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Studying the Effectiveness of the Storytelling/Story-Acting (STSA) Play Intervention on Ugandan Preschoolers' Emergent Literacy, Oral Language, and Theory of Mind in Two Rural Ugandan Community Libraries

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Abstract

This book chapter describes a Fulbright-funded research project aimed at exploring the impact of two rural village libraries in Uganda on preschool children's school readiness skills (emergent literacy, oral language, and theory of mind). Using two rural village libraries in Uganda (Mpigi Community Library in Mpigi and Kabubbu Community Library in Kabubbu) as a backdrop, this study explored the effectiveness of a six-month play-based intervention known as the Storytelling/Story-Acting (STSA) activity. Children ages 3 to 5 at each library were randomly assigned to participate in either the STSA intervention (n = 63) or a story-reading activity (n = 60) for one hour twice per week for six months. With the aid of translators, all children were administered an emergent literacy measure (knowledge of colors, letters, numbers/counting, sizes and comparisons, and shapes), a receptive vocabulary measure, and a theory of mind measure (along with other instruments) before and after the six-month intervention. These tasks were selected because they are easy to administer and do not depend heavily on expressive vocabulary skills. Caregivers were also administered an interview that assessed their educational level, quality of life, reading aloud to target child, social support, and total possessions. Children who participated in the STSA intervention had higher scores on the colors subtest of the emergent literacy measure than children who did not participate in this activity. When examining both groups together (N = 121 post-intervention), girls who scored low on a baseline measure of receptive vocabulary ability showed improvement at post-intervention; however, boys who initially scored low showed no improvement. We argue that preschool girls with poor receptive vocabulary skills might show more improvement with the STSA play intervention than preschool boys with similarly poor skills because preschool boys might have lower emotional investment in an activity that includes telling and acting out stories than preschool girls do. We also found that caregiver variables predicted the child outcomes at baseline. Preschool children benefit from a story-reading activity with or without the STSA play intervention. Caregivers play an outsized role in the development of their children's school readiness skills. Widespread dissemination of rural village libraries with cost-effective caregiver and child programs focusing on the development of school readiness skills carry the potential to transform this developing country.

Keywords: school readiness skills, emergent literacy, oral language, theory of mind, play intervention, cross-cultural psychology

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Children in the developing world are at far greater risk for all sorts of emotional, psychological, and health challenges; at the same time, they have little access to therapy, clinical interventions, and other types of support services. There are precious few resources, so traditional approaches to play therapy that might include toys and other props are not available. The intervention presented in this study is a low-cost, play-based intervention that we believed could help to address some early learning and developmental challenges using the child's natural inclination toward flexing their imagination and play muscles. The intervention also builds on the local practice of oral storytelling.

One of the legacies of colonialism on the African continent is the widespread illiteracy and entrenched poverty that interfere with its people's full participation in the global economy. A historical snapshot illustrates the scope of the problem: as of 1991, 54% of all Africans were illiterate. In some African countries, the illiteracy rate was over 90% (Kedem, 1991). Africa is

also the poorest region in the world and the only major developing region with negative growth in income per capita during 1980 to 2000 (Sachs et al., 2004). In sub-Saharan Africa, the per capita gross domestic product is less than it was in 1974 (Artadi & Sala-i-Martin, 2003), and recently, the average per capita income declined from $608 to $556 (Lakner & Milanovic, 2015). The average life expectancy is 59 years (World Bank Sub-Saharan Africa Statistics, 2014), while the average child mortality rate (deaths before the age of 5 per 1,000 live births) is 92 (You, Hug, & Chen, 2014). Improvement in the literacy rate could provide the necessary conditions for an economic renaissance in Africa through mass dissemination of information that people could then use to produce goods and services in demand in other parts of Africa and overseas (Dent, 2007). The role of literacy in the functioning of the democratic process has also been noted (Kranich, 2001; Stilwell, 1989, 1991).

Uganda is a sub-Saharan landlocked country enduring the same struggles as its African neighbors. With a population of 37 million (World Bank Country Statistics, 2014), Uganda's literacy rate is 86% for men (World Bank Literacy Indicators Male, 2014) and 62% for women (World Bank Literacy Indicators Female, 2014). The average life expectancy is 58 years (World Bank Country Statistics, 2014), and the scourge of AIDS orphaned more than 1 million children in the 1990s alone (World Bank, 2014). Eighty-eight percent of the population live in rural villages and earn an average daily wage of 77¢ (Dent, 2006, 2007). Having gained independence from Great Britain in 1962, Uganda is ranked 163rd out of 188 countries on the Human Development Index (Human Development Reports, 2014). Since coming to power in 1987, the current Ugandan government has attempted to redress illiteracy and its devastating effects by instituting the policies of universal primary education in 1997 and universal secondary education in 2007 (Parry, 2007; see also Parry, Chapter 5). These policies seem to be bearing early fruit; the current literacy rate for young adults is approximately 10% higher than for older adults (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2007).

School Readiness Skills

The goal of this study is to improve Ugandan preschool children's school readiness skills, which would logically improve the literacy rate and, in turn, improve the economic outlook of this developing country (for a broader overview of this project, see Dent, Goodman, & Kevane, 2014). School readiness skills have been defined as skills that adequately prepare children for academic success, which obviously includes literacy acquisition (Kagan & Lowenstein, 2004). Assessing school readiness skills poses challenges for the researcher. The child's nascent linguistic and cognitive abilities necessitate adopting creative methods to discover a child's readiness for school-based learning. Nicolopoulou and her colleagues (Nicolopoulou, de Sá, Ilgaz, & Brockmeyer, 2010; Nicolopoulou, Schnabel Cortina, Ilgaz, Brockmeyer Cates, & de Sá, 2015) have identified three broad domains of school readiness that collectively reflect a child's confident exploration of the environment: 1) emergent literacy skills, 2) oral language skills, and 3) social competence (specifically, theory of mind skills). Instruments have been developed to assess each of these domains in preschool children. These instruments have then been used to assess the effectiveness of preschool intervention programs designed to facilitate linguistic development and literacy acquisition (e.g., Barnett et al., 2008; Nicolopoulou & Cole, 2010; Nicolopoulou et al., 2015; Zigler, Singer, & Bishop-Josef, 2004). These three domains of school readiness represent the outcome variables.

Emergent Literacy.

This domain reflects the skills required by preschool children to begin the process of reading words. These skills include but are not limited to having a receptive knowledge of colors, letters, numbers and counting, sizes and comparisons, shapes, and words. Any assessment of emergent literacy in preschool children would include these basic skills because reading consists of recognizing letters and numbers and putting them together into words already known to the child. Emergent literacy seems to be a necessary but not sufficient condition for the development of later forms of literacy (Adams, 1990; Catts, Fey, Zhang, & Tomblin, 1999; Dickinson & Neuman, 2006; Hecht, Burgess, Torgesen, Wagner, & Rachotte, 2000; Pullen & Justice, 2003; Storch & Whitehurst, 2002; Whitehurst & Lonigan, 2001). Emergent literacy is necessarily transmitted within a context of human relationships and narrative activities that provide meaning to these foundational skills.

Oral Language Skills.

This domain reflects the skills required to comprehend stories. The mastery of oral language is crucial to school readiness because it contributes to emergent literacy and later reading development (e.g., Snow, 1991; Snow & Dickinson, 1990, 1991; Wells, 1985, 1986; Westby, 1991). Oral language skills occupy a continuum, which ranges from listening to and comprehending oral and written stories, to telling stories embedded in the child's surrounding context such as enactments with characters (e.g., doll play) or visual aids (e.g., picture sequences), to telling spontaneously generated stories. In young children whose symbolic capacities are just coming online, external verbal and nonverbal cues are required to contextualize their stories. We used a measure of receptive vocabulary skills as a proxy for oral language skills.

