 2002) found that participating children achieved significant gains in a narrative production task. Nicolopoulou (2002) also found that participation in the STSA was associated with improvements in scores on the Expressive Vocabulary Test (EVT), which measures a combination of vocabulary knowledge and vocabulary-related skills, that were not just significant but substantial.

In the present study, pretest–posttest results for the effects of the STSA on the children's oral language abilities were mixed. With respect to narrative development, children in the experimental group improved their scores on a narrative comprehension task more than children in the control group, though this difference was significant only in year 2. And within the experimental group, frequency of participation in storytelling (NOST) significantly predicted greater improvements in narrative comprehension. These results were positive and encouraging, though not as strong or consistent as expected. For the EVT, however, the positive results found in Nicolopoulou (2002) were not replicated in the present study. EVT scores improved for both experimental and control groups, but there was no significant relationship between the amount of improvement and participation in the STSA.

The reasons for this pattern of outcomes remain unclear, but it is worth considering one possible factor. The present study found that the STSA can help to promote young children's learning and development, but there are good reasons to expect that it does so most effectively when it operates in conjunction with certain other classroom practices, especially regular bookreading activities by and with adults (Nicolopoulou et al., 2014). Bookreading activities were frequent in both the experimental and control classrooms studied for Nicolopoulou (2002). (The fact that the two classrooms were equivalent in this respect should be emphasized, since it excludes the possibility that improved scores for the experimental group were simply a direct result of bookreading.) They were also frequent in the preschool classrooms studied for McNamee et al. (1985) and in Paley's classrooms described in her writings. On the other hand, in the classrooms included in the present study, bookreading activities were infrequent and were rarely conducted using interactive techniques. Frequent engagement with

adult-authored storybooks, especially though interactive adult–child bookreading practices, can help familiarize children with more diverse vocabulary, a wider array of characters and plotlines and narrative devices, and expanded examples of extended discourse that augment what they encounter in everyday conversations and in electronic media like TV cartoons. Providing children with these narrative and other oral-language resources can strengthen and enrich their own narrative activity in the STSA – both directly and, through processes of narrative borrowing and cross-fertilization, collectively – and enhance its benefits for those involved. One would expect this kind of mutually supportive interaction between storybook reading and the STSA to be particularly valuable for low-income preschoolers, who are less likely than middle-class preschoolers to have extensive bookreading interactions with their primary caregivers (Storch & Whitehurst, 2002). Therefore, future studies of the STSA should systematically explore the possibility that its developmental and educational effectiveness is increased when it is complemented by regular bookreading and similar activities.

Promoting emergent literacy skills

We used a measurement instrument with subtests for three clusters of skills related more directly to emergent literacy than the oral language skills just discussed: print and word awareness (PWA), beginning sound awareness (BSA), and rhyming awareness (RA). The findings for print and word awareness were the strongest. Children in the experimental classes improved their print and word awareness significantly more than children in the control classes. And within the experimental group, the number of stories told (NOST) was a significant predictor of greater PWA. Results for the BSA phonological subtest were less straightforward. In year 2, children in the experimental classes improved significantly more than those in the control classes. But in year 1, surprisingly, control children showed greater improvement on this measure. The RA phonological subtest showed no significant differences between children in the experimental and control conditions; in fact, it showed no significant improvements in RA for either condition or either year.

The RA subtest was included in the study primarily because it has sometimes been linked to other emergent literacy measures. But we had no strong expectations that we would find significant associations with the STSA, so the absence of significant results is not troubling. With respect to beginning sound awareness, however, the fact that control children showed greater improvements than experimental children in year 1 is perplexing. The reasons for this anomalous result are unclear. Given this inconsistent pattern of results, future studies of the STSA should probably reexamine its effects on phonological awareness. The finding that participation in the STSA was significantly associated with increased print and word awareness is very encouraging, since there is accumulating evidence that these skills are key predictors, along with phonological awareness and oral language skills, of later success in learning to read (Hecht, Burgess, Torgesen, Wagner, & Rashotte, 2000; Justice & Ezell, 2001). We did not find this result surprising, since the STSA provides children with a range of engaging literacy-related experiences that concretely demonstrate the uses and mechanics of writing, reading, and print. With respect to promoting emergent literacy skills we surmise, once again, that the STSA will have the most beneficial effects if it is suitably complemented by other effective literacy-related activities.

