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Exploring Efficacy of a Community-Based Reading Programme for At-Risk Children

Abstract

This study reports an exploratory evaluation of a community-based reading programme kidsREAD. Children (N=186) aged 4 through 8, of different ethnic groups, from 12 reading clubs, were exposed to one hour of reading intervention with trained volunteers at various locations. For one year, volunteers read stories to children once a week in groups less than 30, then divided them up into smaller groups to engage in a variety of reading-related activities. Paired t-tests and inter-correlation analyses were conducted. Parent survey was collated for triangulation. There were significant improvements in use of English language, individual participation and peer interaction, and reading skills, at post-programme evaluation. Effect size analyses pointed to a significant impact of programme participation on changes in reading-related behaviour. Results from the analysis were used to predict the reading success for the programme, illustrated through the equation: $RgA \rightarrow [(UEL)(PAI)(RS)] \rightarrow RgS$.

Keywords: kidsREAD, low-income, at-risk, reading, volunteer.

Introduction

In the last few decades, there has been much interest in how to help young children read, especially those identified as at risk for reading difficulty or academic failure. As a result, reading programmes initiated by various agencies for helping children have arisen, especially those for reluctant or poor readers. In part, this is fuelled by national interest in literacy problems, as well as a wealth of research findings on reading and its effect on readers. Programmes initiated at the national level are normally funded and use teachers or certified reading specialists to deliver instruction. This can be costly,

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especially if one-on-one tutoring is practised. An alternative is the utilization of volunteers to facilitate reading sessions with a group of children. However, little is known about the efficacy of such programmes.

Research Framework - kidsREAD Programme

The framework for this study comes from a nationwide early reading project initiated by the National Library Board (NLB). Launched in 2004, *kidsREAD* is a reading programme born out of a collaborative effort by the NLB, People's Association (PA) and major ethnic community self-help groups in Singapore (NLB, 2004). Endorsed by the Prime Minister, cabinet ministers and various members of the Parliament, it is an initiative to promote early reading and language competence among children ages 4 to 8, from families with low income, regardless of ethnic background.

The *kidsREAD* classes are kept to small groups of less than 30 children, with volunteers managing and facilitating the session. Lessons are normally conducted once a week, over the weekend; volunteers read aloud one or two stories to children, then divide them into smaller groups and engage them in a variety of reading activities. This literature-based intervention programme, for children from economically disadvantaged backgrounds, provides enjoyable and facilitative interactions among volunteers and children from various races, with the presumption of enhancing literacy skills whilst inculcating good reading habits and helping the children discover the love for reading. Volunteers undergo training on basic storytelling skills, and use the *kidsREAD Starter Kit* that comprises a recommended reading list, a poetry and rhymes list, and an activities list as a resource guide for facilitation. Volunteers are also regularly provided training in other skills to work with and engage the children. Through read alouds and participating in a fun-filled interactive setting where word puzzles, board games and craft making are incorporated into the programme, participating children can expect learning to read to be a more enjoyable and exciting journey.

This study was undertaken at a time when NLB was seeking answers to quantify the effectiveness of *kidsREAD*, to determine how it will proceed, moving into Phase 3, extending the programme from one to five years. From the initial intake of 272 children and 42 volunteers in 2004, the programme had expanded to serve nearly 2,500 children with the support of almost 500 volunteers. By 2011, no less than 13,278 children have benefitted through Phases 1 and 2 of the programme, making *kidsREAD* Singapore's single-largest, nationwide reading programme to date. Hence, there was an urgent need to conduct a study to gain new insights into the programme, gather preliminary information to formulate a more definitive investigation of this community-based volunteer-driven reading programme to help NLB prepare for a more rigorous longitudinal study on the impact of *kidsREAD* on its participants vis-à-vis meeting the programme objectives.

Benefits of Reading for At-Risk Children

According to Chall, Jacobs, and Baldwin (1990), reading is a concern as there is considerable evidence to show it is related to academic learning and is an index of

general academic achievement. That reading is highly correlated to reading and academic successes has been consistently demonstrated in many studies (e.g., Anderson, Wilson, & Fielding, 1988; Cipielewski & Stanovich, 1992; Cox & Guthrie, 2001; Cunningham & Stanovich, 1991). Studies (e.g., Arizpe & Blatt, 2011; Dickinson, Griffith, Golinkoff & Hirsh-Pasek, 2012; Justice, McGinty, Piasta, Kaderavek & Fan, 2010) further inform us that the benefits of reading are phenomenal, extending beyond academic to other skills such as language and general knowledge development, critical thinking, listening, imagination, cognitive, communication, character development and social development. In particular, besides exposing young children to rich vocabulary (Hayes & Ahrens, 1988), reading storybooks aloud is found to support children's language and early literacy development (Dickson, de Temple, Hirschler & Smith, 1992; van Kleeck, Stahl & Bauer, 2003; Wasik, Bond & Hindman, 2006).