Social Competence.

This domain reflects the skills required to understand social interactions and to regulate one's own behavior, attention, and emotions. Social competence plays a key role in the development of school readiness skills because social interactions both facilitate and promote cognitive development, learning, and academic success (Blair et al., 2007; Bronson, 2000; Coolahan, Fantuzzo, Mendez, & McDemott, 2000; Fantuzzo, Sekino, & Cohen, 2004; Raver, Garner, & Smith-Donald, 2007). Classroom learning requires children to attend to the information presented by the teacher. Children need to regulate their attention, emotions, and behavior to retain this information and acquire school-based skills such as reading, writing, and arithmetic. Children also need to develop theories about the intentions and feelings of their teachers, classmates, and themselves. Verbal communication depends on one's understanding of the mental states of others—what they know and do not know about what one knows. Understanding social interactions provides a necessary context for learning, not only in the classroom but also in children's peer groups. Without this understanding, children might avoid social interactions and therefore lose the benefits of pretend play experiences provided by the peer group. These benefits include the development of symbolic capacities required for reading and writing and the construction of a shared set of rules of peer-group engagement (Nicolopoulou et al., 2015). We used theory of mind skills as a proxy for social competence.

Caregiver Influences on School Readiness Skills

Caregivers play a monumental role in their children's development of school readiness skills. For example, a caregiver's verbal responsiveness to a child's gestures, communication, or other initiation of communication influences the child's development of oral language skills (Tamis-LeMonda, Bornstein, & Baumwell, 2001). A caregiver's use of words to describe the infant's and young child's mental states also predicts later theory of mind and oral language skills (Meins et al., 2002). We were interested in exploring whether five caregiver variables would moderate the relation between the STSA play intervention and the three child outcome variables: 1) educational level, 2) quality of life, 3) reading aloud to target child, 4) social support, and 5) total possessions. Each of these caregiver variables has support in the literature for its potential impact on the development of school readiness skills.

Educational Level.

A caregiver's educational level impacts the child's school readiness skills, probably because educational level is associated with a wider vocabulary, which in turn is associated with exposure to more words. By age 4, children of professional caregivers hear about four times the total number of words as children whose caregivers receive welfare benefits (Hart & Risley, 1999). Unsurprisingly, caregiver educational level also predicts school readiness (Quirk, Mayworm, Furlong, Grimm, & Rebelez, 2015), reading trajectories (Aikens & Barbarin, 2008), and academic and behavioral outcomes (Ferguson, Jimerson, & Dalton, 2001). This association between caregiver educational level and school readiness skills holds across cultures: caregivers' educational and vocabulary levels accounted for their children's vocabulary levels and cognitive development in general in Ecuador (Schady, 2011) and reading achievement in South Africa (Hungi & Thuku, 2010).

Quality of Life.

Caregivers whose basic physical health is compromised cannot provide a secure base for their children to rely on during anxiety-provoking situations. In Uganda, where the average life expectancy is 48 years, and the scourge of AIDS has orphaned 940,000 children (Dent, 2006, 2007), caregiver health is often severely compromised. In their study conducted in Kampala, Uganda, Nuwagaba-Biribonwoha and her colleagues (Nuwagaba-Biribonwoha, Mayon-White, Okong, Carpenter, & Jenkinson, 2006) found that pregnant HIV-positive women scored significantly lower than pregnant HIV-negative women on the dimensions of Feelings, Daily Activities, Pain, Overall Health, and Quality of Life. In addition, pregnant HIV-positive women have a 70% higher likelihood of having major morbidity than pregnant HIV-negative women (Nuwagaba-Biribonwoha, Mayon-White, Okong, Brocklehurst, & Carpenter, 2012). HIV, malaria, and malnutrition seem to be a way of life for many Ugandans. The effect of caregivers' health on their children's development, however, is poorly understood.

Adverse childhood experiences such as abuse and household dysfunction are known to have debilitating effects on adults' physical health (Felitti et al., 1998), and recent evidence suggests that these same adverse childhood experiences also impact children's well-being such as obesity and learning and behavioral problems (Burke, Hellman, Scott, Weems, & Carrion, 2011). It seems plausible to suggest that caregivers' quality of life would not only reflect an exposure to some of these same adverse childhood experiences but also pose a risk for their

children's well-being, which in turn would impact on their development of school readiness skills.

Social Support.

A caregiver's social support is expected to be associated with the child's school readiness skills. Social support has been associated with more emotionally responsive parenting and more favorable child health and developmental outcomes (Oyserman, Bybee, Mowbray, & MacFarlane, 2002; Sheppard, 2009; Simons, Beaman, Conger, & Chao, 1993). Crockenberg (1981) found that caregiver social support moderated the relation between infant irritability and anxious-resistant attachment at 12 months, which in turn has been shown to predict early school performance (Sroufe, 2005).

Total Possessions.

A caregiver's total possessions impact the child's school readiness skills in some of the same ways that educational level does (Aber, Jones, & Cohen, 2000). For example, household income was conflated with educational level when Hart and Risley (1999) discovered that by age 4, children of professional caregivers hear about four times the total number of words as children whose caregivers receive welfare benefits. Caregiver total possessions also predict school readiness (Quirk et al., 2015), reading trajectories (Aikens & Barbarin, 2008), and academic and behavioral outcomes (Ferguson et al., 2001). More possessions might also reflect a less stressful, more harmonious household environment that facilitates a higher level of attention paid to conversational discourse and thus greater absorption of school readiness skills from caregivers as well as the preschool environment.

Patterns of Caregiver Reading Aloud to the Child.

The developmental researcher Meins (1997) has investigated specific aspects of caregiver sensitivity responsible for promoting both secure attachment and early linguistic capabilities in young children. Mothers of securely attached infants were more likely to treat their 19-month-olds' vocal utterances as meaningful than mothers of insecurely attached infants. She used this finding to account for the significant correlation of $r = .28$ between attachment and language development found in a meta-analysis (van IJzendoorn, Dijkstra, & Bus, 1995). Meins's (1997) research is consistent with other studies (e.g., Fonagy & Target, 2005; Meins, Fernyhough, Russell, & Clark-Carter, 1998; Slade, Grienenberger, Bernbach, Levy, & Locker, 2005) that suggest that a caregiver's treatment of a child as a thinking, feeling, desiring agent—in other words, a person possessing a mind—is associated with children's attachment security and predicts later indices of socioemotional competence. Notably, the children in Meins's (1997) study could not have cognitively understood their mothers' verbal responses to them because of their limited receptive vocabularies but rather probably experienced the accompanying affective communication as subjective evidence that their mothers were understanding their needs (see also Grienenberger, Kelly, & Slade, 2005). These mentalizing (Fonagy, Gergely, Jurist, & Target, 2002) interactions between mother and child serve to stretch the child's linguistic capabilities (Belsky & Fearon, 2002). By ages 4 to 6, exposure to stories read aloud predicts theory of mind skills (Mar, Tackett, & Moore, 2010).

We are suggesting that a caregiver's reading aloud to her child will facilitate that caregiver's treatment of her child as a mentalizing agent, which in turn will foster the child's

theory of mind skills. In other words, reading aloud to a child provides an ideal opportunity for a caregiver to communicate her sensitivity (or insensitivity) to her child by treating him or her as a child with a thinking, feeling, desiring mind, which he or she can then use to explore and understand the world around them. Through reading stories, caregivers are exposing their children to narrative structure and emotional understanding and facilitating these children's self-regulation skills through the act of listening.