Promoting pretend abilities

Children's capacity for imaginative pretense is related to the development of their social competence, since there is evidence that it is one of the developmental foundations for social pretend play and self-regulation, and it has also been linked to the interconnected domains of cognitive and narrative development (Harris, 2000; Sachet & Mottweiler, 2014). As in the case of children's narrative abilities, the STSA draws on children's developing abilities and enthusiasm for pretending and, at the same time, we expected that children's participation in this activity would also promote the further development of their pretend abilities. This expectation was confirmed by the results. The pretend abilities of children in the experimental condition improved significantly more than those of children in the control condition.

Promoting social competence

There were also positive results for several elements of social competence, though not for all the measured components. The peer play assessment, which sought to capture aspects of children's capacity and willingness for cooperation, measured play disruption, play disconnection, and play interaction. We found expected results for play disruption, which decreased in the experimental group and increased in the control group, but this effect was statistically significant only for year 1. Among experimental children, however, there was a significant overall association between more frequent participation in storytelling (NOST) and decreases in play disruption. On the other hand, pretest–posttest results showed no significant differences between experimental and control children in outcomes for play disconnection or play interaction (though NOST was correlated with improved play interaction). The self-regulation assessment had measures for self-inhibition and self-assertion. (Unfortunately, as explained earlier, self-regulation data could be analyzed only for year 2.) Results showed a significant association between participation in the STSA and improved self-inhibition (with a moderate to strong effect size; Cohen's $d = .610$), and there was also a significant association between NOST and improved self-inhibition. On the other hand, results for the self-assertion measure showed no significant effect of the STSA.

In short, in both the peer play assessment and the self-regulation assessment we found positive effects of the STSA for the components most directly related to self-discipline – i.e., reduced play disruption and increased self-inhibition capacities. But the absence of significant results for components related more directly to active cooperation, especially the play interaction subscale, was unexpected and calls for further consideration. We suspect it would be premature to conclude from these results that children's participation in the STSA has no beneficial effects on their capacities for cooperation. One possible methodological factor may be limitations in the play interaction subscale derived from the PPIS, which focused on what might be called prosocial orientations and behaviors (e.g., "comforting others," "helping other children," or "sharing toys with others"). These indicators capture only some of the abilities and behaviors involved in cooperation – though, on the other hand, one might have expected the scores for those indicators to improve as well. These and other questions, both substantive and methodological, concerning the possible relationships between the STSA and the development of the cooperative elements of social competence should be addressed by future research.

Summary using the storytelling and story-acting practice to promote school readiness

In sum, these findings provide substantial evidence that the children's participation in the STSA helped to promote a range of their school readiness skills in the domains of narrative, emergent literacy, and social competence. Its success in doing so was especially encouraging given that preschoolers from low-income and

otherwise disadvantaged backgrounds, like the ones participating in this study, tend to start out with weaker foundations in these areas than preschoolers from middle-class backgrounds, including less familiarity with some of the basic narrative conventions and resources for constructing free-standing self-contextualizing fictional stories (Hart & Risley, 1995; Hecht et al., 2000; Peterson, 1994; Snow et al., 1998). Nevertheless, the STSA drew on children's existing abilities and enthusiasm for constructing and playfully enacting fictional narratives and effectively mobilized them to help promote further development. To adapt a useful formulation employed in another context by Ochs, Smith, and Taylor (1989), the operation of the STSA created and maintained a shared *opportunity space* that provided resources and generated motivations for the children's learning and development.