Despite the compelling evidence of the benefits of reading, there is still a need to get children to read, especially those from families with low income. In her article *High-Poverty Schools That Beat the Odds*, Cunningham (2006) stated that "poverty is the largest correlate of reading achievement" (p. 382). Neuman and Celano (2006) also reported that previous research had shown that on average, cognitive scores of children at age 4 in the lowest socio-economic status (SES) groups were 60% below the scores of those from the highest SES group, and this gap was likely to stay or even increase throughout the schooling years of children. Research studies (e.g., Krashen, 2004; Neuman & Celano, 2001) have consistently shown that children from low-income communities have little access to reading material. Other research studies (e.g., Burney & Beilke, 2008; Chall, Jacobs & Baldwin, 1990) also abound with findings that relate higher frequencies of reading difficulties to socio-economic status. According to Parcel and Dufur (2001), the lower reading achievement of children from low income families could be attributed to the lower family social capital (home physical environment) as opposed to family financial capital (parental income and material resources).

Findings from the research conducted by McKool (2007) suggested there were differences between avid and reluctant readers from the economically diverse backgrounds of their home lives and literacy experiences in preschool. In particular, more children from middle- or high-income families were read aloud to when they were young as compared to their peers from families with low income. This finding is consistent with the concept of "blue collar value" as discussed by Allington and Cunningham (1996) and McKool (2007).

Stanat et al. (2002) noted that poor readers (i.e., reluctant readers) were considered to be an at-risk group for failure in both academic and social life. Adapting from Tierney, Readance, and Dishner's (1995) definition, an "at-risk reader" is defined here as one who, without appropriate intervention, may fail to have the necessary skills and strategies to maintain the ability to read and grow as a reader.

The debate on whether code-focused or meaning-focused instruction is the right approach for helping children learn to read has never ceased. Authors, researchers, and

educators continually strive to find the right “balanced approach”. Shared storybook reading is an instructional approach, which has long garnered the attention of researchers and practitioners. Findings in this area from several research studies (e.g., Bus, Belsky, van Ijzendoorn & Crnic, 1997; Kaderavek & Justice, 2005; Van Kleeck, Vander Woude & Hammett, 2006; Wasik, Bond & Hindman, 2006) have consistently revealed positive impacts on the acquisition of various important early language and literacy skills of young children. In particular, reading aloud to children has been touted as the best way to help children learn to love reading (Beck & McKeown, 2001; Lane & Wright, 2007) and effective in working with and motivating heterogeneously grouped students (Tyner & Green, 2012).

Reading Programmes in Singapore

Given the importance of reading, schools are naturally toeing the line. Primary schools in Singapore are reportedly recruiting “language facilitators” to run enrichment lessons in reading, storytelling, and drama, to improve reading ability of their students. Schools and pupils interviewed listed students’ increased confidence in speaking English, willingness to express views, reading with expression and good pronunciation, and becoming an avid reader as some of the benefits of this programme (Leow & Yeo, 2010).

In Singapore, there is no lack of reading programmes developed to help young children learn to read. Most are implemented by the Ministry of Education (MOE) in schools or preschools, grassroots organization such as the Resident’s Committee, and professional bodies or other ethnic or religious communities, while still others are commercially run. Despite the prevalence of these programmes, there has been very little research to evaluate them.

In contrast, in the United States, there was greater interest in assessing reading intervention programmes to provide informed decision-making for schools to teach reading and make policy decisions. Nonetheless, the majority of these evaluated programmes either recruited certified teachers or para-professionals to facilitate the programmes, involved comprehension intervention models, or were based on one-on-one tutoring (Wasik, 1997, 1998). Few of these used the whole language approach, were delivered by community volunteers, and were facilitated as a group. As a result, effectiveness of community-based whole language or experiential reading programmes, using volunteers for group instruction, received almost no research attention.

A review of the literature exploring reading among children in Singapore revealed most studies were conducted in the late 1970s and early 80s. These studies were primarily conducted by then-Institute of Education (e.g., Gopinathan et al., 1978; Johnston, 1981; Ng, 1980) with a focus on primary school children, demonstrating the level of reading was generally low among Singapore children. Reading was also an unpopular leisure activity, regarded as another school subject, adding to the stress of primary school children and adversely affected their interest in reading (Gopinathan et al., 1978; Heaton, 1979; Johnston, 1981; Ng, 1980).

While research on reading has shown gender, cultural and family background differences in reading performance and reading attitude, this study will focus on differences in domain of reading behaviour arising from exposure to intervention (i.e., participation in the programme). The primary intent is to provide insights to the impact of participation in a volunteer-delivered, community-based reading programme on the reading success of at-risk children from families with low income. While doing so, this study also seeks to discover whether there are meaningful interactions between the various reading-related measures tracked by the programme. Adopting the view that reading is an interactive process, this suggests the reader's performance on various measures of reading success would be expected to vary as a function of the relations and conditions under which the reader is being evaluated (Brozo, 1990).

The present study aims to explore two research questions:

1. Are there differences in the ability to use English language, participation and interaction level, and general reading ability of children from low-income families after participating in the *kidsREAD* programme?
2. What and how do the measures of use of English language, participation and interaction level, and general reading ability of children influence each other to affect the success of *kidsREAD* programme?