Storytelling/Story-Acting (STSA) Play Intervention

While many preschool interventions have been effective at improving school readiness skills (e.g., Barnett et al., 2008; Weiland & Yoshikawa, 2013; Zigler et al., 2004), this study selected the Storytelling/Story-Acting (STSA) play intervention because it has been shown to be effective, requires few materials, and is easy to conduct. Developed by Paley (1990), a Chicago educator, the STSA play intervention capitalizes on oral storytelling (which has a venerable tradition in sub-Saharan African culture) to enhance children's cognitive and linguistic development. The STSA play intervention consists of two phases: 1) young children's dictation of spontaneously generated stories (storytelling phase), and 2) young children's acting out these stories on a makeshift stage (story-acting phase). During a period of unstructured time for children in the library, a child can approach the librarian with a story. The librarian then writes down the story verbatim with minimal intervention and reads it back to the child to ensure accuracy. The librarian also underlines all the characters in the story, and the child author assigns child actors to all the characters. After four or five stories have been collected, the librarian assembles all the children around a large rectangle on the floor, instructing them to sit behind the lines. The librarian then calls up the first child author, who selects from the group those child actors who will be acting out the story characters. The librarian reads the story first to acquaint the children with it, and then reads it again with the child actors acting it out. Each child author's story is read and acted out in the same fashion.

Paley's (1990) STSA play intervention combines narrative and play that can be deeply engaging to children and, in the process, helps them to develop strong oral language skills. Paley discussed this play intervention and some of its effects, usually in conjunction with other aspects of her classroom environment, producing rich, vivid, and engrossing ethnographic studies during the period she taught at the Chicago Laboratory School (e.g., Paley, 1990). For about 15 years, Nicolopoulou and her research team have been implementing and evaluating this play intervention in classroom settings both similar to and different from Paley's (e.g., Nicolopoulou, 2002). While a strong ethnographic dimension was always included, principles of evidence-based research involving quantitative measures of intervention outcomes also guided their efforts. In an effort to promote an evidence base for this powerful educational intervention that includes principles of play, Nicolopoulou and her research team conducted five iterative studies in the US building on Paley's research: (1) a two-year study of two middle-income preschool classrooms; (2) a three-year study of two middle-income preschool classrooms in a different setting; (3) a one-year study of a Head Start classroom using another classroom for comparison; (4) a two-year study of four Head Start classrooms in a large urban center using two other classrooms as comparisons; and (5) a two-year study where a total of seven experimental and seven control classrooms serving low-income families were studied. Each of these studies yielded significant results that validate the effectiveness of the STSA play intervention in promoting school readiness skills (for a summary of findings, see Nicolopoulou & Cole, 2010).

Our goal in studying preschool children from Uganda was to determine whether six months of participation in the STSA play intervention could improve children's school readiness skills in comparison with a control group of children who received only stories being read aloud to them. A significant finding would support the idea that this play intervention could make preschool children more prepared to enter the school environment. We wanted to demonstrate that this finding holds true even when caregivers are not providing optimal learning environments at home such as infrequent reading patterns with their children, or optimal supports because of a poor quality of life. In other words, can the STSA activity "cover the multitude of sins" embedded within these children's emotionally and materially impoverished home environments and facilitate the development of school readiness skills?

Method

Participants

We collected data from two groups of Ugandan villagers: caregivers and children ages 3 to 5 from Mpigi (n = 61) and Kabubbu (n = 62). Both groups of children were randomly assigned to participate in either the STSA play intervention (n = 63) or a story-reading activity (n = 60) for one hour twice per week for six months. Inclusion criteria for caregivers included having a child between the ages of 3 and 5 (M = 58.4 months, SD = 8.7) over whom she had primary caregiving responsibilities. Caregivers were either the mother or grandmother of the target child; four fathers participated as caregivers. Eleven caregivers had two children enrolled in the study, and one caregiver had three children enrolled. One set of twins participated. The caregivers of these 123 children were informed of the study by word of mouth spread by the librarians and project coordinator. All caregivers who satisfied the inclusion criteria consented to their participation and the participation of their children and were enrolled in the study. Caregivers in both conditions tended to be living in economically poor conditions with their spouses or partners in large households and were graduates of primary school. Children were 43.1% male and had not yet begun primary school.

Caregiver Measures

At Time 1 (January, 2014), all caregivers completed an hour-long semistructured interview designed by the authors. Interviews were videotaped and transcribed verbatim for coding purposes.

Educational Level. Educational level was assessed by asking caregivers about their highest level of educational attainment. Seventeen levels ranged from "none" to "graduate of university".

Quality of Life. The Dartmouth Primary Care Cooperative Information Charts (COOP Charts; Nelson et al., 1987) is a 10-minute, 9-item survey that assesses the quality of the person's physical health and its effects on their quality of life on nine 5-point items ("not at all" to "extremely"): 1) Feelings, 2) Daily Activities, 3) Pain, 4) Physical Fitness, 5) Change in Health, 6) Social Activities, 7) Social Support, 8) Overall Health, and 9) Quality of Life. The five anchor points for each item are visually displayed on a chart shown to the person. Adequate convergent and discriminant validity was established with the RAND scales (Nelson et al., 1987). This instrument was used previously in Uganda (Nuwagaba-Biribonwoha, Mayon-White, Okong, Carpenter, & Jenkinson, 2006). HIV-positive pregnant women scored higher on five of

the nine items than HIV-negative pregnant women (Nuwagaba-Biribonwoha et al., 2006). The nine items were summed so that total scores could range from 9 to 45. In the present study, the internal consistency of the COOP Charts was .67.

Reading Aloud to Target Child. We attempted to establish the extent of caregivers' reading to the target child. Whether the caregiver read aloud to the target child (rated 2 = "yes"; 1 = "no") and the frequency of reading aloud to the target child (rated 1 = "less than 1 day/wk"; 2 = "1 day/wk"; 3 = "2-3 days/wk"; 4 = "4-5 days/wk"; 5 = "greater than 5 days/wk"), were variables used in the exploratory analyses.

Social Support. To determine the quality of social support, caregivers were read three vignettes, modified from the work of Schaefer, Coyne, and Lazarus (1981), related to emotional, financial, and childcare support, and then asked to name three persons in their lives who could provide each of the three kinds of social support. Each item was assigned 1 point for every person named. Scores could thus range from 0 to 9.

Total Possessions. The Africa Centre Demographic Information System (ACDIS; Tanser et al., 2008) is a 10-minute, 18-item survey originally designed to assess the demographic, social, and health impact of the HIV epidemic in South Africa. Socioeconomic status was positively correlated with HIV incidence in the regions of South Africa surveyed (Tanser et al., 2008). One item, caregiver's Total Possessions in the household, included 18 possessions. We selected 12 possessions and added one item—cement floors in the home. Possessions received 1 point each and were then summed.

Child Measures

At both Time 1 (January, 2014) and Time 2 (August, 2014), all children completed three measures designed to three indices of school readiness: 1) Emergent Literacy, 2) Oral Language, and 3) Theory of Mind skills. These measures were selected because they are easy to administer and do not depend heavily on expressive vocabulary skills.

Bracken School Readiness Assessment—Third Edition (BSRA-3; Bracken, 2007)**.** The BSRA-3 is a 10-minute, 85-item interview that assesses school readiness skills in five domains: 1) colors, 2) letters, 3) numbers/counting, 4) sizes/comparisons, and 5) shapes. The child is shown a series of four pictures and instructed to point to the picture corresponding to the correct response. Split-half reliabilities for children ages 3 to 5 ranged from .96 to .97 (Bracken, 2007). The BSRA-3 was also shown to distinguish language impaired and intellectually disabled children from a normative sample that included a range of ethnicities, US geographical locations, and (socioeconomic status (SES; Bracken, 2007).

