The Effect Using the REWARDS® Reading Program on Vowel Sounds, Word Part, and Prefix and Suffix Identification in Multi-Syllabic Words: A Case Report

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Proficiency, accuracy and fluency in reading is an essential part of nurturing a disposition towards learning, growth and continued education for any student who wishes to be successful in school. Many studies have assessed the efficiency and success of various reading programs that have been developed to improve these areas of reading proficiency. The REWARDS® Program is one such example. This program works to increase a student's ability to decode multisyllabic words using specific strategies including vowel sound, word part, and prefix and suffix recognition. REWARDS® can be used as intervention elementary to high school, and with students in both general and special education settings. This study was performed by two undergraduate students at a high school in the Pacific Northwest and assesses the progress of a 14-year-old-female participant who was diagnosed with a specific learning disorder in reading skills. The study tracks the development of the participant's reading skills through the use of the REWARDS Program. Through this study, there was clear evidence that the REWARDS Program had a positive impact on the student's ability to decode multisyllabic words.

Fluent reading is a starting point for any person wishing to further their learning and be successful and school and later life (Adams, 1990; Archer, Gleason, & Vachon, 2003; Sanzo, Clayton, & Sherman, 2011). However, reading is not merely

a skill important for the school environment but is applied in most activities, work environments, and everyday life (Sanzo, Clayton, & Sherman, 2011). This is why reading is one of the most important skills to be taught and developed in a child's early education and must be a focal point of growth in order for the student to succeed (Archer et al., 2003). Finally there is a strong correlation reading success future learning throughout other content areas. As students progress through school, proficient reading is a required skill in most, if not all, other classes

There is strong evidence showing that if a child does not read by third grade, they often fail to catch up and are more likely to drop out of school, take drugs, or become incarcerated (Greenwood, 1996). Therefore, the need for developing early reading skills, as well as an enthusiasm for reading and fostering these skills throughout a child's life, is central to reinforcing a disposition towards learning and growth (Adams & Engelmann, 1996; Archer et al., 2003). Unfortunately, much of the research done on tracking the progress of students who fall behind indicates that this development is not always fostered. After being exited from special reading programs due to their improvement in reading skills,, many junior and senior high school students tend to regress once they return to the general education classroom (Algozzine, McQuiston, O'Shea, & McCollin, 2008). Early intervention with reading skills is always preferred, but not always realistic, and many children end up falling further behind in the reading skills (Shippen, Houchins, Steventon, & Sartor, 2005).

There have been several studies that have evaluated the effectiveness of different interventions in developing helpful and beneficial reading skills in adolescent students whose reading skills are below grade level. For example, Causton-Theoharis, Giangreco, Doyle and Vadasy (2007) reported seven studies in which they observed

paraprofessionals to carry out reading intervention, that "paraprofessionals are most effectively utilized during instructional time if they are provided with research-based reading approaches that have explicit and systematic instructional rules and procedures (Causton-Theoharis et al., 2007). Along with explicit, systematic intervention, specific instructions on helpful reading strategies have been shown to aid student's progress. Explicitly taught reading strategies such as these have been helpful in intervening with reading skills for students with specific learning disorders. We have carried out three case studies at the high school level that have shown that employing Direct Instruction materials and procedures improves student performance (Blackwell, Stookey, & McLaughlin, 1991; Gregory, McLaughlin, Weber, & Stookey, 2005; Holz, Peck, McLaughlin, & Stookey, 1996).

Archer and colleagues, authors of the REWARDS® Program, examined the effects of different research-validated reading programs on students with specific learning disabilities. They reported that the National Education Goals Panel (1995 NO) reported that only 28% of eighth graders and 34% of twelfth graders achieve proficient reading standards. Also, 74% of those students that identified with reading disabilities in the third grade continue to have these challenges in the ninth grade (Archer, Gleason, & Vachon, 2003). For these students, it is important to use researched based programs in order to increase their understanding of multisyllabic words. Likewise, as Borkowski and Muthukrishna (1992) indicated that it is important to enhance generalization when working with students with learning disabilities. Archer et al., (2003) noted that generalization is enhanced when "(a) students are told when, why, and where to use the strategy; (b) students reach a high automaticity on the strategy; (c) students are given a great deal of practice on using the strategy as they would in their daily lives; and (d) students are directed to use the strategy (Archer, Gleason, &