Methodology

This exploratory study examines participation in a community-sponsored reading programme for at-risk children and attempts to identify the relationship between reading factors that contribute to performance as measured by the organizer. The overall goal was to run a preliminary probe into the programme's efficacy on children from low-income families and shed light on the usefulness of the tracking measures adopted in the programme. This could help NLB to better formulate their future research into the effectiveness of *kidsREAD*. It also aims to fill the gap in literature concerning research on the effectiveness of reading programmes delivered by volunteers to children in a naturalistic group context. Of interest here are the affective and behavioural outcomes such as interaction, participation level, and general disposition which were part of the measures tracked. Following consultations with Early Childhood and Language specialists, these assessment measures were drawn directly from, and sensitive to, the unique features of the *kidsREAD* programme; highly experiential, semi-structured, non-code focused, and delivered by passionate volunteers who enjoy reading and working with children.

Research Design

The primary purpose of this study was to review collected data to gain insights into the impact of the programme in a setting prohibiting the control or manipulation of all relevant variables. Therefore, a quasi-experimental research approach using one-group pretest/posttest design was selected. Due to the secondary purpose of this study – exploring relationships between measures of different reading-related performance

variables obtained from the participants – a correlational design was also incorporated as a way of analysing data, utilizing a definition offered by McLeod (2008).

Traditional experimental control and isolation was not possible, due to an attempt to identify changes occurring in a naturalistic context (Cook & Campbell, 1986). Based on the programme structure of using volunteer reading clubs to deliver the reading programme guided by a resource kit, and the requirement for participants to meet low-income criteria, it was unfeasible to have a control group. Reviewing available data also rendered random assignment of the participants into experimental or control groups impossible; all *kidsREAD* participants were from intact groups.

To draw insights regarding how sensitive measured reading behaviours are in impacting the reading outcome, the correlational design was integrated into the quasi-experimental design of this exploratory study. Creswell (2008) reported the correlational design is used when the investigator seeks “to relate two or more variables to see if they influence each other” (p. 356).

This quasi-experimental, correlational exploratory study using one-group pretest-posttest design follows the procedure as briefly described below:

- Step 1. Administer the pretest, consisting of 10 items for assessment by volunteers, to measure mean reading factors of a single group, consisting of participants from 121 reading clubs before exposure to the *kidsREAD* programme.
- Step 2. Expose participants to the *kidsREAD* programme for one “programme year”, varying from 9 to 33 sessions, between January 2010 and November 2010.
- Step 3. Administer the posttest (which consisted of the same 10 items for assessment by the volunteers), to measure mean reading factors of the same group of participants after having undergone the *kidsREAD* programme. The results of pretest and posttest were compared to determine if there was any difference in the participants’ reading performance.
- Step 4. Apply appropriate statistical evaluation to determine whether the differences and relationships were significant.

As only a single group was studied, with measurement occurring both before (O_1) and after (O_2) a treatment (X , i.e., participating in *kidsREAD*), the research design used in this study can be represented as $O_1 X O_2$ (Campbell & Stanley, 1966; Creswell, 2008). According to Mertens (2010), although the research design $O_1 X O_2$ (Campbell & Stanley, 1966; Creswell, 2008) has many weaknesses, its use is justifiable under circumstances in which change in attitudes, behaviour, or knowledge are unlikely to occur without the introduction of an experimental treatment. Attitude towards reading quality storybooks, disposition and interaction level with other kids (i.e. behaviour) from similar social economic status for read-aloud and activity times, and acquisition of

vocabulary and comprehension are specific to the *kidsREAD* context, activities and stories read during the programme.

The debate on the paradox of using experimental methodology to study complex social life (such as education) has been ongoing among those with different paradigms as coming from a constructivist, transformative or pragmatic perspective (Campbell & Stanley, 1966; Mertens, 2010). This exploratory study was conducted using the quasi-experimental and correlational approach in the spirit of methods or partial control based on careful identification of factors influencing internal and external validity, advocated by Campbell and Stanley (1966).

Research Setting and Participants

In 2010, the *kidsREAD* programme reached out to 2,729 children across the island. To maximize learning in the scope and time available for this study, selection of participants was done through reading clubs they were in. At the time of this study, there were 121 reading clubs; a random selection of 12 reading clubs (10%) was done, with all children from the randomly-selected clubs included. After checking for thoroughness of evaluation, a total of 186 participants' data was analysed. The participants for this study included 186 children (aged 4 to 8) attending nursery to Primary 2, who participated in *kidsREAD* in 2010. Of these, 94 (51%) were males, and 92 (49%) females. The children's ethnicity was 72% Chinese (134), 26% was Malay (48), 2% was Indian (2) and 1% was other race (1).

As a result of the long data collection period required (due to variation in start and end dates of the programme for each club) data previously collected for programme year 2010 was used for the analysis. Data came from completed child evaluation forms collected yearly by NLB from all reading clubs, island-wide. Location of the 12 selected clubs was spread across different parts of Singapore and run by different agents (e.g. primary school, community club, preschool, resident's committee, and student service centre). At the end of each programme year, coordinators at each club, or staff members running the programme, forwarded completed evaluation forms to NLB.

