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Supporting Children with Reading Difficulties Across the Summer Learning Gap

Hilary Scruton¹, John McNamara^{1*} and Ashley Short²

¹*Brock University, St. Catharines, ON, Canada.*

²*Learning Disabilities Association of Niagara Region, St. Catharines, ON, Canada.*

Authors' contributions

This work was carried out in collaboration between all authors. Author H.S. designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. J.M. reviewed the protocol and analyses of the study. A.S. managed the intervention program of the study. All authors jointly read and approved the final manuscript.

Original Research Article

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ABSTRACT

Aims: This study describes the components, and tests the efficacy of a full-day summer learning program offered by the Learning Disabilities Association of Niagara Region. The program is aimed to support children with reading difficulties who are particularly susceptible to the summer learning gap.

Study Design: The summer program described in this study was designed to support children with reading difficulties in their development of foundational literacy skills including sight word efficiency, phonemic decoding, letter-sound understanding, and reading fluency. To assess the efficacy of the program, participating children were assessed on the first and last day of the week-long intensive intervention program.

Methodology: A total of 31 children participated in the full-day summer learning program, Sunshine Learning Achievement and More (S.L.A.M.) program and were assessed using a pre - post-test design utilizing five measures of literacy achievement corresponding to the literacy skills taught within the program.

Results: Statistically significant results emerged for all measures including sight word efficiency [t (28) = -6.30, p < .001, d = -.03], phonemic decoding efficiency [t (26) = -6.64, p < .001, d = -0.36], letter names [t (30) = -3.70, p < .005, d = -0.21], letter sounds [t (28) = -4.72, p < .001, d = -0.65], and reading fluency [t (28) = -8.40, p < .001, d = -1.46].

*Corresponding author: Email: jmcnamara@brocku.ca

Conclusion: The findings of the study show the importance providing ongoing support to vulnerable readers or children with reading difficulties throughout the weeks of summer where significant learning loss is particularly evident. The study holds implications for all stakeholders concerned about supporting children with reading difficulties.

Keywords: Reading difficulties; summer learning gap; literacy.

1. INTRODUCTION

The summer learning loss is a well-documented phenomenon [1,2]. The general notion behind summer learning loss posits that the learning gap created by the 8-9 weeks of summer vacation from school can result in children losing some of the academic knowledge and skills that they gained in their previous school year. In fact, it has been found that on average, the summer learning gap resulted in children experiencing a decrease in their achievement that equalled at least one month of instruction as measured by grade level equivalents on standardized test scores [2]. In other words, children's test scores were at least one month lower when they returned to school in the Fall than scores were when students left in the summer. The impact of the summer learning gap has been shown to be particularly problematic for vulnerable learners [3] and also is particularly problematic in the area of literacy [4].

Although the summer learning gap may impact a wide range of learning vulnerabilities, children with learning disabilities may be particularly affected by not attending school over the summer [5]. Children with learning disabilities by definition have average intelligence, yet experience processing problems that affect their ability to process information. Approximately 80% of all learning disabilities are reading-based, often referred to as dyslexia [6,7]. Children with reading disabilities (dyslexia) are faced with processing problems that impact their ability to read fluently and effectively. In the context of the current study, research has illustrated that the summer learning gap can be particularly problematic for children with reading disabilities. For instance, [8] found that without continuous instruction throughout the summer months, many children with reading difficulties fall further behind their grade-level peers. The findings of [2] indicated that the summer learning loss phenomena may be troublesome for less advantaged children including those requiring special educational needs. Similarly, [9] reported that it is most often the children who can least afford to lose the literacy-based skills that they have learned during the school year who end up falling the furthest behind during summer vacation.

Another perspective on this challenge may be to consider using the summer months as an opportunity to engage children with reading difficulties in order to decrease any potential learning loss through summer intervention programming. In other words, summer learning programs have the potential to help children with reading difficulties improve their reading in preparation for their next school year. In a study of summer programming for young vulnerable readers, [5] found that children at-risk for reading difficulties made significant achievement gains in the area of emergent literacy by participating in a brief intensive small group literacy program. The achievement gains experienced by children in this study demonstrated that they had not only stopped any potential summer learning loss, but in fact had gained literacy skills that place them within normal percentile reading scores. Following this research, it is important to consider how best to support children with reading difficulties across the summer months.

