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An investigation into the effect of play-based instruction on the development of play skills and oral language: A 6-month longitudinal study

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Abstract

The current study investigated the influence of a play-based curriculum on the development of pretend play skills and oral language in children attending their first year of formal schooling. In this quasi-experimental design, two groups of children were followed longitudinally across the first 6 months of their first year at school. The children in the experimental group were attending a school with a play-based curriculum; the children in the control group were attending schools following a traditional curriculum. A total of 54 children (Time 1 M_{age} = 5;6, range: 4;10–6;2 years) completed standardised measures of pretend play and narrative

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language skills upon school entry and again 6 months later. The results showed that the children in the play-based group significantly improved on all measures, whereas the children in the traditional group did not. A subset of the sample of children ($N = 28$, Time 1 $M_{age} = 5;7$, range: 5;2 – 6;1) also completed additional measures of vocabulary and grammar knowledge, and a test of non-verbal IQ. The results suggested that, in addition to improving play skills and narrative language ability, the play-based curriculum also had a positive influence on the acquisition of grammar.

Keywords
curriculum, education, narrative, play, school, spoken language development

The role of pretend play in early childhood education has been a matter of intense recent debate. Although the empirical findings point to positive associations between play-based practice and development in both academic and social domains (e.g. Bellin and Singer, 2006; Berk, 2001; Diamond et al., 2007; but see Smith, 2010), these findings have not translated into changes in educational practice. On the contrary, as Hirsh-Pasek et al. (2009) note, there has been an increasing trend towards the devaluation of play (see also Nicolopoulou, 2010). This disconnect between research and practice has received wider coverage in the public domain (e.g. Kidd, 2012; Robinson, 2006; Tullis, 2011). For example, Tullis discusses the evidence for the effectiveness of play-based learning in young children, and yet parents still regard sitting at desks and learning academically as more valuable. In the current article, we report on longitudinal research that compared the development of play skills and oral language in children attending schools that either followed a play-based or traditional didactic curriculum, and report meaningful differences in favour of the play-based curriculum.

A play-based learning environment enhances opportunities for engagement in play underpinned by the philosophy that play-based experiential learning fosters a positive attitude towards learning (Walsh et al., 2006). As such, play-based curricula have been argued to provide a meaningful context for child learning (Justice and Pullen, 2003; Korat et al., 2002/2003; Nicolopoulou et al., 2006). This is not 'free' play without guidance. Rather, play is integrated within the curriculum, where teachers facilitate and extend children's developmental and learning abilities (Nicolopoulou et al., 2010). In contrast, a traditional focus to education in school settings places emphasis on academic-based didactic learning and a structured curriculum (Trawick-Smith, 2008).

The value of play in child development as well as the value of play-based pedagogies have been debated at length (e.g. McInnes et al., 2011; Martlew et al., 2011; Pellegrini, 2009; Pui-Wah, 2010; Samuelsson and Carlsson, 2008; Singer et al., 2006; Smith, 2010). At the heart of this debate is the issue of whether pretend play directly and positively affects children's cognitive and socio-emotional development, or whether it is but one context in which children learn important skills. Although this question has yet to be definitively answered (see Lillard et al., 2013), the perceived value of play-based pedagogy in the academic research community is less controversial than the suggestion that play is essential for development (for contemporary reviews see Hirsh-Pasek et al., 2009; Lillard et al., 2013).

In this article, we focus on the effect of play-based learning on the development of play and oral language skills, and the relationship between the two. Oral language is the single most important socio-cognitive skill a child brings to the classroom; it is the medium through which children acquire and represent new knowledge and communicate their understanding and competencies, as well as being the foundation from which they learn early literacy skills (Clarke et al., 2010; National Institute of Child Health and Human Development (NICHD) Early Child Care Research Network,

2005).Understanding how play-based learning relates to oral language learning is therefore essential if evidence-based play-based practices are to be incorporated into mainstream education.

Pretend play, language development and play-based learning

Numerous studies have identified a closely coupled relationship between pretend play and early language development (e.g. Bates et al., 1979; Hall et al., 2013; McCune, 1995; Shore et al., 1984), a relationship that appears to remain meaningful even in later language development (e.g. Bouldin et al., 2002; Ilgaz and Aksu-Koç, 2005; Trionfi and Reese, 2009). The early attested association between play and language has been taken to reflect the fact that the emergence of both behaviours are symptomatic of the infant's early understanding of the symbolic nature of both systems (Bates et al., 1979; McCune, 1995; Piaget, 1962). That is, just as a spoken word is an acoustic sequence that symbolises a semantic concept, in play a banana can represent a telephone or a pencil can represent an airplane. This correspondence between play and language does not seem limited to vocabulary. For instance, McCune (1995) showed that increasingly complex play sequences predicted the emergence of early multi-word speech, and Fekonja et al. (2005) have shown that preschool children produce more complex grammatical speech in play contexts than in routine and guided activity.