Each item was assigned 1 point for each correct response. A subtest was discontinued when the child received three consecutive scores of 0. Items were then summed both within and between domains so that total scores could range from 0 to 85. Raw scores rather than norm-referenced standard scores were used in the statistical analyses because we were not comparing this sample to a normative sample in the US. The BSRA-3 was used as a measure of Emergent Literacy skills.

Kilifi Picture Vocabulary Test (Holding et al., 2004; Nampijja et al., 2010). The Kilifi is a 4-minute, 24-item measure of receptive vocabulary adapted and translated into Luganda, the native language of the children in this sample, by Maggie Nampijja, a Ugandan child development researcher (Nampijja et al., 2010). The child is shown a series of four pictures—one target picture, a phonological distractor, a visual or semantic distractor, and an unrelated

distractor, all drawn in black and white. The child is instructed to point to the picture corresponding to the word spoken by the translator. In Kenyan samples, the Kilifi distinguished school-attending from non-school-attending children, was negatively correlated with behavioral problems, and demonstrated adequate test-retest reliability (Alcock, Holding, Mung'ala-Odera, & Newton, 2008; Holding et al., 2004). These results were mostly replicated in a Ugandan sample (Nampijja et al., 2010). Each item was assigned 1 point for each correct response. Items were summed so that total scores could range from 0 to 24. The Kilifi was used as a measure of Oral Language skills.

Five Theory of Mind Tasks (Peterson, Wellman, & Liu, 2005). The five Theory of Mind tasks comprise a 10-minute procedure that assesses the child's awareness of how mental states such as memories, beliefs, desires, and intentions govern the behavior of self and others. This awareness is purported to facilitate the child's social competence. The tasks consist of presenting a series of props (i.e., adult doll, girl and boy doll, toy house, cardboard tea box, a toy pig and cow, a picture of the back of a boy's head, and pictures of a carrot, biscuit, bushes, and hut) that facilitate the interviewer's narration of five brief stories. Each story assesses a different aspect of theory of mind: diverse desires, diverse beliefs, knowledge access, false belief, and hidden emotion. After each story, the interviewer asks the child two or three questions that assess the child's theory of mind. We slightly modified three stories to make them more culturally appropriate. In the diverse beliefs story, we replaced the garage with a hut and the cat with a chicken. In the knowledge access story, we replaced the toy chest with a toy house and the dog with a cow. In the false belief story, we replaced the Band-Aid box with a tea box (a familiar container in all Ugandan households). We believed that these slight modifications would not affect coding. The five Theory of Mind tasks were able to track the different developmental trajectories of theory of mind in children with deafness, autism, and typical development (Peterson et al., 2005; Peterson, Wellman, & Slaughter, 2012).

Each item was assigned 1 point for demonstrating theory of mind in response to the questions presented after each story. Items were summed so that total scores could range between 0 and 5. In the present study, scores ranged between 0 and 4 at Time 1 (every child participant responded incorrectly to the hidden emotion story) and between 0 and 5 at Time 2. The five Theory of Mind tasks were used as a measure of Theory of Mind skills.

Procedure

In January, 2014, we traveled to the rural Ugandan villages of Mpigi and Kabubbu to collect Time 1 data on the caregivers and children. The librarians at the Mpigi Community Library and Kabubbu Community Library as well as our project coordinator recruited participants for a study documenting the impact of the STSA play intervention on caregivers and their children ages 3 to 5 over whom they have primary responsibility. All caregivers and children provided oral or written consent to participate in this IRB-approved study after the scope and procedures of the study were carefully explained.

One of us (VD) and a research assistant independently interviewed caregivers for over one hour in a quiet area of a nearby school in both villages with assistance from two translators, who translated the questions and the caregivers' responses from Luganda to English. Caregivers received a bar of laundry soap and a bag of sugar for their participation. Caregivers were administered an interview that included questions designed to assess caregiver's Educational Level, Quality of Life, Reading Aloud to Target Child, Social Support, and Total Possessions.

At the same time, one of us (GG) and a research assistant independently interviewed the children for over one hour in a separate area from the caregivers with assistance from two translators, who translated the instructions and the children's responses from Luganda to English. Children received a T-shirt and a lollipop for their participation. The three child measures were administered in a fixed order: the BSRA-3, the Kilifi, and the Five Theory of Mind Tasks at both Time 1 and Time 2 (August, 2014) after six months of intervention.

Our project coordinator and his assistant, both trained by one of us (GG), conducted the STSA play intervention and the control intervention at the Mpigi Community Library and the Kabubbu Community Library. In Mpigi, children were randomly assigned to two STSA play intervention groups (n = 16 and n =15) and two control groups (n = 15 and n = 15) were conducted for one hour twice per week for six months (February to July, 2014). Similarly, in Kabubbu, children were randomly assigned to two STSA play intervention groups (both n =16) and two control groups (both n = 15) were conducted in exactly the same manner. The four Mpigi groups were conducted on Mondays and Wednesdays for a total of 42 sessions, while the four Kabubbu groups were conducted on Tuesdays and Thursdays for a total of 41 sessions. Some group sessions were canceled because of exam and holiday schedules as well as unscheduled events that interfered (e.g., all children from a village attending a child's funeral).

The STSA play intervention was described earlier. Both the STSA children and the control children received a story reading time (in Luganda) followed by a series of questions to assess their story comprehension and stimulate them to reflect on the storyline and the reasons why the characters behaved as they did. The children were then given paper and crayons to draw anything they wished on both front and back. The STSA children dictated their stories during their drawing time, followed by the acting out of these stories by the group.

Results

Descriptive Statistics by Group

Table 1 displays the descriptive statistics and mean differences between the STSA and control groups. Results indicate that random assignment did not prevent the STSA children from being almost four months older than the control children. In addition, the STSA children scored higher than the control children at Time 1 on the Numbers/Counting subtest, Shapes subtest, BSRA-3 Total Scores, and Theory of Mind Total Scores. Four subsequent analyses of covariance (ANCOVAs) indicated age accounted for these four significant differences.

Between-Group Differences in Change Scores

Table 2 displays the mean differences in change scores between the STSA and control groups. Results indicate that the STSA children scored higher than the control children on the Colors subtest of the BSRA-3. No other differences in change scores were significant.

Within-Group Differences in the Total Sample

Because there was only one significant difference between the STSA and control children on the theory of mind and emergent literacy variables reported on, we analyzed Time 1 to Time 2 change on these variables in the total sample. Table 3 displays the mean differences between Time 1 and Time 2 on all the variables of interest. A series of paired-samples t-tests were conducted, and all mean differences were highly significant, $p < .001$, except for the Theory of

Mind Total Scores, which were significant, $p < .05$. Children in both groups dramatically improved their theory of mind and emergent literacy scores.

Within-Group Differences in the STSA Group

We wanted to analyze Time 1 to Time 2 change on these variables in each group in isolation. Table 4 displays the mean differences between Time 1 and Time 2 on all the variables of interest. A series of paired-samples *t*-tests were conducted, and all mean differences were highly significant, $p < .001$, except for the Shapes subtest, which was significant, $p < .01$, and the Theory of Mind Total Scores, which were nonsignificant. STSA children dramatically improved their emergent literacy scores.

Within-Group Differences in the Control Group

Table 5 displays the mean differences between Time 1 and Time 2 on all the variables of interest. A series of paired-samples *t*-tests were conducted, and all mean differences were highly significant, $p < .001$, except for the Theory of Mind Total Scores, which were significant, $p < .05$. Control children dramatically improved their theory of mind and emergent literacy scores.

Exploratory Analyses

Gender as a Moderator of Change.