Vachon, 2003). One program that focuses specifically on teaching children how to decode these difficult, multisyllabic words through generalization is the REWARDS® Program. The REWARDS® Program is a research-based program developed by Sopris Learning. The goal of this program is "to teach students a flexible strategy for decoding long words that is both effective and efficient" (Archer et al., 2003). It is incredibly important that students learn how to decode longer words in order to follow along with more difficult textbooks and materials as they get older. This program breaks down longer words into word parts, vowel sounds, and affixes in order to give students an easier time reading more advanced materials. By participating in the program, students will be able to accurately read more multisyllabic words found in sentences, in science, social studies, and health textbooks; speak with an expanded vocabulary; and decode previously unknown multisyllabic words. When revising the program, authors Archer and colleagues conducted two studies to verify the power of the REWARDS® strategy. In the first study, the authors observed a significant difference in reading skills between reading-deficient fourth and fifth graders using the REWARDS® Program, compared with the students receiving monosyllabic word instruction. Similar findings were gathered when the authors performed this study with sixth, seventh, and eighth graders as subjects. Overall, the students using the strategy experienced notable increases in reading accuracy and fluency (Archer, Gleason, & Vachon, 2000).

The purpose of this study was to evaluate the effects of the Reading REWARDS® Program on the identification of word parts, prefixes and suffixes, and vowel sounds in multisyllabic words of a 14-year-old ninth grader in a resource room setting whose major focus is to teach high school students to read.

Method

Participant and Setting

The participant in this study was a 14-year-old girl in the ninth grade with a specific learning disability. The participant was adopted from China as an infant and lived with three older sisters, whose ages were 15, 18 and 21 as well as her adoptive mother. Her adoptive parents were divorced and lived separately. Her first language was English, and she had a slight speech impediment, which affected her pronunciation of certain vowel sounds and letter combinations. At the beginning of the study, she performed at a second grade reading level and was recommended for the study because of her deficit in reading skills.

The study took place in a reading resource room located in a large public high school in the Inland Northwest. The students attended regular education classes for most of the day and would come to the resource room in the afternoons each day. There were approximately 10-12 students present in the reading resource room each day working on individual assignments. There was also a lead teacher, as well as at least two to three other teacher assistants and volunteers working with their own small groups around the classroom. The study was done on Mondays, Wednesdays, Thursdays, and an occasional Fridays from 1:00 p.m. to 2:30 p. m over a 10-week period. This classroom setting has a long history of classroom research (Blackwell et al., 1991; Gregory et al., 2005; Holz et al., 1996). The study was conducted by the first two authors who were completing course work in classroom management as part of the academic major in special education from a local private university (McLaughlin, B. Williams, R. Williams, Peck, Derby, Bjordahl, & Weber, 1999).

Materials

The materials used in this study included the reading REWARDS® program, (both student and teacher copies), pencils and pens, tootsie rolls as part of an edible REWARDS® system, a daily student worksheet, and data collecting worksheets including a session log and inter-observer agreement data forms. The REWARDS® program was used as intervention, and the participants used the corresponding student REWARDS® workbook as daily practice and intervention. The first two authors also provided the participant with a daily worksheet containing 51 words taken from Lessons 1-25 of REWARDS®, which provided permanent product records of the participant's comprehension of vowel sounds, word parts, and prefixes and suffixes of the words. The data collection sheets included a list of the study's target words and were used to measure the number of words with correctly identified elements in each session throughout the course of intervention, which included sessions 1-21 by the end of the study.