Research on play and language in preschool and school-age children has linked play to developments in narrative skills such as story comprehension and story production. For instance, Ilgaz and Aksu-Koç (2005) reported that 4-year-old children showed an early emergence of narrative competence when narratives were elicited in play situations than when they were directly elicited in a non-play context. Trionfi and Reese (2009) showed that 5-and-a-half-year-old children with imaginary companions, who by definition engage in large amounts of pretend play, produced more complex narratives than aged matched peers who did not have an imaginary companion. Play-based interventions have also been found to improve narrative skills. For instance, Baumer et al. (2005) showed that the *Play World* intervention significantly improved the narrative skills of 5- to 7-year-old children in comparison to a control group that did not receive any pretence-based intervention. These data show that adult-guided pretend play can facilitate narrative language skills and, importantly, that play-based learning in educational contexts can lead to significant gains in oral language skill (see also Pellegrini and Galda, 1982, 1993; Silvern et al., 1986).

Overall, the previous results suggest that pretend play provides a context in which children can extend their linguistic capabilities, and is consistent with the argument that play provides an especially framed situation whereby children learn important cognitive skills (Vygotsky, 1997). Others have argued the commonalities between pretend play and narrative ability seem to be greater than simple contextual support for learning. Since play often involves the enactment of scenarios, Nicolopoulou (2005) has argued that pretend play and storytelling are complementary modes of narrative activity that lie on a continuum, from discursive spoken exposition to non-verbal pantomime (as in a silent film). The commonalities are further underlined by neuroimaging (magnetic resonance imaging (MRI)) data reported by Whitehead et al. (2009), who observed overlap of activation in brain areas supporting the comprehension of both pretend play and narrative. The authors argued that the results of their study were consistent with the suggestion that pretend play is a form of communicative narrative.

The current research

The average 5-year-old child begins elementary school knowing many thousands of words and many of the grammatical structures used in everyday speech. However, there is still much of their

native language to acquire: children are still rapidly acquiring vocabulary and honing their grammatical knowledge, as well as coordinating their vocabulary and grammatical knowledge to produce coherent narratives (see Berman and Slobin, 1994; Karmiloff-Smith, 1986). Following research that has identified links between play and oral language development (e.g. Baumer et al., 2005; Bouldin et al., 2002; Dansky, 1980; Ilgaz and Aksu-Koç, 2005; McCune, 1995; Trionfi and Reese, 2009), we aimed to test the proposal that learning through the medium of play during the first year of elementary school leads to greater growth in linguistic knowledge than learning in a traditional classroom environment through direct, didactic instruction.

In the current article, we present a study that tests this proposal. The play and narrative skills of children from both curricula were measured within the first month of beginning school and again 6 months later. A subset of the children was also tested on a wider array of language measures and a measure of non-verbal ability. The context of this study is the natural setting where the children went to school, and the quasi-experimental design is suitable for such a setting (Glennon et al., 2013). The research had three hypotheses. The first hypothesis was that there would be a relationship between the type of curriculum (a play-based versus traditional curriculum) and play development. Specifically, we expected the play-based curriculum to lead to greater growth in play skills across time. The second hypothesis, based on the additional data collected from a subset of children, was that greater improvements in oral language and non-verbal reasoning would be found in the play-based group. We expected these differences to be most marked in narrative development because previous research has highlighted the play–narrative relationship in children of this age. We added a third hypothesis to examine both play and language, in particular narrative. This third hypothesis was that the type of curriculum would jointly influence play and narrative re-tell, such that growth in these two domains would be related.

Participants

Children

A total of 54 ($N = 54$, 24 females) children aged 4;10–6;2 years were recruited from three elementary schools in regional and metropolitan Victoria, Australia. One school used a play-based curriculum, and the other two followed the traditional curriculum as prescribed by the state government. There were 34 children (14 females, mean age = 5;6) from the play-based curriculum school, and 20 children from the traditional curriculum schools (10 females, mean age = 5;6). All children came from lower to lower-middle class areas (see Table 1 for demographic comparisons). As can be seen from Table 1, the children who attended the play-based curriculum were from the most disadvantaged region compared to the other two schools.

At the beginning of the second year of data collection, we decided to add additional measures of language (a measure of vocabulary and a measure of grammar) and non-verbal ability. Adding additional measures enabled us to test the second hypothesis as to whether play-based learning has a more general influence on oral language learning and non-verbal reasoning.

Participants who were assessed with additional measures of language

A total of 28 ($N = 28$) children aged 5;2–6;1 years (mean = 5;7; standard deviation (SD) = 3.6 months) were recruited from two of the elementary schools at the beginning of the school year. Of them, 16 (7 females, mean age = 5;6, SD = 3.6 months) children were attending the school with the play-based curriculum. A total of 12 (7 females, mean age = 5;7, SD = 3.5 months) were attending the

Table 1. Demographic comparison of groups.