On the other hand, some findings from the present study remain suggestive rather than definitive, and the results leave open various questions to be pursued by further research. Although the results confirmed that the STSA improved children's scores on a number of the measured skills, in some areas the results were uneven or inconsistent, and it is possible that they might have been stronger and more comprehensive under somewhat different conditions. For example, there are plausible reasons to expect that the STSA will be most effective in enhancing children's oral language skills – especially in preschools serving low-income and otherwise disadvantaged children – if it is complemented by certain other preschool practices, such as regular adult–child bookreading. Given what appears to be a self-reinforcing dynamic in the STSA, it is also possible that its effects could be strengthened if it is conducted with greater frequency than was the case in this study. In this and other respects, we suggest that the present study should be regarded as a first step in assessing and analyzing the potential educational and developmental benefits of the STSA. Its findings are sufficiently promising that they ought to be followed up.

Limitations and future directions

Along with its promising findings, the present study also had several limitations. Some of these were linked to constraints in the arrangements that could be worked out with the child care/preschool organization used for the study. This study used a randomized experimental vs. control design, but the assignment of classrooms to experimental or control conditions could not be fully randomized, because the consent of the teachers was required. One teacher requested that her classroom be used as a control rather than an experimental classroom because it was her first year with this organization (though not her first year as a preschool teacher). It is worth noting, however, that assessments of classrooms using the Early Language and Literacy Classroom Observation Toolkit (ELLCO) found no significant differences between experimental and control classrooms. To prevent possible cross-classroom contamination, we tried to avoid having more than one participating classroom per center in a given year; but during the second year there was one case where using one experimental and one control classroom in the same center was unavoidable. However, if there were any consequential influences between these two classes (none were observed), one would expect them to have weakened the hypothesized outcome differences between experimental and control conditions rather than augmenting them.

Other limitations and complications were related to the measures used in the study. Standardized measurement instruments suitable for this study were not readily available for many of the abilities to be tested. In most cases, it was necessary to develop measures by adapting or modifying existing instruments and to validate these measures using study data. It seems possible that one measure, the play interaction subscale derived from the Penn Peer Interaction Scale (PPIS), may not have captured all the relevant aspects of children's capacities for cooperation it was designed to assess. The self-assertion subscale of the self-regulation assessment, derived from Olson and Kashiwagi (2000), had relatively weak reliability; this factor may be a reason to reconsider the effects of STSA participation on self-assertion, for which our analysis found no significant association. Future research on this STSA should further refine some measures and may have a wider range of standardized measures available. The emergent literacy tasks derived from the Phonological Awareness Literacy Screening (PALS-PreK) could be administered to only part of the sample, since the PALS-PreK is not designed for use with children younger than age four. But this limitation was unavoidable, since suitable measures of pre-literacy skills designed for use with children younger than four remain unavailable. And during year 1 of the study, for reasons described earlier, the pretest and posttest for the self-regulation assessment were administered with an insufficient time interval between then, so that it was possible to analyze data only from year 2; these results were valid and significant, but it would have been preferable to be able to analyze data from both years, in accord with analyses for the other measures.

Some other possible limitations became clear as the study was carried out. Bookreading practices, particularly interactive bookreading, were relatively infrequent in the preschool classrooms included in the present study (though their frequency of occurrence was not explicitly measured). However, there are good reasons to expect that the STSA will be most effective in promoting preschool children's oral language and emergent literacy skills if it is complemented by regular bookreading practices, and that the mutually supportive interaction between adult–child bookreading and the STSA should be especially valuable for children from low-income and otherwise disadvantaged backgrounds. Therefore, it is possible that the results from this study did not fully bring out the potential benefits of the STSA. Future studies of the STSA should test these hypotheses systematically. It is also likely that the effectiveness of the STSA will be affected by the frequency with which it is conducted. In the present study, the STSA was conducted two times per week in all the intervention classrooms during year 2, but the frequency of implementation was less consistent between and within classrooms during year 1, with a slightly lower mean frequency of implementation for year 1 than for year 2. Results on some measures (though not all) appeared to be stronger for year 2 than year 1, though it was not possible to analyze such differences systematically in the present study. Future studies of the STSA should probably (a) implement the STSA a minimum of twice per week and (b) systematically vary the frequency of implementation between different intervention classrooms to assess whether and to what extent conducting the STSA more frequently –three, four, or five days per week – can increase its effectiveness for promoting children's learning and development.