We were interested in exploring whether gender moderated the changes in theory of mind and emergent literacy scores between Time 1 and Time 2. In an ANCOVA controlling for age, gender moderated the Kilifi Time 1 Total Scores on Time 2 Total Scores (see Figure 1). The figure suggests that for the lowest scoring children at Time 1, the girls performed better in receptive vocabulary skills than the boys at Time 2, $F(1,116) = 6.43$, $p < .05$.

Caregiver Correlates of Theory of Mind, Emergent Literacy, and Receptive Vocabulary Scores at Time 1.

We were also interested in exploring caregiver variables that correlated with their children's theory of mind and emergent literacy scores at Time 1. These caregiver variables included caregiver's Quality of Life, Total Possessions, Social Support, and Educational Level. Table 6 displays the descriptive statistics of the caregiver variables and mean differences between the STSA and control groups. Table 7 displays the correlation matrix between these caregiver variables and their children's theory of mind and emergent literacy variables. Caregiver's Quality of Life (higher scores denote lower Quality of Life) was negatively correlated with the Colors subtest of the BSRA-3, $p < .01$, and the Letters and Numbers/Counting subtests of the BSRA-3, the BSRA-3 Total Scores, and the Kilifi Total Scores, $p < .05$. Caregiver's Total Possessions was positively correlated with the Kilifi Total Scores, $p < .001$. Caregiver's Social Support was positively correlated with the Kilifi Total Scores, $p < .05$. Caregiver's Educational Level was positively correlated with the Colors and Letters subtests of the BSRA-3, $p < .05$, the Sizes/Comparisons subtest of the BSRA-3, $p < .001$, the BSRA-3 Total Scores, the Kilifi Total Scores, $p < .01$, and the Theory of Mind Total Scores, $p < .05$. Three multiple regression analyses were conducted, with BSRA-3 Total Scores, Kilifi Total Scores, and Theory of Mind Total Scores taking turns as the dependent variable. Of the four caregiver predictor variables, caregiver's Educational Level predicted the BSRA-3 Total

Scores, $\beta = .23$, $p < .05$. Caregiver's Total Possessions and Educational Level predicted the Kilifi Total Scores, $\beta = .31$, $p < .01$, and $\beta = .20$, $p < .05$, respectively. Caregiver's Educational Level predicted the Theory of Mind Total Scores, $\beta = .20$, $p < .05$. The results suggest that caregivers play an important role in the development of their children's theory of mind and emergent literacy skills.

Caregiver Reading Habits as Correlates of Theory of Mind, Emergent Literacy, and Receptive Vocabulary Scores at Time 1.

We were also interested in exploring caregiver reading habits that correlated with their children's theory of mind and emergent literacy scores at Time 1. These variables included Reading Aloud to Target Child and Frequency of Reading Aloud to Target Child. Table 8 displays the correlation matrix between caregiver reading habits and their children's theory of mind and emergent literacy variables. Caregiver's Reading Aloud to Target Child was positively correlated with the Sizes/Comparisons subtest of the BSRA-3 and the Kilifi Total Scores, $p < .01$, the Colors subtest of the BSRA-3, the BSRA-3 Total Scores, and the Theory of Mind Total Scores, $p < .05$. Caregiver's Frequency of Reading Aloud to Target Child was positively correlated with the Colors and Sizes/Comparisons subtests of the BSRA-3 and the Theory of Mind Total Scores, $p < .01$, the Letters subtest of the BSRA-3, the BSRA-3 Total Scores, and the Kilifi Total Scores, $p < .05$. Three multiple regression analyses were conducted, with BSRA-3 Total Scores, Kilifi Total Scores, and Theory of Mind Total Scores taking turns as the dependent variable. Of the four caregiver predictor variables and Frequency of Reading Aloud to Target Child, none of these variables predicted the BSRA-3 Total Scores. Caregiver's Total Possessions predicted the Kilifi Total Scores, $\beta = .36$, $p < .001$. Frequency of Reading Aloud to Target Child predicted the Theory of Mind Total Scores, $\beta = .20$, $p < .05$. The results suggest that caregiver reading habits differentially predict children's theory of mind scores.

Caregiver and Child Time 1 Correlates of Session Attendance and Total STSA Stories Told.

Finally, we were also interested in exploring caregiver and child variables at Time 1 that correlated with the total number of group sessions attended by all the children and the total number of stories told by the STSA children. Table 9 displays the correlation matrix between the caregiver and child variables and Session Attendance and Total Stories Told (in the STSA group). Session Attendance was positively correlated with the Kilifi Total Scores, $p < .05$. Total Stories Told was negatively correlated with caregiver's Quality of Life (higher scores denote lower Quality of Life), $p < .05$, and positively correlated with the BSRA-3 Total Scores and Frequency of Reading Aloud to Target Child, $p < .05$. The results suggest that caregiver and child variables assessed at Time 1 predict Session Attendance and Total Stories Told during the STSA play intervention.

Discussion

This study tested the effectiveness of the STSA play intervention on Ugandan preschoolers' theory of mind and emergent literacy in two rural Ugandan community libraries. With a literacy rate of 79% for men and 58% for women in Uganda (UNICEF, 2013), we were interested in using the rural community library as a convenient vehicle for delivering a play-based group intervention twice per week for six months that has been shown to improve

emergent literacy, oral language, and social competence in preschoolers in the US (Nicolopoulou et al., 2015). STSA children scored higher than the control children on the Colors subtest of the BSRA-3. Perhaps children were primed for learning colors by using colored crayons to draw pictures after the library assistant's storytelling time and during the children's story dictation time. Perhaps the colors that the children used in their drawings found their way into the stories they dictated, which helped them to remember the color names. Control children also drew pictures with colored crayons, but they did not have the opportunity to use color names in story dictation; thus, they did not rehearse them in dictated stories. We could determine whether the STSA children used color names in their story dictation by counting the frequency of the use of such words in their stories. The translation of every child's STSA story has just been completed, thus allowing us to complete word frequency counts.

Contrary to expectations, however, the STSA play intervention did not produce any other significant benefits in emergent literacy or theory of mind skills. Instead, both the STSA and control children showed highly significant improvement in most of the child variables measured. Why did the STSA children not demonstrate significantly more improvement in theory of mind and emergent literacy skills than the control children? The preschool children participating in this study were pulled one hour twice a week from preschool classrooms that contained over 60 children with only two teachers to join a group of only 15 children with two facilitators. The study children often received individualized attention from these facilitators, who sometimes let them sit in their laps while they were drawing or, in the case of the STSA children, dictating their stories. In addition to small group size and individualized attention, both groups of children were exposed to a storytelling time with the facilitator asking comprehension questions afterward. One group of children told and acted out stories, while the other group continued working on their pictures, but otherwise, the two groups were identical. It is quite plausible that both groups benefited from these interventions and that the STSA play intervention did not add incrementally to this exposure to attention, oral language through story reading, and story comprehension.

Given the adverse learning conditions in their preschool classrooms, perhaps any intervention that included small group size, individualized attention, freestyle drawing, story reading, and story comprehension could have produced similar outcomes on emergent literacy and theory of mind skills. Perhaps a higher frequency of the STSA play intervention than twice per week is necessary to produce a significant effect. It is also possible that a "sleeper effect" (Muratori, Picchi, Bruni, Patarnello, & Romagnoli, 2003) on children's outcomes might be assessed at a later follow-up assessment. STSA children might reap benefits from this play intervention later in development that could distinguish them from control children. We also did not directly assess children's expressive vocabulary skills. Because the STSA play intervention forces children to rehearse their expressive vocabulary skills, we might have detected significant differences between the STSA and control children on this particular set of skills so crucial to later academic and occupational success.