The current study describes and assesses the efficacy of a summer literacy program designed to support children with reading difficulties. Children participating in the program were either diagnosed with reading disabilities or considered to be at-risk for reading disabilities. As such, all children participating in the program were considered to have significant reading difficulties. The purpose of the program was to build children's foundational literacy skills, subsequently reversing the effects of the summer learning loss phenomenon. The Learning Disabilities Association of Niagara Region, in partnership with researchers at Brock University, designed a summer program, Sunshine Learning Achievement and More (S.L.A.M.), aimed at promoting empirically-supported reading-based skills for children with reading difficulties. The program was designed to promote sight word efficiency, phonemic decoding, letter-sound understanding, and reading fluency – all skills deemed essential to programs aimed at supporting children with reading difficulties by the National Research Panel [10]. The current study aimed to measure the efficacy of the S.L.A.M. program and considers how summer programs such as this can be effective tools in supporting children with reading difficulties over the summer months.

2. METHODS

2.1 Participants

Participants in the S.L.A.M. literacy program were 30 children, 6-10 years of age, who were either at-risk for reading disabilities or who had been previously identified with a reading disability. Children were referred to the program either by parents or educators, based on their previous year's academic achievement. Although formal diagnosis was not established, program staff screened children for processing deficits consistent with reading disabilities. All children were deemed to have significant reading difficulties without any global intellectual impairment. Also, children with behavioral or other exceptionalities were excluded from the program. Participating children lived in a middle-class neighbourhood within a city located in Southwestern Ontario, Canada.

2.2 Program

The Sunshine Learning Achievement and More (S.L.A.M.) program was a full-day summer support program offered by the Learning Disabilities Association of Niagara Region (LDANR). The program was offered weekly throughout the summer months of July and August. Participating children attended the program daily from 9 a.m. to 4 p.m. (delete "for one week")

The S.L.A.M. program was an intensive one-week program designed to provide ongoing support to vulnerable readers. The structure of the program was designed such that each day, children spent the morning involved in hands-on engaging literacy activities, and for the afternoon, children worked on developing social skills through cooperative recreational activities. The program was staffed by a number of facilitators and volunteers who worked with children in both small groups and individually. All program staff were trained by coordinators from the LDANR in effective literacy intervention. Throughout each day, children worked with facilitators and volunteers on various literacy skills and strategies that were tailored to their individual needs. Also, at various points, children also had the opportunity to work on specific literacy skills with a one-on-one facilitator.

Within the program, children focused on 4 specific literacy skills; sight words, phonics, letter sound understanding, and fluency – skills identified by the National Reading Panel as important for children with reading difficulties [10]. Program facilitators designed instruction of these skills to be explicit, direct, and delivered in small group settings.

During the first instructional regime facilitators focused on sight word vocabulary and high frequency (delete “,”) irregular words. Specifically, facilitators taught participants five sight words each session that corresponded with the participant’s current reading level. Sight words were selected from the TOWRE sight word list. This direct instructional approach was then complimented with a related sight word activity. The same type of instruction was used for teaching letter-sound understanding and phonics. Facilitators responded to the individual decoding needs of children and utilized a variety of activities enabling them to manipulate and think about letters and sounds in spoken language. When focusing on fluency, participants were given a reading passage that corresponded with their current reading level. Using the repeated reading strategy, participants would practice the same passage throughout the week in order to increase fluency rate on that specific passage.

2.3 Measures

The study used a pre-test, post-test design where participating children were administered two assessments on the first and last day of the program. Assessments included the Test of Word Reading Efficiency - Second Edition (TOWRE-2), a standard measure of letter-sound awareness, and a standard measure of reading fluency calculated by words correct per minute. Achievement data was collected and recorded on the first and last day of the program by the one-on-one program facilitator. Assessment measures are described below.