In the present study, the story-acting portion of the STSA – the public reading-out and enactment of the children's stories – was always led by the classroom teacher. Sometimes the teachers also wrote down the children's stories as they were dictated, but we provided them with the option of letting research assistants from the study perform this task. For the purposes of the present study, which focused on the basic question of whether the STSA can promote children's school readiness skills, this procedure was not problematic. In other preschool classrooms where the STSA is a regular part of the curriculum, it is not uncommon for someone other than the teacher, such as a teacher's aide or a volunteer classroom aide from the community, to assist with story-taking. However, in order to explore more fully the practical feasibility of integrating the STSA as a regular curriculum module in preschools serving low-income children, future interventions

should be conducted without offering teachers this sort of external support.

The findings and limitations of the present study suggest other possible directions for future research on the operation and effects of the STSA. The number of classrooms and children included in the present study was adequate for a preliminary assessment, but it would clearly be useful to replicate this study on a larger scale. Future research can also examine more closely the interaction between the different components of the STSA and seek to specify more fully the mechanisms by which they produce their effects separately or in combination. For reasons explained earlier, there are theoretical and empirical grounds for believing that the STSA's mode of combining individual story*telling* and public story-*acting* is crucial to its effectiveness. But further examination and confirmation of this conclusion would be useful. For example, interventions could systematically introduce story dictation and story enactment separately and in combination (perhaps along lines similar to McNamee et al., 1985) and compare the effects. Or individual story dictation might be combined with two types of peer-oriented public activities, the public enactment of the stories or their public discussion by the classroom peer group (a technique used by Fein et al., 2000, but without systematic measures of child outcomes). Furthermore it is important to discover whether the beneficial effects of the STSA for participating preschool children remain durable as children proceed into kindergarten and elementary school; answering those questions will require longitudinal studies.

To borrow a formulation used by Lewis (1995) to sum up her study of Japanese preschools, early childhood education is most valuable when it educates both hearts and minds – that is, when it simultaneously promotes the development of socioemotional and intellectual abilities – in effective and mutually reinforcing ways. The findings of the present study indicate that the STSA can help to do this, and therefore can contribute to enhancing school readiness in young children from low-income and otherwise disadvantaged backgrounds. This promise should be pursued further in research and practice.

Acknowledgements

The research reported here was supported by a grant to the first author (NIH/NICHD R2l HD 046909-01). After the first two authors, the other three are listed in random order, since they contributed equally to the research and analyses. Special thanks are due to the children who participated in this study, their teachers, and the child care/preschool organization in which the classrooms were located; their generous cooperation was essential to this research project. We are grateful to Jeff Weintraub for extensive consultation, constructive criticism, and other assistance.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.ecresq.2015.01.006.

References

Barnett, W. S., Jung, K., Yarosz, D. J., Thomas, J., Hornbeck, A., Stechuk, R., et al. (2008). Educational effects of the Tools of the Mind curriculum: A randomized trial. *Early Childhood Research Quarterly*, *23*, 299–313. http://dx.doi.org/10.1016/j.ecresq.2008.03.001

Berk, L. E. (1994). Vygotsky's theory: The importance of make-believe play. *Young Children*, *50*, 30–39.

Bierman, K. L., Domitrovitch, C. E., Nix, R. L., Gest, S. D., Welsh, J. A., Greenberg, M. T., et al. (2008). Promoting academic and social-emotional school readiness: The Head Start REDI program. *Child Development*, *79*, 1802–1817. http://dx.doi.org/10.1111/j. 1467-8624.2008.01227.x

Bodrova, E., & Leong, D. J. (2003). Learning and development of preschool children from the Vygotskian perspective. In A. Kozulin, B. Gindis, V. S. Ageyev, & S. M. Miller (Eds.), *Vygotsky's educational theory in cultural context* (pp. 156–176). New York, NY: Cambridge University Press.

Bodrova, E., & Leong, D. J. (2009). Tools of the mind: A Vygotskian-based early childhood curriculum. *Early Childhood Services*, *3*, 245–262.