Dependent Variable

The dependent variable in this study was the participant's ability to accurately identify (by underlining, swooping under, and circling) vowel sounds, word parts, and prefixes and suffixes in the chosen 51 words from REWARDS For a correct response, the participant would circle, underline and swoop under the prefix and/or suffix, vowel sounds, and word parts respectively. Vowel sounds, as defined by the REWARDS program were any single appearance of "a", "e", "i", "o", "u" and "y", as well as the vowel sound combinations, including; "ay", "ai", "au", "er", "ir", "ur", "ar", "or", "oi", "oy", "ee", "oa", "ou", "ow", "oo" and finally, "ea". In order to be counted as correct, each vowel sound in a word had to be underlined, and if the vowel sound involved two letters, both letters had to be underlined

together. For example, in order to be counted as correct, both the "o" and the "u" had to be underlined in the word "round". Furthermore, some of the words contained vowel-consonant-vowel (VCV) combinations, which had to be underlined by the participant in order for the word to be counted as correct. VCV combinations included, "o-e", "a-e", "i-e", "e-e" and "u-e". These VCV combinations had to be underlined, but only the vowels were underlined, then connected by swooping underneath the consonant to connect the two vowels, in order to show that their respective vowel sounds were connected and affected each other. For example, in the word "stampede", the two "e's" at the end of the word had to be underlined with a line connecting the two lines under the "e's" in order to be counted as correct. This shows that the silent "e" has an effect on the previous "e" by making it say it's name, rather than it's sound. A vowel sound or VCV combination was marked as incorrect by the first two authors if the participant failed to underline all vowel sounds in a word, if they only underlined one letter in a paired vowel sound, if they forgot to underline one of the vowels in the VCV combination, or if they forgot to connect the underlined vowels in the VCV combination. Word parts, or syllables, were separate parts of each word that had only one vowel sound in each word part. For example, in the word "sundown", there are two vowel sounds, "u" and "ow". Therefore, there would be two word parts, each containing one of the vowel sounds, "s**u**n" and "d**ow**n". In order to be counted as correct, the participant had to swoop under the correct word parts in a word, each containing one vowel sound. A word part was counted as incorrect if the student failed to swoop under the correct word parts by either adding or leaving out letters that should have or should not have been contained within a word part, or omitted swooping under any part of the word. Finally, some of the chosen 51 words from REWARDS contained prefixes or suffixes, which

were taught in stages as the lessons progressed. In order to be counted as correct, the participant had to circle all appropriate prefixes and/or suffixes in a word. Therefore, for a word to be counted as completely right, all three components (Prefix/Suffix; Vowel Sounds/VCV combinations; and word parts) had to be correctly identified and designated on the daily student worksheet. If any component was present and not designated by the participant, or if a component was designated and was not present, the word was counted as incorrect.

Data Collection and Measurement

During this study the first two authors used a permanent product recording system. Both first two authors were responsible for collecting the data, depending on who was working with the participant that day. Only one researcher worked with the participant at any one given time during a session. Permanent product recording was taken in the form of a worksheet containing all 51 words selected from the Reading REWARDS Program to form the dependent variable (See Figure 1: Permanent Product Worksheet). A total of two to three words were taken from each lesson, between lessons 1 and 25 of REWARDS, depending on the length of the lesson; if a lesson was longer, three words were selected in order to properly represent the material covered in the lesson. The first two authors determined which words to choose from each lesson based upon the letter-sound correspondence that each lesson focused on. For example, if the "ou" vowel sound was the focus of the lesson, two words with the "ou" sound were selected to be part of the dependent variable list. Furthermore, if two different pronunciations of the vowel sound existed, the two words selected would properly represent the two existing vowel sounds. For example, in the vowel sound "ow", which can be pronounced in a number of ways, both "outgrow" and

"sundown" were selected due to the fact that they represent two different pronunciations of the vowel sound "ow". This worksheet was given to the subject at the end of each intervention session in order to track the progress of her understanding. After the participant completed the worksheet by circling all know prefixes and suffixes, underlining vowel sounds and VCV combinations, as well as swooping under the correct word parts, two copies of the completed worksheet were made. Each researcher then independently corrected a copy of the participant's answers on their individual sheet. If any component of a word was incorrectly marked in any way, the first two authors would mark an X on the data sheet to designate the whole word as incorrect. If every component of the word was correctly marked on the worksheet by the participant, the word was correct, and the first two authors would use a check mark to identify the word as correct. After each word was marked as correct or incorrect on each researcher's data sheet, the total number of correct and incorrect words was noted on the session log, which was then used to determine interobserver agreement.