Having tested the effectiveness of the STSA play intervention on Ugandan preschoolers' theory of mind and emergent literacy, we decided to conduct a series of exploratory analyses on the total sample ($N = 123$) to determine whether gender moderates change on the outcome variables and whether any caregiver variables predict the outcome variables at Time 1. Interestingly, controlling for age, gender moderated the Kilifi Time 1 Total Scores on Time 2 Total Scores. Figure 1 suggests that for the lowest scoring children at Time 1, the girls

performed better in receptive vocabulary skills than the boys at Time 2. We believe that the lowest scoring boys might have lower emotional investment in these activities than the lowest scoring girls and thus did not pay as much attention to the story reading, the drawings, or, in the case of the STSA boys, the story dictation or story-acting. By the end of the six-month intervention period, these boys' receptive vocabulary scores did not improve as much as the girls' scores. In this extreme patriarchal society, listening to and telling stories might be not be considered a masculine activity for boys. Previous research from our lab (Fanciullo et al., 2013) suggests gender-coded differences in children's implicit perception of familial social roles in this culture. The fact that these boys were also far behind in their receptive vocabulary skills probably also made these activities difficult for them and further eroded any interest they might have otherwise had.

Four caregiver variables—Quality of Life, Total Possessions, Social Support, and Educational Level—were correlated with the child outcome variables at Time 1. When entered simultaneously in a multiple regression analysis, caregiver's Educational Level predicted the BSRA-3 Total Scores and Theory of Mind Total Scores, and caregiver's Total Possessions and Educational Level predicted the Kilifi Total Scores. Prior to intervention, we were able to predict children's emergent literacy and theory of mind scores from their caregiver's educational level and wealth. The fact that caregiver wealth (as measured by total number of possessions) was identified as a significant predictor of their children's receptive vocabulary skills is particularly striking because so little variation exists in these caregivers' income levels. Family wealth and caregiver educational level play a large role in the development of their children's emergent literacy and theory of mind skills, suggesting that any play intervention targeting these outcomes must also simultaneously target caregiver, family, and community needs. The social context plays an outsized role in the development of emergent literacy (Bus, 1994). Quicken Trust (www. quickentrust.com), a UK-based private charity in Uganda, sponsors programs such as Adopt-a-Granny that provide material support to Ugandan matriarchs who often provide much of the direct care to children. This charity builds and furnishes new homes that provide shelter for these children. The Uganda Community Libraries Association (UgCLA) sponsors the Family Literacy Project (Parry, Kirabo, & Nakyato, 2014) in which caregivers get together once per week to learn how to read and to discuss how to start a business. Participants have not only become literate but have also learned how to raise chickens, cattle, and other livestock to provide for their families. Successful intervention must involve caregivers as well as children. Perhaps caregivers can also be offered graduate equivalency educational and vocational opportunities and be trained to read or tell stories to their children at home. Work with caregivers and families increases the odds that play-based group interventions such as STSA could benefit these children in the long term.

Unsurprisingly, caregiver's Reading Aloud to Target Child and Frequency of Reading Aloud to Target Child were positively correlated with the BSRA-3 Total Scores, Kilifi Total Scores, and Theory of Mind Total Scores. After controlling for the four caregiver variables, only Frequency of Reading Aloud to Target Child predicted the Theory of Mind Total Scores. Frequent exposure to stories told by the caregiver helps children to develop a theory of one's own and others' minds over and above the caregiver's quality of life, family wealth, social support, and even educational level. Mar and his colleagues (2010) reported similar findings in a US sample after controlling for child's age and gender, receptive vocabulary skills, and parental income. Our findings suggest that supporting caregivers' reading aloud to their children (if they

are themselves literate) might facilitate theory of mind development even in the presence of social-contextual risk factors such as poverty, lack of social support, poor quality of life, and even educational level. Mothers must know how to read, however, and so programs such as the Family Literacy Project are instrumental in helping caregivers to acquire literacy skills, not only to help them develop their own businesses but also to facilitate theory of mind skills in their young children.

Mar and his colleagues (2010) suggested two possible mechanisms for this finding. First, reading stories aloud to the child allows the caregiver to engage in conversation about the story characters and their beliefs, intentions, and feelings. Through such conversation, the child develops an increasingly nuanced understanding of the mental states of self and others—both similarities and differences between the mind of the self and the minds of others. Second, reading stories aloud to the child provides opportunities for the child to simulate the events depicted in his or her mind by adopting the visuospatial perspective of story characters. This mental simulation is believed to be associated with the development of imagination and pretense, which in turn predict theory of mind skills and ultimately, social competence in children (Garner, Curenton, & Taylor, 2005; Seja & Russ, 1999; Taylor & Carlson, 1997).

We collected videos of the caregivers in our sample reading a wordless story book to their children; we are now coding and analyzing these data to discover whether caregivers who read aloud to their children at home more frequently and thus have children with more highly developed theory of mind skills are also more likely to engage these children in discussions of mental state talk around the story characters. We believe that children whose caregivers engage them in discussions of mental state talk while reading a wordless story book are more likely to simulate the depicted events in the story, develop the capacity to interpret the behaviors of story characters as expressions of their mental states, and ultimately, reproduce these simulations in their own dictated stories, which they also act out in the STSA play intervention. We suggest that "playing around" with mental representations of story characters' intentions and behaviors can facilitate "playing around" with words and actions in the context of the STSA play intervention. This playing around capacity might also predict later flexibility in understanding peers' intentions and behaviors and thus enhance social competence so crucial for later relationship and occupational success. Preliminary evidence for this position comes from our finding that caregiver's Frequency of Reading Aloud to Target Child was positively correlated with Total Stories Told in the STSA play intervention. Listening to stories from the caregiver at home, possibly discussing them and simulating the events depicted in these stories in the child's mind, facilitates the child's own symbolization and storytelling ability. These storytelling experiences provide further differentiation, integration, and complexity to the child's developing mental structure, which permits deeper emotional understanding of oneself and others (Goodman, 2010).

Limitations

This study's limitations serve to qualify the conclusions that can be drawn. Translators assisted with the caregiver and child assessments. Although trained by the researchers to translate responses as accurately as possible, some responses might have got lost in translation. Administration of these measures by Ugandans without the need for translation would be ideal.

Some of the caregivers and children had never interacted with a foreigner ("*mzungu*") before. Reactions among the villagers varied widely from curiosity to fear. Although no one in

this study refused to participate, some caregivers and children were more inhibited in their responses than others, thus introducing a potential confounding variable. Participants also needed to adjust to using a translator to communicate with the interviewers. All four translators, who grew up the general area of Mpigi and Kabubbu, made every effort to build rapport with participants and remove social inhibitions. They used humor and friendly interactions with the interviewers, observed by the participants, to emphasize that the translators and interviewers were friends. The interviewers also made every effort to establish rapport directly with the participants. For example, one of us (GG) used fist-bumping ("*bonga*"), a common greeting among children in the villages, to make the child participants smile and to facilitate interactions with him. In spite of such efforts, it is not known to what extent the interviewers' presence might have confounded the results. Native interviewers might have obtained different results.

Caregivers sometimes lied about their children's birthdates to gain entry into the participant pool. In rural Uganda, it is surprisingly easy to succeed at lying about a child's age because most children have no birth records. A culturally based lack of emphasis on birthdates also accounts for the imprecision encountered in caregivers' memory of birthdates. A few caregivers could not even remember the year in which their child was born. If a child whose mother could not remember his or her birthdate appeared to fall outside the age criteria, we excluded that child from the study. In spite of these efforts, the children's ages might be inaccurate.

No information was collected about ancillary caregivers who have both indirect and direct impacts on the child. For example, assessment of the amount and quality of contact with the father could facilitate our understanding of the developmental pathways of school readiness skills in this population. Information about other caregivers could also serve to augment the emerging socioemotional picture of these preschool children.