Coolahan, K., Fantuzzo, J., Mendez, J., & McDermott, P. (2000). Preschool peer interactions and readiness to learn: Relationships between classroom peer play and learning behaviors and conduct. *Journal of Educational Psychology*, *92*, 458–465. http://dx.doi.org/10.1037/0022-0663.92.3.458

Cooper, P. M. (2005). Literacy learning and pedagogical purpose in Vivian Paley's storytelling curriculum. *Journal of Early Childhood Literacy*, *5*, 229–251. http://dx.doi.org/10.1177/1468798405058686

Cooper, P. M. (2009). *The classrooms all young children need: Lessons in teaching from Vivian Paley*. Chicago, IL: University of Chicago Press.

Creasey, G. L., Jarvis, P. A., & Berk, L. E. (1998). Play and social competence. In O. N. Saracho, & B. Spodek (Eds.), *Multiple perspectives on play in early childhood education* (pp. 116–143). Albany, NY: SUNY Press.

Denham, S. A. (2006). Social–emotional competence as support for school readiness: What is it and how do we assess it? *Early Education and Development*, *17*, 57–89. http://dx.doi.org/10.1207/s15566935eed1701_4

Diamond, A., Barnett, W. S., Thomas, J., & Munro, S. (2007). Preschool program improves cognitive control. *Science*, *318*, 1387–1388. http://dx.doi.org/10.1126/science.1151148

Dickinson, D. K., & Tabors, P. O. (2001). *Beginning literacy with language*. Baltimore, MD: Paul H. Brookes.

Dickinson, D. K., McCabe, A., Anastosopoulos, L., Peisner-Feinberg, E. S., & Poe, M. D. (2003). The comprehensive language approach to early literacy: The interrelationships among vocabulary, phonological sensitivity, and print knowledge among preschool-aged children. *Journal of Educational Psychology*, *95*, 465–481. http://dx.doi.org/10.1037/0022-0663.95.3.465

Dickinson, D. K., McCabe, A., & Essex, M. J. (2006). A window of opportunity we must open to all: The case for preschool with high-quality support for language and literacy. In D. K. Dickinson, & S. B. Neumann (Eds.), *Handbook of early literacy research* (Vol. 2) (pp. 11–28). New York, NY: Guilford Press.

Fantuzzo, J. W., Sutton-Smith, B., Coolahan, K. C., Manz, P., Canning, S., & Debnam, D. (1995). Assessment of play interaction behaviors in young low-income children: Penn Interactive Peer Play Scale. *Early Childhood Research Quarterly*, *10*, 105–120. http://dx.doi.org/10.1016/0885-2006(95)90028-4

Fein, G. G., Ardila-Rey, A. E., & Groth, L. A. (2000). The narrative connection: Stories and literacy. In K. A. Roskos, & J. F. Christie (Eds.), *Play and literacy in early childhood: Research from multiple perspectives* (pp. 27–43). Mahwah, NJ: Erlbaum.

Gillam, R. B., & Pearson, N. A. (2004). *Test of Narrative Language*. Austin, TX: Pro-Ed.

Golbeck, S. L. (2001). Instructional models for early childhood: In search of a child-regulated/teacher guided pedagogy. In S. L. Golbeck (Ed.), *Psychological perspectives on early childhood education: Reframing dilemmas in research and practice* (pp. 3–34). Mahwah, NJ: Erlbaum.

Graue, E., Clemens, M. A., Reynolds, A. J., & Niles, M. D. (2004). More than teacher directed or child initiated: Preschool curriculum type, parent involvement, and children's outcomes in the child-parent centers. *Education Policy Analysis Archives*, *72*, l–l36.

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

Groth, L. A., & Darling, L. D. (2001). Playing inside stories. In A. Göncü, & E. Klein (Eds.), *Children in play, story, and school* (pp. 220–237). New York, NY: Guilford Press.

Harris, P. L. (2000). *The work of the imagination*. Malden, MA: Blackwell.

Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore, MD: Paul H. Brookes.