Experimental Design and Conditions

A criterion changing design (Kazdin, 2011, McLaughlin, 1983) was used in this study. After two days of baseline, the participant was taught using the REWARDS program and was administered the same test each day. After going through each lesson with the participant, she was given a version of the original test and asked to underline the vowel sounds, swoop under the different word parts, and circle the prefixes and suffixes. The participant needed to successfully label two words to reach the first criterion. In order to reach the next criterion, the participant needed to identify four words. Because the student was excelling at such a high rate, we were able to continue to double the criterion goal the participant

had to reach up to the goal of 32 correctly identified words. After session number 15, the participant's generalized knowledge plateaued around 36 correctly identified words. The criterion goal was no longer doubled each time, but instead increased at a rate of about 2 more words each session. The participant's knowledge increased rapidly after intervention began. Learning slowed around session 12, increased rapidly to session 13, and then plateaued until the last session.

Figure 1. **Permanent Product Data Collection Sheet**

Student _____ Date _____

Primary Data Collector_____ Reliability Data Collector _____

strain	rapid	fault
Jaunt	Curtail	verdict
overhaul	northern	costume
stampede	timberline	hoist
joyride	fifteenth	freedom
carload	southwestern	outgrow
sundown	shadow	downtown
monsoon	cookbook	rooftop
outlook	meantime	meadow
seamstress	sweatshirt	sunbeam
teammate	redundant	enormity
observant	perfection	utterance
amusement	contribution	reinvest
occurrence	unmentionable	prematurely
population	eventually	exterminator
jealousy	communication	escalator
productivity	occasionally	fundamentally

Baseline. During baseline, the participant was administered a test that included 51 words. The participant was required first to underline the vowel sounds found in each word. Then, the

participant was asked to swoop under the word parts. Last, the participant was asked to circle the prefixes and suffixes in each word. The participant was assured that it was okay to make mistakes, and there was no assistance given by the first two authors during any part of the test. The participant was encouraged to stay on task during the administration of the test.

The REWARDS® program. The REWARDS® program was used to teach the participant how to decipher long words. Each lesson in the REWARDS® program consisted of nine activities. Activity A consisted of having the participant blend words. Activity B introduced new vowel combinations such as "ay" and "ai", and Activity C introduced vowel conversions, or the different pronunciations of vowels. Activity D had the participant read parts of real words. The next activity utilized the vowel sounds learned earlier and had the participant underline the vowel sounds in words. Activity F required the first two authors to pronounce parts of words incorrectly. The participant was able to hear the mispronounced word within a sentence to help them figure out how to correctly pronounce the world. Activity G identifies prefixes and suffixes within words, and Activity H had the participant circle prefixes and suffixes found within twenty-one different words. The last two activities consisted of definitions and spelling. Throughout intervention, if the participant made any errors, the first two authors would use rules from the independent variable REWARDS® program in order to explain misunderstood concepts. The first two authors also implemented a model-lead-test strategy in order to assess whether or not the participant understood the correction. The participant was given verbal praise throughout the intervention session, especially when implementing previously used strategies to correctly identify word components in

difficult words. If the first two authors determined that the participant was focused and responsive to instruction, the participant was given edible reinforcement in the form of Tootsie Rolls®, the participants preferred reinforcer. Tootsie Rolls® were also given after the participant completed the permanent product worksheet, but only if it was obvious that the participant took her time to identify the different components of the words.

Reliability of Measurement and Interobserver Agreement

Because each worksheet was collected using permanent product, interobserver agreement was conducted on 100% of the sessions. As stated, the two first two authors separately corrected tests and data sheets and then compared their copies. The total number of words that were counted as correct and incorrect by each researcher were measured, to see if there were disagreements on any answers. A disagreement would be, for example, if one researcher marked an X on one word, while the other researcher designated it as correct with a check mark. An agreement would be if both first two authors marked a word as an X, for incorrect, or if both first two authors marked a word with a check mark, for a correct answer. The method used for computing inter-agreement scores was by finding the total number of correctly identified words at the end of each session by each researcher. The researcher with the lower number of total correct words divided their data by the higher number of total correct words, then multiplied that decimal by 100 to find the interobserver agreement percentage. The mean interobserver agreement score found was 99.6% (range 75% to 100%).