Instruments and Procedures

The instrument used for this study – the child evaluation form – was developed by the *kidsREAD* Secretariat, in consultation with Early Childhood and Language specialists, for the purpose of reporting on key performance indicators for the programme. The form was pre-designed to assess different reading outcomes across three domains, namely use of English language (UEL), participation and interaction (PAI), and reading skills (RS). The basic outcome measure in this study is the evaluation form's rated performance of children at the end of the programme, compared to rated performance at the start of the programme. The child evaluation form contained 10 multiple-choice items completed by volunteers at both the start and end of the programme, with three to four response choices for each item assessed. These choices or outcome rates were presented on a scale-like level, indicating performance at varying levels of competence.

For statistical analysis, the outcomes had to be expressed on a common scale of measurement, accomplished by coding each response from zero to two or three, with zero representing lowest competence and two or three representing highest competence. The codes for choices selected by volunteers for both pre- and post-programme evaluations were entered into the database for analysis.

Validity and Reliability Controls

Campbell and Stanley (1966) report that when full experimental control is lacking, it is imperative the researcher be fully cognizant of the specific variables the design failed to control. Threats to internal validity could potentially cause changes to outcome measures and be mistaken as effects of the treatment. Creswell (2008) listed three categories of threats to internal validity: those related to participants, related to treatment, and related to procedure. Cook and Campbell (1979) listed three external validity threats, which might affect ability to generalise results: interaction of selection and treatment, setting and treatment, or history and treatment. Accordingly, this study was designed to create structure of observation and treatment implementation, to effectively rule out these threats as discussed below:

1. Threats related to participants: With only one “experimental” group comprising of all participants enrolled in the programme from 12 clubs located island-wide, and where the participants all came from the same socio-economic background, threats to regression, mortality, selection, and interactions with selection were avoided. However, two rival variables, history and maturation, were uncontrollable.
2. Threats related to treatment: In a single group design, main biases such as diffusion of treatments, compensatory equalization, compensatory rivalry and resentful demoralization that threatened construct validity related to treatment were also averted.
3. Threats related to procedure: There was no threat to testing or instrumentation. Participants were not “test-wise” as pre- and post-test was in the form of pre- and post-programme evaluations carried out by volunteers, and not tests taken by participants. With a standardized set of evaluation form using the same observational scales measured at the start and end of programme, differences in pre- and post-tests arising from different instrument used was similarly ruled out.
4. Interaction of selection and treatment: All participants in the intact group were selected for the study. Moreover participation in kidsREAD is voluntary.
5. Interaction of setting and treatment: The good spread of geographical location of the 12 selected clubs, along with the wide array of context in terms of multiple sites where treatment was carried effectively ruled out this threat.
6. Interaction of history and treatment: As threat of history cannot be completely avoided in the study. Caution must be exercised when generalizing the effects of the findings here.

Results

Data analysis was conducted in two distinct steps. Firstly, the paired *t*-test was conducted for all reading outcomes (subcategories) measured by the programme. Included in the results was the effect size (*d*), which measures the magnitude of the treatment effect (Cohen, 1988) on the subjects’ ability to perform in the various outcomes measured. This was computed using Ray and Shadish’s (1996) Equation II. Secondly, inter-item correlation matrix of each domain and its associated subcategories (refer to Figure 1) was computed.

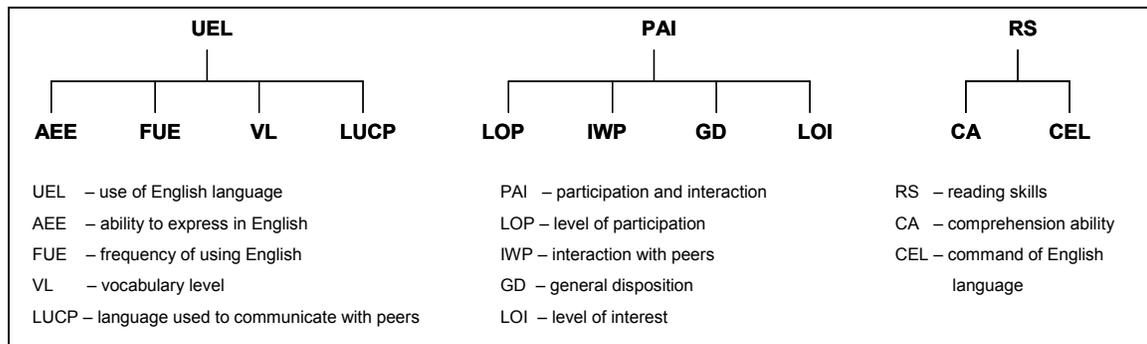


Figure 1.
Schematic representation of the three domains and their associated subcategories