Hecht, S. A., Burgess, S. R., Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (2000). Explaining social class differences in growth of reading skills from beginning Kindergarten through fourth-grade: The role of phonological awareness, rate of access, and print knowledge. *Reading and Writing*, *12*, 99–127. http://dx.doi.org/10.1023/A:1008033824385

Hirsh-Pasek, K., Golinkoff, R. M., Berk, L. E., & Singer, D. G. (2009). *A mandate for playful learning in preschool: Presenting the evidence*. New York, NY: Oxford University Press.

Invernizzi, M., Sullivan, A., Meier, J., & Swank, L. (2004). *Phonological awareness literacy screening: PreK teacher's manual*. Richmond, VA: University of Virginia Press.

Justice, L. M., & Ezell, H. K. (2001). Word and print awareness in 4-year-old children. *Child Language Teaching and Therapy*, *17*, 207–225. http://dx.doi.org/10.1191/026565901680666527

Kagan, S. L., & Kauerz, K. (2007). Reaching for the whole: Integration and alignment in early education policy. In R. C. Pianta, M. J. Cox, & K. Snow (Eds.), *School readiness and the transition to kindergarten in the era of accountability* (pp. 11–30). Baltimore, MD: Paul H. Brookes.

Kendeou, P., van den Broek, P., White, M. J., & Lynch, J. S. (2009). Predicting reading comprehension in early elementary school: The independent contributions of oral language and decoding skills. *Journal of Educational Psychology*, *101*, 765–778. http://dx.doi.org/10.1037/a0015956

Lewis, C. C. (1995). *Educating hearts and minds: Reflections on Japanese preschool and elementary education*. New York, NY: Cambridge University Press.

Lonigan, C. J., & Phillips, B. M. (2012, March). Comparing skills-focused and self-regulation focused preschool curricula: Impacts on academic and self-regulatory

skills. *Paper presented at the Society for Research in Educational Effectiveness Conference, Washington, DC.*

Lynch, J. S., van den Broek, P., Kremer, K. E., Kendeou, P., White, M. J., & Lorch, E. P. (2008). The development of narrative comprehension and its relation to other reading skills. *Reading Psychology*, *29*, 327–365. http://dx.doi.org/10.1080/02702710802165416

McNamee, G. D. (1987). The social origins of narrative skills. In M. Hickmann (Ed.), *Social and functional approaches to language and thought* (pp. 287–304). Orlando, FL: Academic Press.

McNamee, G. D., McLane, J. B., Cooper, P. M., & Kerwin, S. M. (1985). Cognition and affect in early literacy development. *Early Child Development and Care*, *20*, 229–244. http://dx.doi.org/10.1080/0300443850200402

Meisels, S. E. (1999). Assessing readiness. In R. J. Pianta, & M. J. Cox (Eds.), *The transition to kindergarten* (pp. 39–66). Baltimore, MD: Paul H. Brookes.

Miller, E., & Almon, J. (2009). *Crisis in the kindergarten: Why children need to play in school*. College Park, MD: Alliance for Childhood.

National Research Council & Institute of Medicine. (2000). From neurons to neighborhoods: The science of early childhood development. In J. P. Shonkoff, & D. A. Phillips (Eds.), *Committee on integrating the science of early childhood development*. Washington, DC: National Academy Press.

National Research Council. (2001). Eager to learn: Educating our preschoolers. In B. T. Bowman, M. S. Donovan, & M. S. Burns (Eds.), *Committee on early childhood pedagogy*. Washington, DC: National Academy Press.

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

Nicolopoulou, A. (1993). Play, cognitive development, and the social world: Piaget, Vygotsky, and beyond. *Human Development*, *36*, 1–23. http://dx.doi.org/10.1159/000277285

Nicolopoulou, A. (1996). Narrative development in social context. In D. I. Slobin, J. Gerhardt, J. Guo, & A. Kyratzis (Eds.), *Social interaction, social context, and language: Essays in honor of Susan Ervin-Tripp* (pp. 369–390). Mahwah, NJ: Erlbaum.