Results

The results of the implementation of the REWARDS® program on vowel sound, prefix and suffix, and word part

identification are displayed in Figure 2. The data represented a changing criterion design, in which the student reached a criterion before moving on to the next level. Our participant was not able to identify any vowel sounds, prefixes and suffixes, or word parts during baseline and so the participant was given a score of 0 for both baseline points. However, the participant's generalized knowledge increased rapidly after the REWARDS® intervention began. In order to meet each criterion and move on to the next goal, the participant was required to either meet or surpass each goal for at least two sessions in order to show mastery. The first criterion required the participant to correctly label two words by circling the prefixes and suffixes, underlining vowel sounds, and swooping under the word parts. The participant passed this criterion at session 5 with 4 correctly labeled words. The second criterion was set at 4 correctly labeled words, which the participant was able to reach at session 7. The third criterion necessitated eight correctly labeled words, which the participant easily surpassed at session 9 with 28 correctly labeled words. The participant passed the fourth criterion goal of 16 on session 11 with 30 correctly labeled words. The fifth criterion was set at 32 correctly labeled words, which took the participant three sessions to pass. The participant passed this criterion at session 14 with 34 correctly labeled words. After the fifth criterion, the first two authors no longer doubled the necessary amount of correctly identified words because the program had ceased to introduce new concepts and instead focused on review of previously taught skills and concepts. The sixth criterion was set at 34 correctly identified words, which the participant was able to meet on session 16 with 37 correctly labeled words. The participant was able to pass the seventh criterion on session 18 with 39 correctly labeled words. The last and eighth criterion required the participant to correctly label 38 words. The first two authors were unsure of how many sessions they would have

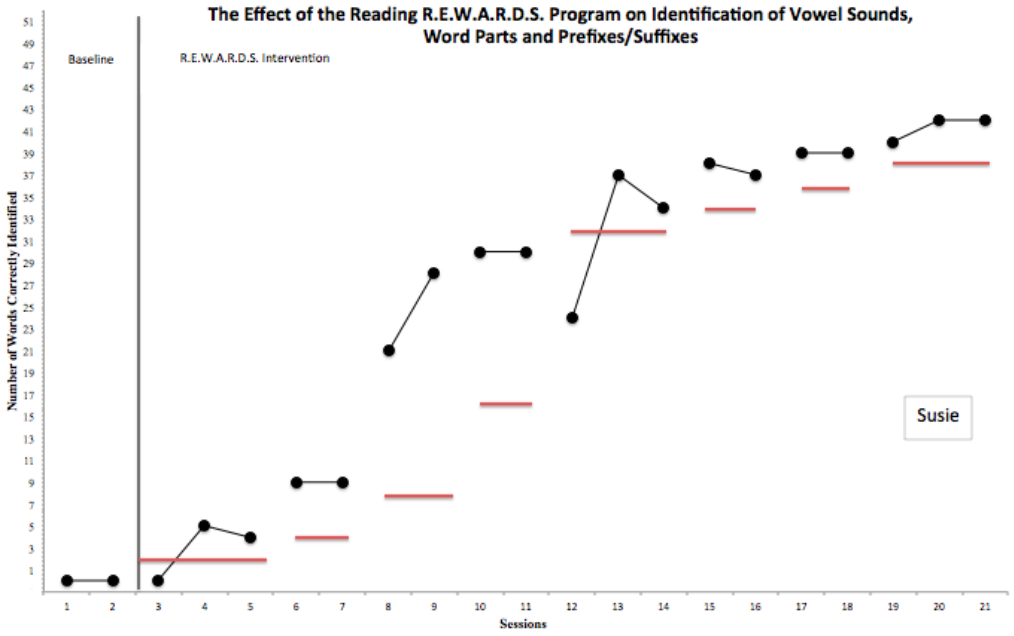
with the participant, and decided to make this the final criterion, which the participant was able to reach at a total of 42 correctly labeled words at the last session.