Group	Assessments	SEIFA index[a]	Population of region	AEDI (2010)[b] % children developmentally vulnerable on one or more domains
Play-based curriculum school ($n=34$)	34 children assessed with ChIPPA and SAOLA. 16 of the 34 children also assessed with TROG, BPVS and Raven	10th percentile	9401	21.1%
Traditional curriculum ($n=8$)	All children assessed with ChIPPA and SAOLA	16th percentile	8066	17.8%
Traditional curriculum ($n=12$)	All children assessed with ChIPPA, SAOLA, TROG, BPVS and Raven	65th percentile	7822	17.8%

ChIPPA:Child-Initiated Pretend Play Assessment; SAOLA:School Age Oral Language Assessment; TROG:Test for Reception of Grammar–2; BPVS:British Picture Vocabulary Scale II; Raven:Raven Coloured Progressive Matrices.
[a]SEIFA index (2011) is a measure of the socio-economic status in Australia based on unemployment rates, percentage of single parents and income. Data are ranking within Australia.
[b]Australian Early Developmental Index (AEDI, 2010) which is a measure of the developmental status of children in Australia across 100 developmental items.

traditional school in a large urban city in Victoria, Australia (see Table 1). All children were re-tested exactly 6 months after their first testing session.

The study was conducted over a period of 2 years, testing two cohorts of children from each curriculum type. The two cohorts from the play-based curriculum school had different teachers. In the first year of the study, the teacher was experienced in play-based curriculum (teaching in the school for 8 years) and had a master's degree in education. In the second year of the study, the teacher was on maternity leave and so there was a teacher who was newly trained and who was new to the school and to play-based curriculum. This new teacher was mentored in the play-based curriculum of the school by the principal and deputy principal. The change in teacher reduced the possibility that any improvements in this group were due to teacher-specific influences. The children from the traditional curriculum schools also had two different teachers (one in each school). All three participating schools were part of the Catholic educational system.

Curricula

Play-based curriculum setting. The school is child-focussed, with each child developing a plan of what they will make or carry out at the beginning of each day. The staff have taken a constructivist approach, emphasising that children are capable beings who come to school with a construction of the world and that they learn through interaction with competent adults (see Stagnitti et al., 2013). The teacher explores with the children the questions they have about their world. For example, in the classroom the children have explored 'What has the sun got to do with growing?' The teacher's role is to find their students' strengths and assist with improving student's learning through scaffolding, direction and explicit teaching (Walker, 2007). Children are actively engaged in what they are interested in and pursue their plan throughout the day, facilitated by the teacher. The children also undertake plan-do-review, where they not only plan, but also carry out their plan and review its outcome. Whitebread et al. (2009) reported that this approach to learning resulted in deeper learning of the child. Teachers observe the purpose and quality of children's play, and facilitate the

underpinning learning of the children's play. For example, when children were exploring the effect of the sun on growing, the teacher facilitated the children to explore play scenes that included night and day. In doing this, the teacher was extending the children's logical thinking through their play.

The school upholds the educational goals of the Australian Curriculum, Assessment and Reporting Authority (ACARA, 2012), including that young Australians have (1) the capacity to be active, independent learners, (2) essential skills in literacy, numeracy and information technology and (3) confidence and creativity. This is achieved through a classroom environment with a number of play areas to address different areas of learning, such as a floor space near the teacher for children to sit at the beginning and end of the day, two dramatic (pretend) play areas, dress-ups, a writing table, a construction area, a computer area and a reading tent. For example, on one occasion children expressed an interest in banking and shopping and so with the facilitation of the teacher, the children decided which shops to create, made the materials that went in that shop (e.g. they made brushes, and rollers for the hairdresser), and played in the shop areas by banking, making shopping lists and appointments, and purchasing items from shops. Within this scenario, the teacher had developed learning goals around literacy and numeracy.

Traditionally structured classroom curriculum setting. The two schools following the traditional curriculum both had tables and chairs for each child and floor space for the children to sit. Time during the day was set aside for the specific lessons covering a range of subjects, including: literacy, science, mathematics, physical education and music. The classes followed a set, teacher-directed routine. Each school day there was a 2-hour literacy block in the morning with 1 hour of reading and 1 hour of writing. After a break, the children had a 1-hour block of mathematics and a religious education class followed by a break. The final part of the day was dedicated to special classes such as library, art, science or music, depending on the school resources. During this daily routine, there may be times of small group activities, but these were teacher directed. There were no times during the classroom day where children were involved in child-initiated activities. The only child-initiated time was during the breaks when children were on recess or eating their lunch. The teaching mode was didactic with the teacher directing the learning of the child. Both schools upheld the educational goals of the ACARA.

Materials

A point of contention in play-based intervention studies has been experimenter bias (Smith, 2010). To reduce the likelihood that this would affect our results, we used standardised measures. Since standardised tests do not allow variation in administration of the measures and have explicit scoring instructions, we could be relatively confident that all children were tested in an equivalent fashion.[1] All the children were assessed on two measures which were: the Child-Initiated Pretend Play Assessment (ChIPPA, Stagnitti, 2007) and the narrative re-tell component of the School Age Oral Language Assessment (SAOLA, Allen et al., 1993).Each is described in turn.