Nicolopoulou, A. (1997a). Children and narratives: Toward an interpretive and sociocultural approach. In M. Bamberg (Ed.), *Narrative development: Six approaches* (pp. 179–215). Mahwah, NJ: Erlbaum.

Nicolopoulou, A. (1997b). Worldmaking and identity formation in children's narrative play-acting. In B. D. Cox, & C. Lightfoot (Eds.), *Sociogenetic perspectives on internalization* (pp. 157–187). Mahwah, NJ: Erlbaum.

Nicolopoulou, A. (2002). Peer-group culture and narrative development. In S. Blum-Kulka, & C. E. Snow (Eds.), *Talking to adults: The contribution of multiparty discourse to language acquisition* (pp. 117–152). Mahwah, NJ: Erlbaum.

Nicolopoulou, A. (2007). The interplay of play and narrative in children's development: Theoretical reflections and concrete examples. In A. Göncü, & S. Gaskins (Eds.), *Play and development: Evolutionary, sociocultural, and functional perspectives* (pp. 247–273). Mahwah, NJ: Erlbaum.

Nicolopoulou, A., & Cole, M. (1993). The generation and transmission of shared knowledge in the culture of collaborative learning: The Fifth Dimension, its play-world and its institutional contexts. In E. A. Forman, N. Minick, & C. A. Stone (Eds.), *Contexts for learning: Sociocultural dynamics in children's development* (pp. 283–314). New York, NY: Oxford University Press.

Nicolopoulou, A., Scales, B., & Weintraub, J. (1994). Gender differences and symbolic imagination in the stories of four-year-olds. In A. H. Dyson, & C. Genishi (Eds.), *The need for story: Cultural diversity in classroom and community* (pp. 102–123). Urbana, IL: National Council of Teachers of English.

Nicolopoulou, A., McDowell, J., & Brockmeyer, C. (2006). Narrative play and emergent literacy: Storytelling and story-acting meet journal writing. In D. Singer, R. Golinkoff, & K. Hirsh-Pasek (Eds.), *Play=learning* (pp. 124–144). New York, NY: Oxford University Press.

Nicolopoulou, A., de Sá, A., Ilgaz, H., & Brockmeyer, C. (2010). Using the transformative power of play to educate hearts and minds: From Vygotsky to Vivian Paley. *Mind, Culture, and Activity*, *5*, 61–71. http://dx.doi.org/10.1080/10749030903312512

Nicolopoulou, A., Brockmeyer, C., de Sá, A., & Ilgaz, H. (2014). Narrative performance, peer-group culture, and narrative development in a preschool classroom. In A. Cekaite, S. Blum-Kulka, V. Aukrust, & E. Teubal (Eds.), *Children's peer talk: Learning from each other* (pp. 42–62). NY: Cambridge University Press.

Oakhill, J., & Cain, K. (2007). Introduction to comprehension development. In K. Cain, & J. Oakhill (Eds.), *Children's comprehension problems in oral and written language: A cognitive perspective* (pp. 3–40). New York, NY: Guilford Press.

Ochs, E., Smith, R., & Taylor, C. (1989). Detective stories at dinnertime: Problem-solving through co-narration. *Cultural Dynamics*, *2*, 238–257.

Olson, S. L., & Kashiwagi, K. (2000). Teacher ratings of behavioral self-regulation in preschool children: A Japanese/U.S. comparison. *Journal of Applied Developmental Psychology*, *21*, 609–617. http://dx.doi.org/10.1016/S0193-3973(00)00056-3

Overton, W. F., & Jackson, J. P. (1973). The representation of imagined objects in action sequences: A developmental study. *Child Development*, *44*, 309–314. http://dx.doi.org/10.2307/1128052

Paley, V. G. (1990). *The boy who would be a helicopter: The uses of storytelling in the classroom*. Cambridge, MA: Harvard University Press.

Peterson, C. (1994). Narrative skills and social class. *Canadian Journal of Education*, *19*, 251–269. http://dx.doi.org/10.2307/1495131

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage.