Table 1.
Paired t-Test for All Subcategories

Variable	N=185	Mean	SD	Variance σ^2	SEM	95% confidence interval of the difference		<i>t</i> (df)	Sig. (2-tailed <i>p</i>)	Effect size <i>d</i>
						Lower	Upper			
AEE	Pre	0.84	0.701	0.492	0.052			-10.394		
	Post	1.34	0.648	0.420	0.048	-0.585	-0.399	(184)	.000	0.37
FUE	Pre	0.79	0.710	0.501	0.052			-11.317		
	Post	1.34	0.690	0.476	0.051	-0.638	-0.449	(183)	.000	0.41
VL	Pre	0.82	0.614	0.379	0.045			-11.099		
	Post	1.30	0.623	0.388	0.046	-0.570	-0.398	(183)	.000	0.40
LUCP	Pre	1.70	0.495	0.244	0.036			-5.787		
	Post	1.89	0.318	0.101	0.023	-0.254	-0.125	(184)	.000	0.15
LOP	Pre	0.96	0.777	0.604	0.057			-11.079		
	Post	1.51	0.634	0.403	0.047	-0.652	-0.455	(185)	.000	0.40
IWP	Pre	0.92	0.739	0.546	0.054			-10.980		
	Post	1.47	0.642	0.412	0.047	-0.641	-0.445	(185)	.000	0.39
GD	Pre	1.38	0.550	0.302	0.040			-8.874		
	Post	1.71	0.455	0.207	0.033	-0.401	-0.255	(185)	.000	0.30
LOI	Pre	1.17	0.668	0.446	0.049			-9.046		
	Post	1.57	0.622	0.387	0.046	-0.485	-0.311	(185)	.000	0.31
CA	Pre	1.29	0.692	0.480	0.051			-10.516		
	Post	1.83	0.751	0.568	0.055	-0.642	-0.439	(184)	.000	0.38
CEL	Pre	1.28	0.712	0.508	0.052			-15.695		
	Post	2.09	0.738	0.544	0.054	-0.902	-0.700	(185)	.000	0.57

Paired t-Test and Effect Size Analyses

Table 1 shows the mean scores for all subcategories of the three domains rose at post treatment, after one year of *kidsREAD* Programme. The improvements in scores across all subcategories were found to be statistically significant ($p = 0.000$). The effect sizes d 's for most subcategories ranged from 0.30 to 0.57 except for LUCP ($d = 0.15$). This revealed the treatment effect was moderately to highly substantive on all the subcategories except the LUCP.

Correlational Analysis

The results of the various correlational analyses are presented separately in Tables 2, 3, 4 and 5 for both inter- and intra-domains. Ratner (2009, 2012) provided the interpretation of correlation coefficients: a range of r values between 0 and .3 indicates a weak positive relationship, between .3 and .7 indicates a moderate positive relationship, and between .7 and 1 indicates a strong positive relationship.

In summary, the correlation coefficient r 's for most subcategories and among the 3 domains were considered either strong or moderately positive or significant except for that between LUCP and AEE, FUE and VL, as well as that between IWP and LOI where the r 's indicated weak but positive relationship. In fact, LUCP was the only subcategory that showed the weakest relationship with other subcategories.

Table 2.*Inter-Item Correlation Matrix for Subcategories of UEL*

	UEL	AEE	FUE	VL	LUCP
AEE	0.73	-			
FUE	0.75	0.37	-		
VL	0.70	0.33	0.36	-	
LUCP	0.48	0.18	0.17	0.15	-

Table 3.*Inter-Item Correlation Matrix for Subcategories of PAI Domain*

	PAI	LOP	IWP	GD	LOI
LOP	0.78	-			
IWP	0.75	0.50	-		
GD	0.70	0.37	0.35	-	
LOI	0.68	0.34	0.25	0.44	-

Table 4.*Inter-Item Correlation Matrix for Subcategories of RS Domain*

	RS	CA	CEL
CA	0.82	-	
CEL	0.82	0.36	-

Table 5.*Inter-Item Correlation Matrix of the Three Domains*

	UEL	PAI	RS
UEL	-		
PAI	0.46	-	
RS	0.56	0.43	-

Parent Survey

For purpose of triangulation, this study also includes analysis of survey feedback from parents of the 186 participants. Table 6 displayed the results. A significant 80% of parents polled reported their child was able to read much better than before, and the use of English increased. Parents also found children were more at ease interacting with other children, and 84% reported their child was more interested in reading.

Table 6.*kidsREAD and Its Impact on Children's Behaviour According to Parents*

Area	Frequency	% Yes
Child is more interested in reading	156	84
Child finds it easier to talk/play with other children	166	89
Child reads in his/her free time more than before	124	67
Child uses English more than before	130	70
Child borrows books from the library	131	70
Child asks you to read to him/her more than before	128	69
Child is more cheerful/confident than before	160	86
Child asks you to go to the library more than before	107	58
Child is able to read much better than before	148	80
Child speaks in English to his/her friends/relatives more often	135	73
Child likes to come for <i>kidsREAD</i>	179	96
You would tell your friends to send their child to <i>kidsREAD</i>	175	94

Discussion

One of the aims of this study is to explore if participation in the *kidsREAD* programme makes a difference in reading performance, as measured in the programme, in at-risk children from low-income families. The results at best suggested that having undergone the *kidsREAD* programme for one year, participants showed improvements in their ability to express in English with increased frequency of its usage and improvement in their vocabulary or word knowledge in English. There was also improvement in their level of interest in reading as well as their participation in its activities and interacting with peers. Their general disposition as a reader also improved in terms of they becoming more enthusiastic or cheerful readers. The same improvement was seen in their ability to comprehend what they read. Overall, participants ended with a better grasp of command in English in a general sense. However, the result also suggested low use of English by the participants to communicate with their peers. Nonetheless, all these results cannot posit an explanatory relationship. Instead, it can be used to tweak the programme for improvement, and determine a better research design, data collection method and sampling that NLB should consider when planning for its future research.