ChIPPA

The ChIPPA (Stagnitti, 2007) is a standardised, norm referenced assessment of a child's ability to spontaneously initiate and engage in pretend play over a 30-minute period. The test is appropriate for children aged 4–7.11 years. The test is administered with the child and examiner sitting on the floor in front of a 'cubby house' (also called a 'play house', consisting of a bed sheet suspended over two chairs), in a relatively quiet location, free from distractions and other children. The ChIPPA assesses both conventional-imaginative play (using a commercial toy set) and symbolic

play (using an unstructured play materials set). Three aspects of pretend play are measured for each set of play materials. These are as follows: (1) the elaborateness, complexity and organisation of a child's play; (2) the child's ability to use symbols in play; and (3) the child's ability to self-initiate play ideas. The raw score for elaborate play is calculated through the percentage of elaborate actions over total actions. This is called the Percentage of Elaborate Pretend Actions (PEPA). The Number of Object Substitutions is the number of objects a child used as symbols in play, for example, a stick for a spoon. The combined components of these two subscales were used as the dependent measures in our analyses, since these scores capture the child's ability to self-initiate pretend play over a 30-minute period (Stagnitti, 2007). The ChIPPA has a clinical observations section to record typical play ability or play deficits, such as ability to play for time period of the ChIPPA, development of a narrative and use of a character in play. Since this scale indexes the development of a narrative within the context of pretend play, we included the clinical observation scale for the indicators of typical play in our analyses. One final ChIPPA subscale, Imitated Actions, was not included in the analyses because a vast majority of children (98%) were at floor on this subscale at baseline.[2]

The ChIPPA has been found to have good to excellent test–retest reliability for elaborate play ($r = .86$) and number of imitated actions. Object substitutions has moderate test–retest reliability ($r = .57$), as the phenomenon of object substitution changes depending on the play scripts created and the need for objects within those scripts (Stagnitti and Unsworth, 2004). Inter-rater reliability is good to excellent, with kappa scores ranging from .7 to .97 (Stagnitti et al., 2000; Swindells and Stagnitti, 2006). Concurrent validity of the ChIPPA was established with inference from ChIPPA play scores for a child's social skills ($r = .35$, $p < .05$) and engagement in school activities ($r = .47$, $p < .01$) (Uren and Stagnitti, 2009).

SAOLA

The SAOLA (Allen et al., 1993) is an Australian assessment used to assess children's oral language abilities. The SAOLA was trialled with 600 children from mainstream schools in Australia between the years of 1988 and 1991 (Allen et al., 1993). The SAOLA assesses children from preschool (4 years) to grade 4 (10 years), and consists of a series of tasks that are criterion referenced. The SAOLA assesses three areas of children's oral language: semantic knowledge, narrative re-tell ability and metalinguistic awareness. Only the narrative re-tell component was used in the current study. This subcomponent involves using a textless picture book entitled 'Peter and the Cat'. The experimenter reads the child the story, which is printed on a separate piece of paper. The child is then encouraged to re-tell the story. The children's narratives were recorded on a voice recorder, then transcribed and scored. The test is scored on eight dimensions that index narrative structure, including listener orientation, vocabulary, the use of grammatical devices typical of the narrative genre (e.g. use of connectors and appropriate deictic tools) and story register. Scores range from 0 to 24.

Three further assessments were administered in the second year of the study: a measure of vocabulary, a measure of grammar and a measure of non-verbal IQ. Each measure is described below.

Raven Coloured Progressive Matrices

The Raven Coloured Progressive Matrices (RCPM) are a multiple choice test of abstract reasoning and non-verbal cognition (Raven et al., 1998), and is suitable for children aged 5–11 years. In the task, the child is shown a series of 36 visual patterns that vary in complexity. Each pattern has a piece missing; the child's task is to select the missing piece from a choice of six possibilities,

thereby completing the pattern. Children were asked to look carefully at the pattern, and to point to the picture that 'fitted best' in the missing space. The children's raw scores were used in the analysis (max score = 36). In a large Australian study by Reddington and Jackson (1981), the RCPM are reported to have a Cronbach's alpha reliability of .80 in 5-and-a-half-year-olds. More recently, Cotton et al. (2005) examined the psychometric properties of the RCPM among Australian primary school children, finding that it had good internal consistency and split-half reliability.

British Picture Vocabulary Scale II

Children's vocabulary was tested using the British Picture Vocabulary Scale Second Edition (BPVS; Dunn et al., 1997). The BPVS is a published standardised test that measures receptive vocabulary in children. In this test, children are orally presented with a word. Children are asked to identify the picture that matches the word from an array of four. The test is suitable for children aged 3–16 years. It is individually administered, and typically takes 5–8 minutes to complete. The children's raw scores were used in the analysis; scores can range from 0 to 168. The test has high reliability (all Cronbach's $\alpha > .85$) (Dunn et al., 1997).

Test for Reception of Grammar–2

The Test for Reception of Grammar–2 (TROG) is a standardised, individually administered test that is designed to assess children's response to English grammatical contrasts (Bishop, 2003). The test is suitable to use with children between the ages of 4 and 13 years. It uses a multiple choice design, consisting of 80 items. The examiner reads a sentence to the child; for example, 'the dog is standing on the table'. The child is then required to point to the picture that matches the phrase, from an array of four options. Items are grouped into blocks of four items; each block tests the child's knowledge of a specific grammatical contrast (e.g. passive, relative clause, locative phrase). Children must pass all four items in a block to pass an individual block. Testing discontinues when five consecutive blocks are failed. The blocks increase in difficulty as the test progresses. The test takes approximately 10–20 minutes to administer. The test has good to high reliability (all Cronbach's α coefficients > .7) (Bishop, 2003). The children's raw scores were used in the analysis; scores can range from 0 to 20.