Discussion

The overall outcomes indicated that our participant improved a great deal when the REWARDS® Program was employed. She was also able to continue to improve. She was able to match or exceed her criterion ceilings for most of the conditions (See Figure 2). The student became more confident as data collection and instruction continued.

There were some limitations that occurred during the implementation of the intervention. In the beginning of the intervention, the first two authors had attempted to work with two different students to compare the results of the implementation of REWARDS® Program; however, because the first two authors did not work at the school at the same times each week, it became difficult to keep the students at the same lesson, which was necessary for proper data collection. After one week of attempting to work with two participants, the first two authors decided to only take data on one of the participants. Once the first two authors concentrated on the data from one of the participants, the intervention became much simpler and focused. Another issue arose when the participant had a long break from school at Thanksgiving. The intervention was not implemented during the break, and some of the information that had previously been maintained was temporarily forgotten, as shown in Figure 2 with a sharp decline in the data. After returning from the break, intervention was implemented again, and the student quickly regained this information. A steadily increasing trend in Figure 2 illustrates the participant's quick return to maintenance and generalization of the information and strategies being employed. The final

Figure 2. The number correct for vowel sounds, word parts, and prefixes and suffixes during baseline and REWARDS. Horizontal red lines indicate the various criterion ceilings.



issue that arose during intervention was the apparent lack of motivation on the part of our participant. After the first week of intervention, the participant began to struggle with the tests given after each lesson due to this lack of motivation, and would put minimal effort into completing each test. This was an issue for the first two authors, as it affected the accuracy of the data due to the fact that the participant was uninterested in whether or not she was accurately identifying word parts, vowel sounds, prefixes and suffixes. To counter this issue, a contingency management system was put in place after Session 5. We employed edibles that were known reinforcers for the participant. If the participant exhibited proper motivation and effort while working on the intervention and completing the test, the participant was given 2-3 tootsie rolls. Once the REWARDS® Program was initiated, the participant exhibited much more effort when completing the tests as well as tasks.

There were several strengths found when the REWARDS® Program was employed.. The participant had been working on the *Corrective Reading Program* (Engelmann, Hanner, & Johnson, 1999) prior to the intervention, and was struggling with decoding longer words in the fluency aspect of the program. The REWARDS® program quickly taught the participant a way to decode these multi-syllabic words. Because the participant was learning and understanding the REWARDS® program, she was much more engaged in the learning process. The participant stated that she could tell her overall ability to decode longer words had increased greatly since beginning intervention with the REWARDS® Program. Overall, the program is fairly expensive, costing around $98.00 for the teacher handbook and $100.00 for a set of ten student books. However, the first two authors were provided with a teacher handbook and student booklet for free by the classroom teacher. However, the first two authors were required to buy their edibles for the student. This totaled

around $10.00. Because the booklets were supplied to the authors, the intervention was extremely low cost. Implementing the intervention did not require a lot of effort on the part of the first two authors because the program was already written and validated. The first two authors were required to create their own test to be given to the student after each lesson was completed, but they were able to pick words from the lessons in the REWARDS® program.

The resource room teacher plans to continue implementing the REWARDS® program with the participant in order to maintain the information learned during intervention. If the first two authors were to continue the study, they would complete through lesson 25 of the REWARDS® Program. The first two authors would continue to administer the posttests in order to determine whether the participant was able to correctly label all 51 words by the end of the intervention. Intervention could also continue on to REWARDS®2*,* which expands and adds to the information and strategies learned in the REWARDS® Intermediate Program used in this study. This intervention could also be used in coordination with other academic areas, in order to improve reading and comprehension skills. It would be beneficial to assess the effects on the participant's generalized reading and comprehension skills in other academic areas, such as History, and the sciences. Another direction the research could take would be assessing the effect of the REWARDS® Program on vocabulary comprehension. The study shows the proficiency of the REWARDS® Program in multi-syllabic word identification and decoding, but not in word comprehension. The REWARDS® Program lesson format includes sections for word definitions and comprehension, but a study analyzing the efficiency and maintenance of this aspect would be highly beneficial.

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