The second aim of this study is to determine if there was any relation among the different measures of reading behaviour that formed the framework of assessment for the *kidsREAD* programme. Figure 2 sums up the findings. The results allowed the researchers to make a preliminary deduction that the UEL, PAI and RS of the children predicted the reading success of *kidsREAD* participants. With the exception of LUCP which had an indirect effect on reading success, all behaviours appeared to be directly associated with the success of supporting programme objectives. This, too, should be interpreted with caution as there are concerns on the validity and reliability of the measure (child evaluation form) as discussed later.

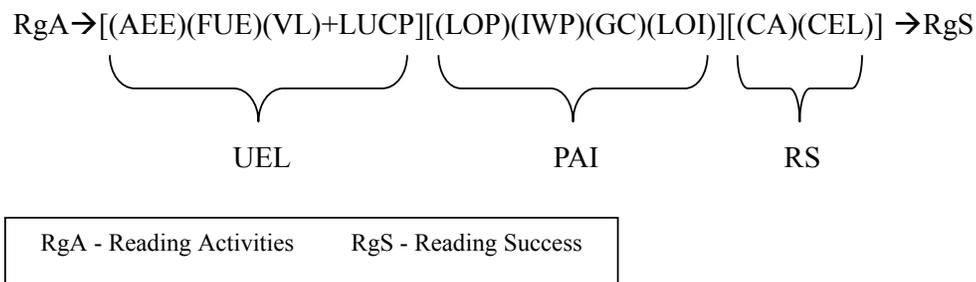


Figure 2.
Reading success (RgS) equation for kidsREAD.

KidsREAD's Equation for Reading Success (RgS)

The instructional conditions of *kidsREAD* consisted of reading behaviour (subcategories) measured in the programme. Figure 2 depicts the possible relationship these different behaviours have and provides a visual appreciation of how they could possibly interact to establish the ability of at-risk children to be successful while using the programme. The findings in this study also allowed deduction as to which reading behaviour had a direct impact on supporting programme goals. By integrating connections of behaviours in the three domains, this study provides a summary of the relationships in the equation: $RgA \rightarrow [(UEL) (PAI) (RS)] \rightarrow RgS$.

Use of English language (UEL). As expected, Table 1 shows that after one year of treatment, there was significant improvement in the children's ability to express themselves in the English language, as well as increased frequency of use of the English language by children after treatment. The children also showed improvement in vocabulary level, with a significant increase as compared to pre-treatment levels. However, the use of English language when interacting with peers was the only behaviour without improvement.

The first part of the equation in Figure 2 - $UEL \rightarrow [(AEE) (FUE) (VL) + LUCP]$ – further illustrates the relationship among the four parameters (AEE, FUE, VL and LUCP) used to measure the use of English language (UEL) in the programme. The equation helped establish evidence that the UEL domain was directly dependent on four variables: AEE, VL, FUE, and LUCP. This dependency is demonstrated in Figure 3 below, where the ability to express in English language (AEE), the frequency of use of English language (FUE), and the vocabulary level (VL) had significant impact on the use of English language (UEL), while the use of English language among peers (LUCP) had less impact on it.

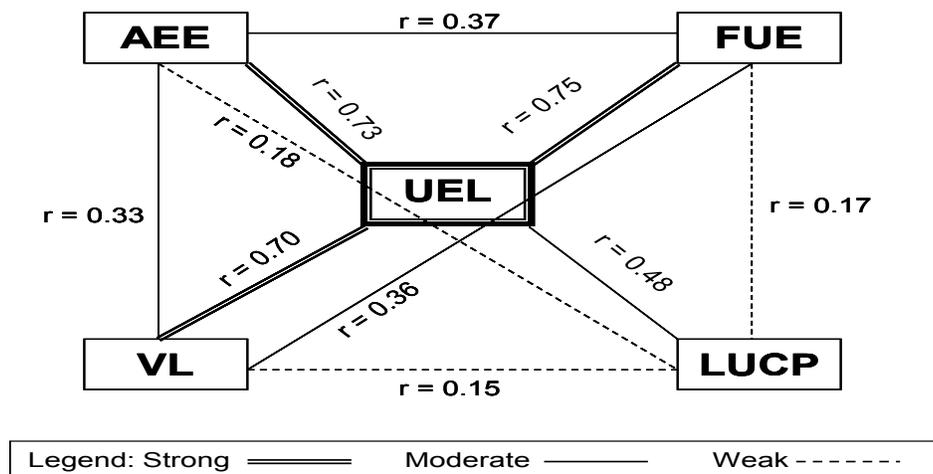


Figure 3.
Intercorrelations among the UEL domain and its subcategories

These four variables were also interrelated to each other. For example, AEE was found to have a moderate relationship with FUE and VL, showing the more a child could express themselves in the English language, the greater increase in vocabulary and higher likelihood to use English. Though there was an improvement in LUCP, the association with the other three factors was weak; LUCP had very little significance to children's reading success. The children did not change habits of using their mother tongue when communicating with peers as communicative efficacy could be the primary driving force in the choice of language used by children to communicate with peers.