Finally, in accordance with the correlational nature of this study, the authors took advantage of the significant correlations between the caregiver and child variables of interest to test six predictions. Future research should test these models *a priori*.

Future Directions for Research

One possibility raised earlier is that the STSA play intervention might have exerted a "sleeper effect" on children's outcomes that could be detected at a later follow-up assessment. The children in this study from Kabubbu have continued to receive the STSA play intervention twice per week in the intervening two years, while the STSA play intervention in Mpigi, the other targeted village, was discontinued after six months. Perhaps an intervention period of two years might differentiate the STSA children from the control children on the identified outcomes of emergent literacy, oral language, and theory of mind. We also are coding and analyzing data from our videos of caregivers reading a wordless story book to their children. We hope to identify one of the mediators of Frequency of Reading Aloud to Target Child on Theory of Mind Total Scores: the use of mental state talk (Bekar, 2014) in discussing these stories with their children.

We also collected attachment data on these children using the Attachment Story-Completion Task (Bretherton, Biringen, Ridgeway, Maslin, & Sherman, 1989; Bretherton, Prentiss, & Ridgeway, 1990; Bretherton, Ridgeway, & Cassidy, 1990). We expect children's quality of attachment to mediate the relation between the caregiver variables and child emergent literacy, oral language and theory of mind skills because previous research on Western samples

suggests that securely attached preschoolers are more likely to attend to their caregivers' reading aloud to them and to experience less anxiety in such interactive learning contexts (Bus, 2001, 2003). The caregiver-child relationship provides the necessary emotional context in which emergent literacy can flourish or flounder. It is also possible that an anxiously attached child can make the reading process unpleasant for the caregiver, who in turn avoids reading to the child to reduce conflict. The bidirectional nature of the caregiver-child relationship must be examined in relation to literacy acquisition in future studies.

Literacy programs targeting young adults of reproductive age must emphasize reading aloud to their children. These programs can then be evaluated for their effectiveness in improving literacy, and follow-up studies can evaluate the success of these programs in persuading these young adults to read aloud to their future children. The two hours per week spent reading aloud to children in small groups did improve emergent literacy, oral language, and theory of mind skills. If library assistants can be trained to read aloud to children and encourage children to tell stories and act them out, the literacy rate in Uganda might increase, accompanied by a drop in the poverty rate.

Conclusions

The STSA play intervention in general did not perform better than the control group on the child outcomes of emergent literacy, oral language, and theory of mind skills. Both groups included a reading time with comprehension questions, small group size, and individualized attention. Children in both groups improved dramatically on all three indices of school readiness. Boys with the lowest receptive vocabulary levels did not improve as much as girls with the same levels. Caregiver's educational level predicted the child's emergent literacy, oral language, and theory of mind skills at Time 1. Caregiver's total possessions also predicted the child's oral language skills at Time 1. Caregiver's frequency of reading aloud to the target child predicted the child's theory of mind skills at Time 1 and was positively correlated with the total number of stories the child told during the STSA play intervention.

Caregivers provide the underlying context for children's school readiness skills. We expect that improvements in caregivers' educational level, household wealth, and time to read aloud to their children daily will facilitate children's development of the skills necessary for school entry. It might also be true that such improvements will prepare children to take fuller advantage of library-based children's activities such as story reading and the STSA play intervention. Widespread dissemination of rural village libraries with cost-effective caregiver and child programs focusing on the development of school readiness skills carry the potential to restore the Pearl of Africa to its original luster.

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Table 1

Child Descriptive Statistics by Group

Variable	STSA group (1)				Control group (2)				Significance	
	M		***SD***		***M***		***SD***			
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
Group size	$n = 63$	$n = 63$			$n = 60$	$n = 58$				
Child age (months)[a]	60.33	--	7.80	--	56.47	--	9.14	--	$1 > 2^{*}$	--
Child gender (% male)	42.9				45.0				--	--
Total attendance		30.56		10.42		30.38		9.19		--
Total STSA stories told[b]		7.84		6.50		--		--		
School readiness skills (BSRA-3)										
Colors (subtest 1)	2.27	3.79	2.96	3.52	2.00	2.16	2.71	2.95	--	$1 > 2^{**}$
Letters (subtest 2)	6.84	10.44	5.66	5.18	5.12	7.78	5.79	5.74	--	$1 > 2^{**}$
Numbers/counting (subtest 3)	7.21	10.21	7.02	6.93	4.58	7.31	5.90	6.99	$1 > 2^{*}$	$1 > 2^{*}$
Sizes/comparisons (subtest 4)	8.87	12.00	6.28	5.93	7.33	10.29	5.02	5.01	--	--
Shapes (subtest 5)	7.70	9.65	5.68	5.09	5.12	8.66	4.39	5.20	$1 > 2^{**}$	--
Total scores	32.89	46.10	23.59	22.12	24.15	36.19	19.39	22.21	$1 > 2^{*}$	$1 > 2^{*}$
Receptive vocabulary (Kilifi)										
Total scores	19.02	20.37	3.34	2.75	17.83	19.74	3.95	2.88	--	--
Theory of mind										
Total scores	2.40	2.54	.89	.98	2.05	2.38	.98	.91	$1 > 2^{*}$	--

Note. $N = 123$ pre-intervention. $N = 121$ post-intervention. BSRA-3 = Bracken School Readiness Assessment-III. Kilifi = Kilifi Picture Vocabulary Test. *M* = mean. Pre = Pre-intervention. Post = Post-intervention. *SD* = standard deviation. STSA = Storytelling/Story-Acting play intervention.

[a]One child in the STSA group had just turned 6 years old at baseline. [b]Only children in the STSA group ($n = 63$) told stories.

$^{*}p < .05$. $^{**}p < .01$.

Table 2

Between-Group Differences in Change Scores

Variable	STSA group (1)		Control group (2)		Significance
	M	***SD***	***M***	***SD***	
School readiness skills (BSRA-3)					
Colors (subtest 1)	1.52	2.30	.24	2.19	$1 > 2^{**}$
Letters (subtest 2)	3.60	4.03	2.76	4.62	--
Numbers/counting (subtest 3)	3.00	4.28	2.78	4.28	--
Sizes/comparisons (subtest 4)	3.13	5.64	3.19	4.67	--
Shapes (subtest 5)	1.95	5.31	3.71	5.25	$2 > 1^{\dagger}$
Total scores	13.21	13.44	12.67	12.06	--
Receptive vocabulary (Kilifi)					
Total scores	1.35	2.90	2.02	3.50	--
Theory of mind					
Total scores	.14	1.09	.33	1.07	--

Note. $N = 123$ pre-intervention. $N = 121$ post-intervention. BSRA-3 = Bracken School Readiness Assessment-III. Kilifi = Kilifi Picture Vocabulary Test. *M* = mean. *SD* = standard deviation. STSA = Storytelling/Story-Acting play intervention.

$^{\dagger}p < .10$. $^{**}p < .01$.

Table 3

Within-Group Differences (Total Sample)

Variable	*M*		*SD*		Significance
	Pre (1)	**Post (2)**	**Pre**	**Post**	
School readiness skills (BSRA-3)					
Colors (subtest 1)	2.10	3.01	2.80	3.35	$2 > 1^{***}$
Letters (subtest 2)	5.97	9.17	5.75	5.59	$2 > 1^{***}$
Numbers/counting (subtest 3)	5.93	8.82	6.65	7.08	$2 > 1^{***}$
Sizes/comparisons (subtest 4)	8.02	11.18	5.71	5.55	$2 > 1^{***}$
Shapes (subtest 5)	6.38	9.17	5.23	5.15	$2 > 1^{***}$
Total scores	28.40	41.35	21.97	22.63	$2 > 1^{***}$
Receptive vocabulary (Kilifi)					
Total scores	18.40	20.07	3.69	2.82	$2 > 1^{***}$
Theory of mind					
Total scores	2.23	2.46	.95	.95	$2 > 1^{*}$

Note. $N = 121$ post-intervention. BSRA-3 = Bracken School Readiness Assessment-III. Kilifi = Kilifi Picture Vocabulary Test. *M* = mean. Pre = Pre-intervention. Post = Post-intervention. *SD* = standard deviation.