Procedure

University and Education Department ethical approval was granted prior to the commencement of the study. Each school principal granted permission to work in their school, and only children who had parental consent participated in the study.

The study used a quasi-experimental design with pre and post testing over a 6-month period using the ChIPPA and narrative re-tell component of the SAOLA for each child over the 2 years of the study, with the addition of the TROG-2, BVPS-II and the RCPM in the second year of the study.

Baseline assessments were completed in February (beginning of the school year) and follow-up assessments were completed in August of the same year. Assessments were scored at the completion of data collection in August to reduce experimenter bias at follow-up data collection. All children were seen at their school, in a quiet room separate to their classroom. Arrangements for the assessment days were made with the child's teacher to fit in with classroom and curriculum activities (e.g. excursions). If there was a special event at the school at the time of assessment, children were not taken from their class until after the event was completed. There was no contact

with the schools by the researchers over the intervening 6-month period. Each school carried out its curriculum activities over this time, and no school made any major changes to their curriculum during this time.

The research assistants were trained in the administration and scoring of the ChIPPA and SAOLA assessments by the first author. The last author trained the research assistants in administration and scoring of the TROG-2, BVPS-II and the RCPM. All assessments were completed on each child at their own school on the same day in a relatively distraction-free room. The order of the assessment administration was randomised to control for order effects and fatigue. A qualified Speech Pathologist, blind to the group allocation of the children, scored the narrative re-tell section of the SAOLA for pre and post assessments. At follow-up, children were assessed at similar times to their baseline assessments and in the same test order to ensure consistency of the assessment schedule.

Results

Hypothesis 1: relationship between curriculum and play

Table 2 presents the Time 1 and Time 2 means and SDs for the children's performance on the items of the ChIPPA by curriculum type, and within-variable comparisons across time, as well as between group comparisons at each time point. Cohen's *d* is used to objectively quantify the effect size of developmental growth in each measure across time.[3] This strategy minimises the chance of making a Type II error, which is high with small samples, but mitigates against inflation of Type I error because Cohen's *d* provides an objective standardised measure of developmental growth in each group. This analysis strategy is commonly used in the biological sciences in disciplines such as Behavioural Ecology (Garamszegi, 2006), where multiple comparisons are typical using a range of dependent variables.

Table 2 shows that the two groups were equivalent on all measures at Time 1. Whereas the two groups only differed significantly on their elaborate play at Time 2, the cross-lag comparisons show differences in development between the two groups. Specifically, the children from the play-based school showed significant improvements on all measures, whereas the children from the mainstream schools only showed statistically robust improvements on one measure of play: object substitutions.

Hypothesis 2: relationship between curriculum, oral language and non-verbal reasoning

First, we report simple comparisons between language variables (including narrative re-tell for the total sample ($n=54$) and the sub-sample ($n=28$)) across time and between groups at each time point, as well as the same comparisons for non-verbal IQ.[4] Once again, Cohen's *d*s are reported for cross-lag within group comparisons for each measure. Table 3 reports the Time 1 and Time 2 means and SDs for the children's performance on the tests of vocabulary, grammar, narrative re-tell and non-verbal IQ.

Table 3 shows that both groups of children showed significant growth in vocabulary and grammatical knowledge as well as non-verbal IQ from Time 1 to Time 2. However, only the children attending the play-based school showed significant growth in narrative re-tell ability. Two other results were noteworthy: whereas the children attending the play-based school scored significantly lower on grammatical knowledge and non-verbal IQ at Time 1, there were no group differences at Time 2.

Table 2. Time 1 and 2 means and standard deviations (SDs) (in brackets) for play measures for each curriculum type.

Measure	Curriculum	Time 1	Time 2	p^c	*d*
^Elaborate play	Play-based	105.17 (23.91)	144.68 (31)	<.001	1.43
	Mainstream	111.03 (32.57)	125.83 (35.11)	.052	0.44
	p	.49	.045		
^Object substitutions	Play-based	17.68 (13.07)	24.06 (12.66)	.005	0.50
	Mainstream	14.2 (11.53)	21.55 (13.58)	.001	0.58
	p	.31	.50		
^Indicators of typical play	Play-based	17.91 (5.15)	20.56 (3.7)	<.001	0.59
	Mainstream	17.5 (4.29)	18.6 (4.65)	.231	0.25
	p	.75	.09		

[c]All *p*-values two-tailed.
^Variable from Child-Initiated Pretend Play Assessment (ChIPPA).

Table 3. Time 1 and 2 means and standard deviations (SDs) (in brackets) for vocabulary, grammar, narrative and non-verbal IQ measures for each curriculum type.