This finding is consistent with suggestions from previous investigations on reading and learning. For instance, reading aloud has been widely accepted as an effective context for developing vocabulary (Newton, Padak, & Rasinski, 2008; Biemiller & Boote, 2006) and word learning (Biemiller & Boote, 2006; Bravo, Hiebert, & Pearson, 2007). The use of read-aloud affords volunteers opportunities to promote talk and discussion on the story read. Thus, it is expected that use of language increases with such a strategy.

When it comes down to language spoken with peers, Ting (2010) found that Chinese teenagers used the language spoken at home, when relating to peers, especially where the home environment is increasingly Mandarin-speaking. This is primarily the case in Singapore, particularly for children participating in *kidsREAD*. Research on children, in the area of code switching, has also shown bilinguals develop knowledge on how and when to use their two languages depending on the topic discussed, the situation, and the person talked to (Fantini, 1985; Halmari & Smith, 1994; Zentella, 1982).

Research in the area of literacy involving bilingualism also shows what children have learned in their first language can help them in the acquisition and learning of their second language (Jiang & Kuehn, 2001; Karim, 2003; Reyes, 2004; Ringbom, 1992). This is also explained in Cummins' (2000) *Iceberg model*, which shows the relationship between one's primary language and second language, that what one learns in the first language transfers to the new language. Hence, it came as no surprise when the children in *kidsREAD* used the language they felt very competent with, during interaction with peers, as this made it likely to form stronger bonds with their peers (Bryan, 1978; Kryratzis, 2004). In this sense, the programme also met another one of its objectives: gaining a greater understanding of children from other races (NLB, 2004, para. 9).

Research has also shown the level of language skill exhibited by classmates of preschoolers would predict language skills (Mashburn, Justice, Downer, & Pianta, 2009). Participants in this study had English as their secondary language, with Malay and Chinese as majority primary languages; most children were attached to their primary language, although they had been taught to read and communicate in English. Therefore, under normal circumstances, children should be allowed to use their primary language, especially when interacting with their peers, to improve their ability to communicate.

Participation and interaction (PAI). The second equation in Figure 2 - PAI → [(LOP) (IWP) (GD) (LOI)] - illustrates the relationship of the four variables that made up the

PAI domain; the PAI domain directly depended on the four variables: IWP, LOP, GD, and LOI, as depicted in Figure 4.

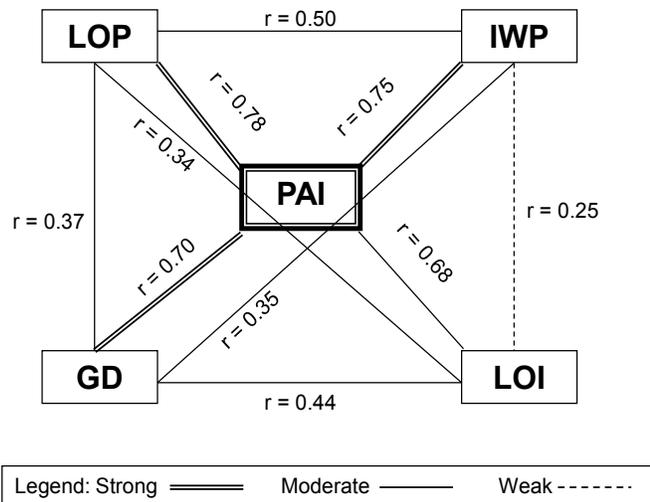


Figure 4.
Intercorrelations of the PAI domain and its subcategories.

With the exception of LOI, these subcategories had a very strong relationship with the PAI domain, showing high dependence on them. However, LOI impact was insignificant. Among themselves, the subcategories were moderately related, with that of LOI and IWP being significantly weak, and level of interest not being a significant determinant for levels of participation and interaction.

An interesting point in this finding was that participation level did not necessarily affect a child's interest in the story or activities. Although a child's interest in reading activities need not affect their level of interaction with peers, it seems contradictory that levels of participation were not significantly affected by attentiveness and responsiveness. According to Guthrie (2000), situational interest related to the story can be arranged by the teacher to connect to the knowledge goals set as part of the reading.

The rest of the findings are generally reflective of results in other studies. Guthrie, Schafer and Hutchison (1991) found that reading increases children's social skills and community participation. In their longitudinal study of 400 rural and urban low-income children from 1996 to 2002, Miles and Stipek (2006) showed good social skills were associated with good reading scores, and students with good social skills in kindergarten and first grade were more likely to be good readers in third grade.

Reading skills (RS). The third and final part of the equation in Figure 2 - $RS \rightarrow [(CA) (CEL)]$ - illustrates the domain of RS was directly dependent on the two variables (CA and CEL) measured, with a strong relation between them (refer to Figure 5).