2.3.1 Test of word reading efficiency, second edition (TOWRE-2)

The Test of Word Reading Efficiency – Second Edition [11] provides a measure of an individual’s ability to pronounce printed words accurately and fluently. The normative sample consists of 1,717 students’ ages 6 years 0 months through 23 years 11 months. The current study used both TOWRE-2 subtests – Sight Word Efficiency (108 items) and Phonemic Decoding Efficiency (66 items).

2.3.1.1 Sight word efficiency (SWE)

This subtest measures the ability to recognize familiar words as whole units automatically. The child was asked to identify as many real words as possible within a time frame of 45 seconds. Raw scores are computed based on how many real words are read correctly and converted to scaled scores and percentile ranks. Reliability coefficients for the TOWRE-2 for SWE was ($\alpha=.91$).

2.3.1.2 Phonemic decoding efficiency (PDE)

This subtest measures the ability to sound out non-words quickly and accurately. The participants were asked to identify as many non-words as possible within a time frame of 45 seconds. Raw scores are computed based on how many non-words are read correctly and are converted to scaled scores and percentile ranks. Reliability coefficients for the TOWRE-2 for PDE was ($\alpha=.92$).

2.3.2 Letter name knowledge

Letter-name association clearly taps into something of critical importance in early reading [12]. The major task of letter naming is mapping a visual symbol to a phonetic representation. Therefore, for this task children were shown all twenty-six lower case letters of the English alphabet and asked to give the letter name. Participants were scored as correct if they responded with the appropriate letter name.

2.3.3 Letter-sound correspondence

Letter sound tasks required associating symbols with discrete sounds, which may be more challenging, because it requires isolating individual phonemes. Research has demonstrated that this skill has a significant causal effect on subsequent development of phonological skills [12]. For this task, participants were shown lower-case letters and asked to give the corresponding sound. If participants responded with a letter’s corresponding soft sound (ex. /c/ as in race), they were prompted to think about another sound. The target sound was the hard consonant or short vowel sound. Participants were scored as correct if they responded with the appropriate letter sound.

2.3.4 Fluency

Fluency was measured by a standard calculation by words correct per minute. Participants read a passage at their estimated reading level. The number of correct words read within one minute were divided by the number of words in the passage and multiplied by 60. The resulting score was recorded as participants reading fluency rate.

3. RESULTS AND DISCUSSION

A pre-test, post-test analysis of literacy score means was conducted to determine if there were significant differences in achievement after participating in the summer program. Pre-test data was collected from the first day of programming and the corresponding post-test data was collected on the last day. Following data collection, SPSS was used to compute five paired samples t-tests corresponding to four literacy measures used in this study. Raw mean scores and standard deviations for all four measures are shown in Table 1.

Table 1. Means and standard deviations of literacy measures

Measures	Pre-test		Post-test		p-value	Cohen’s d
	Means	Standard Deviations	Means	Standard Deviations		
TOWRE Sight Words	27.7	17.8	33.3	19.5	-6.30	-.03
TOWRE Phonemic Decoding	9.7	9.7	13.4	10.9	-6.64	-.36
Letter Names	46.5	9.5	48.5	9.2	-3.70	-.21
Letter Sounds	19.0	3.1	20.7	2.1	-4.72	-.65
Fluency	38.8	24.0	82.2	35.5	-8.40	-1.46