Measure	Curriculum	Time 1	Time 2	p^a	*d*
^Vocabulary (from BPVS)	Play-based[b]	58.31 (18.7)	67.31 (10.83)	.019	0.59
	Mainstream[c]	64.25 (12.88)	72.17 (14.83)	.001	0.57
	p	.354	.35		
^Grammar (from TROG)	Play-based	5.69 (3.82)	9.81 (3.85)	.003	1.07
	Mainstream	9.08 (4.64)	11.92 (3.42)	.022	0.70
	p	.043	.146		
^Narrative (from SAOLA)	Play-based	7.63 (4.16)	10.94 (5.51)	.026	0.68
	Mainstream	9.00 (6.31)	10.42 (5.47)	.532	0.24
	p	.493	.806		
*Narrative	Play-based[a]	7.85 (4.63)	12.18 (5.29)	<.001	0.87
	Mainstream[b]	9.35 (5.02)	10.35 (4.63)	.463	0.21
	p	.283	.192		
^Non-verbal IQ (Raven)	Play-based	13.38 (5.14)	18.19 (6.78)	<.001	0.80
	Mainstream	17.67 (4.74)	21.67 (4.62)	.001	0.86
	p	.032	.119		

SAOLA :School Age Oral Language Assessment; TROG:Test for Reception of Grammar–2;
BPVS :British Picture Vocabulary Scale II; Raven :Raven Coloured Progressive Matrices.
[a]All *p*-values two-tailed.
[b]*N* = 16.
[c]*N* = 12.
*Narrative = Results for 54 children over 2 years of data collection.
^Results for 28 children (the sub-sample).

Because the sub-sample size for oral language was small (28 children), we followed an analysis strategy typical of clinical research by computing a *reliable change index* (RCI) for each child (Jacobson and Truax, 1991). RCIs were developed to aid researchers in clinical psychology to objectively determine change in response to intervention. An RCI for each child was calculated using the following formula

Table 4. Proportion of significant growth as indicated by Reliable Change Indexes (RCIs) and odds ratios for growth in vocabulary, grammar, narrative, and non-verbal IQ.

	Vocabulary	Grammar	Narrative	Non-verbal IQ
Play-based RCIs	.75	.83	.63	.75
Mainstream RCIs	.75	.67	.42	.67
Odds ratio	1	2.41	2.31	1.48

$$\mathrm{RCI} = \frac{(x_2 - x_1)}{\mathrm{S}_{diff}} \tag{1}$$

where x_2 represents the child's score on an individual measure (e.g.narrative score) at Time 2 and x_1 represents the child's score on that same measure at Time 1. S_{diff} is the standard error of the difference between the two test scores. An RCI that is greater than +1.96 represents significant improvement across time, an RCI less than −1.96 represents a significant decrease in performance, and an RCI [$-1.96 < x < +1.96$] represents a non-significant change.

Table 4 lists the proportion of children from the sub-sample who made significant improvements in vocabulary, grammar, narrative and non-verbal IQ (i.e. RCI > +1.96) across time for both curricula groups.

Table 4 shows that the children attending the play-based school had a higher proportion of children showing significant improvements than did the children attending the mainstream school in all domains except vocabulary, where the two groups were equivalent. Using these proportions, we computed odds ratios (ORs) to calculate the odds of significant improvements in each domain given the difference in curricula. The ORs were calculated using the following formula

$$\frac{\left[a_x/(1-a_x)\right]}{\left[b_x/(1-b_x)\right]} \tag{2}$$

where a is the proportion of children from the play-based curriculum with significant positive RCIs for a given variable x (e.g. vocabulary), and b is the proportion of children from the mainstream curriculum with significant positive RCIs for variable x. If the two groups are equivalent then we should observe an OR of 1, indicating that the odds of observing a significant improvement in a given domain across time is the same for both school curriculum types. This is what we see for the children's vocabulary scores. An OR greater than 1 is indicative of an advantage for the play-based curriculum. For instance, the OR for the measure of grammar is 2.41, indicating that a child attending the play-based school was 2.41 times more likely to show a significant improvement in grammatical knowledge across the first 6 months of school than a child attending the mainstream school. A similar OR was observed for the narrative measure, and the OR for the measure of non-verbal IQ suggests that a child attending the play-based school is 1.48 times more likely to make gains in non-verbal ability than a child attending the mainstream school.

Hypothesis 3: influence of curriculum type on play and narrative

As we had narrative re-tell scores and play scores for all 54 children across the two cohorts, we carried out further analysis on whether school type influences performance on play and narrative. A growth rate difference score was computed for each child and their narrative re-tell score and play scores using the following formula: Time 2(x_n) – Time 1(x_n), where x_n signifies variable x (e.g.

Table 5. Correlations between growth in narrative re-tell and play measures for each group.