$^{*}p < .05$. $^{***}p < .001$.

Table 4

Within-Group Differences (STSA Group)

Variable	*M*		*SD*		Significance
	Pre (1)	**Post (2)**	**Pre**	**Post**	
School readiness skills (BSRA-3)					
Colors (subtest 1)	2.27	3.79	2.96	3.52	$2 > 1^{***}$
Letters (subtest 2)	6.84	10.44	5.66	5.18	$2 > 1^{***}$
Numbers/counting (subtest 3)	7.21	10.21	7.02	6.93	$2 > 1^{***}$
Sizes/comparisons (subtest 4)	8.87	12.00	6.28	5.93	$2 > 1^{***}$
Shapes (subtest 5)	7.70	9.65	5.68	5.09	$2 > 1^{**}$
Total scores	32.89	46.10	23.59	22.12	$2 > 1^{***}$
Receptive vocabulary (Kilifi)					
Total scores	19.02	20.37	3.34	2.75	$2 > 1^{***}$
Theory of mind					
Total scores	2.40	2.54	.89	.98	--

Note. $N = 121$ post-intervention. BSRA-3 = Bracken School Readiness Assessment-III. Kilifi = Kilifi Picture Vocabulary Test. *M* = mean. Pre = Pre-intervention. Post = Post-intervention. *SD* = standard deviation. STSA = Storytelling/Story-Acting play intervention.

$^{**}p < .01$. $^{***}p < .001$.

Table 5

Within-Group Differences (Control Group)

Variable	*M*		*SD*		Significance
	Pre (1)	**Post (2)**	**Pre**	**Post**	
School readiness skills (BSRA-3)					
Colors (subtest 1)	1.91	2.16	2.64	2.95	--
Letters (subtest 2)	5.02	7.78	5.75	5.74	$2 > 1^{***}$
Numbers/counting (subtest 3)	4.53	7.31	5.98	6.99	$2 > 1^{***}$
Sizes/comparisons (subtest 4)	7.10	10.29	4.91	5.01	$2 > 1^{***}$
Shapes (subtest 5)	4.95	8.66	4.30	5.20	$2 > 1^{***}$
Total scores	23.52	36.19	19.10	22.21	$2 > 1^{***}$
Receptive vocabulary (Kilifi)					
Total scores	17.72	19.74	3.96	2.88	$2 > 1^{***}$
Theory of mind					
Total scores	2.05	2.38	.13	.12	$2 > 1^{*}$

Note. $N = 121$ post-intervention. BSRA-3 = Bracken School Readiness Assessment-III. Kilifi = Kilifi Picture Vocabulary Test. *M* = mean. Pre = Pre-intervention. Post = Post-intervention. *SD* = standard deviation.

$^{*}p < .05$. $^{***}p < .001$.

Table 6

Caregiver Descriptive Statistics by Group (Pre-Intervention)

Variable	**STSA group (1)**		**Control group (2)**		**Significance**
	M	***SD***	***M***	***SD***	
Caregiver age (years)[a]	34.29	8.99	29.90	5.61	1 > 2**
Caregiver gender (% female)	95.2		96.7		--
Educational level (years)[a]	6.80	3.43	6.78	3.08	--
Quality of life[b]	25.48	5.86	26.22	5.74	--
Social support	2.67	.80	2.60	.85	--
Total possessions	5.76	2.48	4.88	2.81	--
Reading aloud to target child (% yes)	68.25		60.00		--
Frequency of reading aloud	2.46	1.20	2.37	1.23	--

Note. $N = 123$ pre-intervention. *M* = mean. *SD* = standard deviation. STSA = Storytelling/Story-Acting play intervention.
[a]$N = 121$. [b]Higher scores denote lower quality of life.
**$p < .01$.

Table 7

Caregiver Correlates of Theory of Mind, Emergent Literacy, and Receptive Vocabulary Scores at Time 1

Variable	1(*r*)	2(*r*)	3(*r*)	4(*r*)
Caregiver				
1. Education	--			
2. Quality of life (COOP Charts)[a]	-.13	--		
3. Social support	.28**	-.37***	--	
4. Total possessions	.22*	-.36***	.27**	--
Child				
School readiness skills (BSRA-3)				
Colors (subtest 1)	.20*	-.20*	.06	.07
Letters (subtest 2)	.19*	-.21*	.07	.12
Numbers/counting (subtest 3)	.16	-.23**	.01	.11
Sizes/comparisons (subtest 4)	.33***	-.11	.11	.18
Shapes (subtest 5)	.17	-.14	.08	.09
Total scores	.25**	-.21*	.08	.14
Receptive vocabulary (Kilifi)				
Total scores	.29**	-.22*	.20*	.39***
Theory of mind				
Total scores	.20*	-.17	.02	.09

Note. $N = 123$ pre-intervention. BSRA-3 = Bracken School Readiness Assessment-III. Kilifi = Kilifi Picture Vocabulary Test.
[a]Higher scores denote lower quality of life.
*$p < .05$. *$p < .01$. ***$p < .001$.

Table 8

Caregiver Reading Habits as Correlates of Theory of Mind, Emergent Literacy, and Receptive Vocabulary Scores at Time 1

Variable	1(*r*)	2(*r*)
Caregiver		
1. Reading aloud to target child	--	
2. Frequency of reading aloud	.87***	--
Child		
School readiness skills (BSRA-3)		
Colors (subtest 1)	.22*	.24**
Letters (subtest 2)	.17	.21*
Numbers/counting (subtest 3)	.15	.14
Sizes/comparisons (subtest 4)	.25**	.28**
Shapes (subtest 5)	.11	.08
Total scores	.21*	.22*
Receptive vocabulary (Kilifi)		
Total scores	.27**	.22*
Theory of mind		
Total scores	.20*	.25**

Note. N = 123 pre-intervention. BSRA-3 = Bracken School Readiness Assessment-III. Kilifi = Kilifi Picture Vocabulary Test.

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

Table 9

Caregiver and Child Time 1 Correlates of Session Attendance and Total STSA Stories Told

Variable	1(*r*)	2(*r*)[a]
1. Session attendance	--	
2. Total STSA stories told[a]	.52***	--
Caregiver		
Education	-.08	.24
Quality of life (COOP Charts)[b]	-.01	-.27*
Social support	.05	.10
Total possessions	-.04	.07
Reading aloud to target child	.08	.08
frequency of reading aloud	.09	.27*
Child		
School readiness skills (BSRA-3)		
Colors (subtest 1)	.07	.24
Letters (subtest 2)	.15	.23
Numbers/counting (subtest 3)	.10	.20
Sizes/comparisons (subtest 4)	.12	.25
Shapes (subtest 5)	.10	.24
Total scores	.13	.27*
Receptive vocabulary (Kilifi)		
Total scores	.19*	.22
Theory of mind		
Total scores	.10	.17

Note. N = 123 pre-intervention. BSRA-3 = Bracken School Readiness Assessment-III. Kilifi = Kilifi Picture Vocabulary Test.
[a]n = 63. [b]Higher scores denote lower quality of life.

*$p < .05$. ***$p < .001$.

Figure 1

Baseline Kilifi Picture Vocabulary Test Scores X Gender Interaction Effect