A paired samples t-test for TOWRE sight word efficiency was found to be significant [$t(28) = -6.30, p < .001, d = -0.03$], indicating that participating children improved their ability to

recognize and identify sight words from the pre-test (M = 27.69, SD = 17.8) to the post-test (M = 33.3, SD = 19.5). Phonemic decoding efficiency was also found to be significant [t (26) = -6.64, p < .001, d = -0.36], indicating that participating children improved their ability to sound out pseudo-words from the pre-test (M = 9.74, SD = 9.70) to the post-test (M = 13.41, SD = 10.90). Letter names was found to be significant [t (30) = -3.70, p < .005, d = -0.21], indicating that participating children improved their ability to name letters from the pre-test (M = 46.5, SD = 9.5) to the post-test (M = 48.48, SD = 9.20). Letter sounds was found to be significant [t (28) = -4.72, p < .001, d = -0.65], indicating that participating children improved their ability to name sounds from the pre-test (M = 19.03, SD = 3.1) to the post-test (M = 20.72, SD = 2.1). And the final test for reading fluency was found to be significant [t (28) = -8.40, p < .001, d = -1.46], indicating that participating children improved their ability to reading text accurately and fluently using a repeated readings strategy from the pre-test (M = 38.84, SD = 24.0) to the post-test (M = 82.23, SD = 35.5). Cohen's d were computed taking into account the correlations between pre- and post-test measures to determine the effect size for each skill [13]. According to Cohen [14], an effect size of 0.8 is large, 0.5 is medium, and 0.2 is small. By comparing the magnitude of each effect, the effect for sight word efficiency appeared.

3.1 Clinical Significance

Although pre- and post-test analyses revealed statistically significant increases for all four measures, these results do not demonstrate whether the increases are clinically significant. In other words, it is important to compare the achievement gains of participating children relative to typically-achieving readers. To do this, pre- and post-test TOWRE-2 mean scaled scores were converted to percentile rank scores and compared to norm-referenced percentile rank scores reported in the technical data. Pre- and post-test clinical gains are presented in Table 2.

Table 2. Means and percentile ranks of TOWRE sight words and phonemic decoding

Measures	Pre-test		Post-test	
	Means	Percentile Rank	Means	Percentile Rank
TOWRE Sight Words	27.7	4 th	33.3	25 th
TOWRE Phonemic Decoding	9.7	5 th	13.4	25 th

For sight word efficiency, participating children began the program within the poor range, at a percentile rank of 4. After program completion, they improved to a percentile rank of 25, placing them within the below average range. For phonemic decoding, children improved from a percentile rank of 5 to 25, placing them within the average range (descriptive terms provided in the TOWRE-2 Manual). Technical data was not provided for the letter-sound and fluency measures and as such, clinically significant analyses were not possible.

4. CONCLUSION

The results of the study indicated that children with reading difficulties statistically and clinically improved their reading achievement by participating in the S.L.A.M. summer program. Specifically, participating children improved their letter-sound understanding, sight word efficiency, phonemic decoding efficiency, and reading fluency. The results of the study

point to the importance of addressing the summer learning gap, particularly for children at risk for reading difficulties. Within the summer learning gap children lose a significant amount of academic information attained in the previous year. The S.L.A.M. program offered by the Learning Disabilities Association of Niagara Region aimed to reduce the summer learning gap by providing a remedial instructional program, focusing on foundational reading skills recommended by the National Reading Panel. Program facilitators delivered this programming through direct, explicit learning techniques that promoted mastery of the targeted skills. Results of the study support the notion that programs such as S.L.A.M. can help reduce the summer learning gap and prepare children for their upcoming academic year.

There are limitations and future directions associated with the current study. First, the current study used a relatively small sample size. Also, the current study does not include a control group. It would be beneficial for future research in this area to study larger samples using a control group-design to study the effects of the summer learning loss for children with reading difficulties. Another limitation centers itself on the procedure of including participants of both children identified with reading disabilities and children who were deemed at-risk for reading disabilities. This procedure complicates the accuracy and generalizability of the study's findings. Finally, it would be beneficial to study the longer-term sustainability of the achievement gains associated with summer intervention programs. This could be accomplished by including a post-program assessment as participants entered their Fall school year.

In general, the current study points to the notion that it is essential for educators and policy makers to recognize the importance of supporting vulnerable learners over the summer months. Children with reading difficulties may be at an increased disadvantage over the summer, placing them at-risk for falling further behind their grade-level reading peers. Summer programs such as S.L.A.M. support such children and decrease their susceptibility to the summer learning loss.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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