	Elaborate play	Object sub.	Indic. of typical play
Play-based curriculum[a]			
Narrative	.081	−.015	.331*
Indic. of typical play	.105	.360*	
Object sub.	.084		
Mainstream[b]			
Narrative	−.084	−.225	−.129
Indic. of typical play	.566**	−.405	
Object sub.	−.182		

[a]$N = 34$.
[b]$N = 20$.
*$p < .05$; **$p < .01$.

narrative re-tell) for participant *n*. These scores were then entered into a two-way (curriculum: play-based vs. mainstream) multivariate analysis of variance (MANOVA) using narrative re-tell, Elaborate Play, Object substitutions and Indicators of typical play as dependent measures. The main effect of school was significant ($F(4, 49) = 3.06$, $p = .025$, partial $\eta^2 = .20$).[5] Post hoc between-participants univariate analyses of variance (ANOVAs) showed that the children in the play-based curriculum showed significantly greater growth in narrative re-tell ability ($F(1, 52) = 4.56$, $p = .038$, partial $\eta^2 = .081$) and elaborate play (Elaborate Play: $F(1, 52) = 8.36$, $p = .006$, partial $\eta^2 = .138$). The two groups did not differ in the development of object substitutions ($F(1, 52) = .09$, $p = .76$, partial $\eta^2 = .002$) or indicators of typical play ($F(1, 52) = 2.31$, $p = .135$, partial $\eta^2 = .042$).

We next analysed the relationships among growth in each variable by computing simple bivariate correlations between each dependent measure separately for each group. The correlations are shown in Table 5.

Table 5 shows that growth in play was associated with growth in narrative re-tell in the children attending the play-based school. Specifically, growth in narrative re-tell ability was significantly correlated with growth in indicators of typical play. This relationship was not observed in the children attending the mainstream schools, most likely because significant growth in these two variables was not observed in that sample.

Discussion

Our hypotheses 1 and 3 were supported. The children attending the school delivering a play-based curriculum showed consistent and significant improvements in both play and narrative skills, whereas the children attending the mainstream schools only showed significant growth in one aspect of play (object substitutions). Furthermore, in comparison to the children attending the mainstream schools, the children attending the play-based school showed significantly greater growth across the first 6 months of school in both their narrative skills and elaborate play. Finally, growth in narrative ability was significantly associated with growth in typical indicators of play in the play-based curriculum group.

The results are consistent with previous studies that have found positive relationships between play and narrative (e.g. Baumer et al., 2005; Ilgaz and Aksu-Koç, 2005; Pellegrini and Galda, 1982, 1993; Saltz and Johnson, 1974; Silvern et al., 1986; Trionfi and Reese, 2009), and supports Nicolopoulou's (2005) suggestion that play and narrative are 'complementary expressions of

children's symbolic imagination' (p. 496) (see also Whitehead et al., 2009). The novelty of our data is our focus on play-based curricula. Whereas previous research has used targeted interventions (e.g. Baumer et al., 2005; Pellegrini and Galda, 1982; Saltz and Johnson, 1974; Saltz et al., 1977; Smith et al., 1981), our data suggest that the curriculum of our play-based school was associated with significant improvements in both play and narrative language skills.

Hypothesis 2, which aimed to test the limits of the influence of play-based curricula on oral language development and non-verbal ability in the first 6 months of schooling, was also supported. Only the children from the play-based school showed significant improvements in narrative re-tell ability. In contrast, both groups of children showed significant growth in vocabulary and grammatical knowledge and non-verbal IQ across time. Whereas the likelihood that a significant improvement in vocabulary would be observed was equivalent for children attending both school curriculum types (as indexed by ORs), the likelihood of significant improvements in grammar, narrative and non-verbal ability was greater in the children attending the play-based school in comparison to the mainstream school. At Time 1 (school entry), the children from the play-based school scored significantly worse than the children from the mainstream school on both grammar and non-verbal IQ, but over the course of their first 6 months of school sufficiently caught up such that the difference between the two groups was no longer significant. Therefore, we can conclude that attending a school with a play-based curriculum leads to real improvements in narrative skills and grammatical knowledge, in addition to solid but comparatively minor improvements in non-verbal ability.[6]

It is possible that improvements in narrative ability and grammatical knowledge are related. Complex narrative ability necessitates the knowledge and use of a range of complex grammatical devices, such as multiple-clause sentences containing a range of grammatical devices used for coordination (e.g. and, or) and subordination (e.g. if → then, because, that), the use of clause expansion to uniquely identify referents (e.g. the boy *that lost the cat*, the cat *on the roof*), and the correct use of pronouns to track reference across clause and sentence boundaries. Our tentative suggestion here is that the benefit in narrative may also have knock-on effects for grammatical knowledge. As children hone their narrative ability during play, they may also be simultaneously using structures that extend their grammatical knowledge.

Overall, we found that a group of children attending a school with a play-based curriculum, where the curriculum was child-focussed and the physical environment was set up with play spaces, showed substantial improvements in both pretend play and narrative language compared to a group of children attending traditional curricula schools. We also found that attending a school with a play-based curriculum provided added-value in the development of grammatical knowledge. These results suggest that play-based learning significantly enhances both pretend play skills and oral language acquisition in children who are in their first year of formal education.