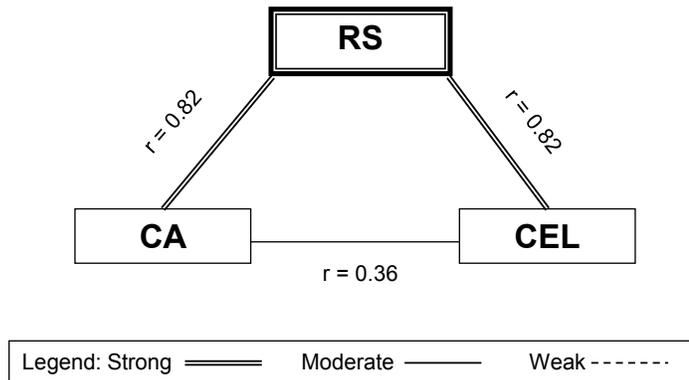


Figure 5.
Intercorrelations of the RS domain and its subcategories

From this equation, it is clear that change in the comprehension ability of the children would significantly affect the child's reading skills. Therefore, a decrease in comprehension ability would also result in a decrease in reading skills, which is consistent with previous research (e.g., Nation & Snowling, 2004; Wise et al, 2007) showing listening comprehension significantly influences word identification skills and reading skills.

From the results, it can be inferred that participation in this programme improved the reading skills of children at risk, who were more likely to comprehend what they read during the programme, and a significant improvement in grasp of the English language. The programme was also useful in improving ability to learn English as a secondary language. It could lead to improved performance in school, ensuring a basic literacy foundation before formal education with the ability to master concepts and learn new things more easily.

The exploratory analyses allow the researchers to demonstrate how various reading behaviours correlate to children's reading success, thus showing exposure to *kidsREAD* facilitated reading success for at-risk children from families with low income. Evidently, children in this sample benefited from participating, showing improvement in all measured reading behaviour. Similarly, correlation analyses provided evidence regarding strength of relationships among the different measures that served as the framework for reporting on the success of *kidsREAD*.

Parent survey. Table 6 displayed the results that afford us the parents' perception of changes observed in their children's reading-related behaviour after attending *kidsREAD*, substantiating that participation in the programme improved reading behaviours of these children. These results provide validation of the positive impact of *kidsREAD* on children from low-income families.

Significance

This research is the first of its kind in Singapore, exploring the impact of a reading intervention programme aimed at improving the development of reading skills and instilling a love of reading of children from low-income families. The positive impact of *kidsREAD* on participants could attract more corporate sponsors and organizations or schools to take part and contribute to empowering more low-income children with resources to improve quality of life. The model is an affordable alternative for providing additional support to those identified as poor or reluctant readers, which may encourage more volunteers to help at-risk children at a critical point in their literacy development. With these preliminary insights, NLB can start exploring improvements to be made to the programme, particularly in training for volunteers and developing a more sensitive instrument to measure the reading outcomes according to the programme objectives.

Limitations

This study included pre-collected data; randomized controlled trial and assignment of children was not possible; therefore, issues on validity and reliability of the findings may be a concern. There are also limitations of correlational design; as it does not imply causality, the major limitation of the design lies in the conclusion drawn from results. In reality, there are several factors that can influence social and natural phenomena and affect reading attainment, pertinent variables such as reading enjoyment, attitude, and behaviour (Clark & de Zoysa, 2011). Therefore, interpreting the result requires being cognizant of confounding variables, as well as difficulties in avoiding them.

Out of the total of 523 clubs run and 13, 278 children served over 7 years, only 12 clubs (2.3%) and 186 children (1.4%) were included in this study. With a smaller sample size, results reported here should be interpreted with caution, as findings may not be transferrable to the target population. If possible, these results should be cross-validated with other samples and programmes.

Another important limitation of the current study lies in the inherent weakness of a one-group pretest-posttest, quasi-experimental design. The key confounded extraneous variables that can jeopardize internal validity of this study are history and maturation. Both of these could offer plausible hypotheses to explain the O_1 to O_2 difference, rivalling the hypothesis that X caused the difference (Campbell & Stanley, 1966).

Yet another major limitation of this study was the reliability of the instrument: the child evaluation form. The instrument did not have any reported validity and reliability scores, nor had there been any review done. It was designed with expert advice sought by NLB and was aligned to measure constructs reflected as key performance indicators for the programme, constructs that were directly drawn from the curriculum and deemed sensitive to distinctive features of the programme, serving as an internal measure of the effectiveness of the programme. Further, volunteers may have altered responses to evaluations, to align with expected social outcomes. However, this is unlikely, based on the lengthy responses of volunteers on most of the evaluations. It was noted that the

Cronbach Alpha α for all variables is .90 ($n = 185$), which according to Kinnear and Gray (2010) was generally accepted as a useful test.

This paper only presented the exploratory statistical findings. The researchers appreciate that there are many other factors that could influence the results, pertinent reading-related variables as investigated by Clark and de Zoysa (2011), as well as nature of the programme such as instructional approaches and strategies that could really work to make volunteer-delivered community-based reading programme an economically sustainable and yet successful model for children at risk of reading difficulty or failure.

Recommendations

Clearly, these limitations give rise to many questions in need of further investigation; issues and factors worth considering, when planning for further study of the impact of this programme. This study, an exploratory investigation, can be likened to a pilot study on *kidsREAD*. The researchers strongly recommend further research be done, taking into consideration the limitations discussed, including examining the predictor variables change over time, to provide definitive evidence for the impact of this programme, preferably in the forthcoming longitudinal study commissioned by NLB. The scope, significance and implication for doing so are immeasurable, and the resulting findings would broaden the collective understanding of this research topic.

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