Raver, C. C., & Zigler, E. F. (1997). Social competence: An untapped dimension in evaluating Head Start's success. *Early Childhood Research Quarterly*, *12*, 363–385. http://dx.doi.org/10.1016/S0885-2006(97)90017-X

Raver, C. C., Garner, P. W., & Smith-Donald, R. (2007). The roles of emotion regulation and emotion knowledge for children's academic readiness: Are the links causal? In R. C. Pianta, M. J. Cox, & K. L. Snow (Eds.), *School readiness and the transition to Kindergarten in the era of accountability* (pp. 121–147). Baltimore, MD: Paul H. Brookes.

Raver, C. C., Jones, S. M., Li-Grining, C., Zhai, F., Bub, K., & Pressler, E. (2011). CSRP's impact on low-income preschoolers' preacademic skills: Self-regulation as a mediating mechanism. *Child Development*, *82*, 362–378. http://dx.doi.org/10.1111/j. 1467-8624.2010.01561.x

Reese, E., Suggate, S., Long, J., & Schaughency, E. (2010). Children's oral narrative and reading skills in the first 3 years of reading instruction. *Reading & Writing*, *23*, 627–644. http://dx.doi.org/10.1007/s11145-009-9175-9

Richner, E. S., & Nicolopoulou, A. (2001). The narrative construction of differing conceptions the person in the development of young children's social understanding. *Early Education & Development*, *12*, 393–432. http://dx.doi.org/10.1207/s15566935eed1203_6

Sachet, A. B., & Mottweiler, C. M. (2014). The distinction between role-play and object-substitution in pretend play. In M. Taylor (Ed.), *The Oxford handbook of the development of imagination* (pp. 175–185). New York, NY: Cambridge University Press.

Schweinhart, L. J., & Weikart, D. P. (1997). *Lasting differences: The HighScope Preschool Curriculum Comparison study through age 23 (Monographs of the HighScope Educational Research Foundation, 12)*. Ypsilanti, MI: HighScope Press.

Smith, M. W., & Dickinson, D. K. (2002). *Early Language and Literacy Classroom Observation (ELLCO) toolkit, research edition*. Baltimore, MD: Paul H. Brookes.

Snow, C. E. (1999). Facilitating language development promotes literacy learning. In L. Eldering, & P. P. M. Leseman (Eds.), *Effective early education: Cross-cultural perspectives* (pp. 141–161). New York, NY: Falmer Press.

Snow, C. E., Burns, M. C., & Griffin, P. (Eds.). (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.

Storch, S. A., & Whitehurst, G. J. (2002). Oral language and code-related precursors to reading: Evidence from a longitudinal structural model. *Developmental Psychology*, *38*, 934–947. http://dx.doi.org/10.1037/0012-1649.38.6.934

Ursache, A., Blair, C., & Raver, C. C. (2012). The promotion of self-regulation as a means of enhancing school readiness and early achievement in children at risk for school failure. *Child Development Perspectives*, *6*, 122–128. http://dx.doi.org/10.1111/j.1750-8606.2011.00209.x

Vygotsky, L. S. (1967). Play and its role in the mental development of the child. *Soviet Psychology*, *12*, 6–18 (translation of a lecture given in Russian in 1933).

Whitehurst, G. J., & Lonigan, C. J. (2001). Emergent literacy: Development from prereaders to readers. In S. B. Neuman, & D. K. Dickinson (Eds.), *Handbook of early literacy research* (pp. 11–29). New York, NY: Guilford Press.

Williams, K. (1997). *Expressive Vocabulary Test*. Circle Pines, MN: American Guidance Service.

Wilson, S., Farran, D. C., Lipsey, M. W., & Turner, K. (2012, June). The effect of Tools of the Mind curriculum on children's achievement and self-regulation. *Paper presented at Head Start's 11th National Research Conference* Washington, DC.

Zigler, E. F., & Bishop-Josef, S. J. (2004). Play under siege: A historical overview. In E. F. Zigler, D. G. Singer, & S. J. Bishop-Josef (Eds.), *Children's play: The roots of reading* (pp. 1–14). Washington, DC: Zero to Three Press.