These results are important for numerous reasons. Learning through play has the potential to whet a child's appetite for learning through the medium which is both non-threatening and intrinsically enjoyable, and which appears to result in longer lasting benefits than does traditional didactic instruction (see Hirsh-Pasek et al., 2009). In the context of on-going debates regarding the importance of play-based pedagogy, the finding that play-based learning facilitates oral language development is important. Play-based activity may stimulate social and therefore linguistic interaction among pupils. Martlew et al. (2011) observed an increase in time children spent talking in classrooms where play-based activities were introduced. This increase in spoken language appears to be associated with more complex language use. For instance, Fekonja et al. (2005) observed 4- to 5-year-old Slovenian-speaking children engaging in their preschool across three conditions: (1) free play, (2) routine activity and (3) teacher-guided activity. They found the children spoke more, used more multi-word sequences,[7] and more negative and interrogative clauses in free play than in

the other two situations. Greater multi-word sequences and negative clauses suggest that children use more complex syntactic constructions during play; more interrogative clauses (i.e. questions) mean that children solicit more verbal responses from others, resulting in greater social and linguistic interaction. Consistent with constructivist approaches to child development (Vygotsky, 1997), this increase in linguistic activity is predicted to result in incremental improvements in linguistic knowledge.

Limitations

Although our results are suggestive, they are inevitably limited. First, our study was quasi-experimental and therefore, we cannot definitively rule out the possibility that our results could be attributable to factors other than differences in curriculum type across groups. This potential problem is at least partially mitigated by the fact that both our narrative and pretend play results replicated across cohorts and teachers; therefore, we are confident that our results can be explained by appealing to the type of curriculum each group experienced. Second, our sample was relatively small. Once again, the fact that our results replicated over two cohorts of children suggests that they are robust. However, further replication with a larger sample across multiple school sites would further strengthen our argument. Third, our sample was drawn from lower to lower-middle class areas. It is likely that children from comparatively deprived backgrounds benefit most from play-based instruction: children from low socio-economic backgrounds play less and their play is less sophisticated than children from middle to upper class backgrounds (Fein and Stork, 1981). This does not mean that children from more privileged backgrounds do not benefit from play-based instruction; what is important is that instruction methods interest and challenge each child at a developmentally appropriate level. The efficacy of play-based instruction across the broad spectrum of socio-economic backgrounds would be an illuminating area of research. Finally, we must raise the possibility that it might not be a focus on play that was responsible for our results. As Lillard et al. (2013) note, child-centred classrooms differ from direct instruction classrooms in many ways; for instance, they offer children the freedom to engage in activities which they find intrinsically interesting, and provide greater opportunities for meaningful peer and adult–child interaction. Teasing these effects apart requires studies that are orders of magnitude larger than the current one.

Conclusion

Despite these potential limitations, we follow Hirsh-Pasek et al. (2009) in arguing that all sources of evidence that bear on the current debate regarding early years instruction are important, whether it be correlational, quasi-experimental, or intervention-based. Our research has shown that play-based instruction is associated with significant developments in both play skills and oral language skills across the first 6 months of formal schooling. Since oral language skills provide a crucial foundation for emerging literacy skills (NICHD Early Child Care Research Network, 2005), the data provide a positive endorsement for play-based learning in early years education (see Hirsh-Pasek et al., 2009).

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Notes

1. Our experimenters were not blind to the group status of each child; however, five different researchers (all authors) were involved in data collection, all of whom strictly followed the testing instructions of each standardised test. Across their two testing sessions, any one child was tested by a minimum of two experimenters and a maximum of four, minimising the possibility that any one experimenter might positively influence children's scores on all tests. Although we cannot definitively rule out experimenter bias, we believe that these points served to reduce any possible systematic effect of experimenter bias.
2. In the context of the test, imitated actions are elicited when children produce no spontaneous play. As such, they are a marker of low play ability. Therefore, the fact that the children were at floor means that they were all capable of producing spontaneous play sequences.
3. Small = $d < 0.5$, medium = $0.5 < d < 0.8$, large = $d > 0.8$. See Cohen (1988).
4. The results for the subscales of the ChIPPA replicated the larger sample in Study 1. The children in the play-based school showed significant growth on all subscales: Elaborate Play ($t(15) = 3.72$, $p = .002$, $d = 0.86$), Object substitutions ($t(15) = 2.16$, $p = .047$, $d = 0.5$), Indicators of Typical Play ($t(15) = 2.99$, $p = .009$, $d = 0.7$). In contrast, the children attending the mainstream school only showed significant improvement in Object substitutions ($t(11) = 2.25$, $p = .046$, $d = 0.47$) but not Elaborate Play ($t(11) = 0.83$, $p = .427$, $d = 0.26$) or Indicators of Typical Play ($t(11) = 1.82$, $p = .096$, $d = 0.69$).
5. Since our groups had uneven sample sizes, there was a chance that a loss of power would result in null effects. This did not seem to be problematic: the observed power for the multivariate effect of school was 0.77, that is, we had a 77 per cent chance of rejecting the null hypothesis if it were false. Furthermore, all dependent measures were normally distributed (One Sample Kolmogorov tests, all ps $> .23$) and the assumption of homogeneity of variance was not violated (Levene's tests, all ps $> .18$).
6. It is important to note that the effect size of the difference in non-verbal ability between Time 1 and Time 2 is similar for both groups (compared to narrative skills and grammatical knowledge). The OR difference provides a different statistic to the effect size, since it indexes the likelihood that a child in the play-based classroom will make a significant improvement relative to a child in the traditional classroom. It is this result which is suggestive of improvements in non-verbal IQ.
7. Multi-word utterances were defined as utterances greater than two words.

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