Research Note

A Case Study on the Effectiveness of Three Treatments on /l/ and /r/ Phonemes with a Japanese Learner

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Abstract

This research investigates how a Japanese professional made progress in her production of the /l/ and /r/ sounds over a six-week period. The study considers the second language acquisition theory on pronunciation activities that help learners discriminate and enunciate /l/ and /r/ sounds. Three treatment activities address the participant's pronunciation difficulty of the respective sounds: minimal pair, gap-fill activity, and tongue twister. The study found that the participant made a 26.2% improvement rate from the pretest to the posttest. The pretest and posttest are based on two reading passages that consist of /l/ and /r/ phonemes words. However, despite the progress, the study has two major limitations: generalizability and retention rate.

Introduction

The English language serves as a medium of communication for many people worldwide and, intelligible pronunciation is essential for effective communication. However, the L1 background of some nonnative speakers (NNS) affect their ability to pronounce words that are intelligible for native English speakers (NS) for effective communication. Jenkins' (2000) Lingua Franca Core (LFC) provides strategies to address challenges in phonology for NNS to improve the intelligibility of speech, by addressing aspects of pronunciation such as vowel length, initial consonant cluster, and stress. It is important for NNS to learn appropriate pronunciation to express themselves clearly.

This paper looks at the effectiveness of three treatment activities to increase the learner's ability to discriminate and enunciate the /l/ and /r/ phonemes. The phonemes /l/ and /r/ are challenging to produce for many Japanese speakers of English. The participant in this study has the same difficulty with pronunciation. With this in mind, three activities are employed to treat the participant: minimal pair, a gap-fill activity,

and tongue twister.

1. Literature Review

In L2 speakers, accent plays a vital role in feeling respected and understood. Levis (2005) found that NNS with strong accents faced discrimination in their work environment as their speech was deemed less intelligible than NS. Also, in some instances, Japanese who went abroad faced discrimination for not being able to use the /l/ phoneme (Gluszek and Dovidio, 2010). According to Aoyama et al. (2004), Japanese learners find it difficult to distinguish the /l/ and /r/ phonemes if they did not learn them when they were children. Moreover, many Japanese learners also find it difficult to produce those phonemes (Kinnaird and Zapf, 2004).

Intelligibility of speech is a key component of effective communication. According to Munro and Derwing (1999) found non-native speakers with a strong accent can produce intelligible speech that is comprehensible to NS. On the other hand, Yamane (2015), the accent of NNS can sometimes obstruct communication even when the speaker's speech is otherwise comprehensible. This means that misplacing stress or accent on a word can make it difficult for the listener to understand what is being said. Pronouncing consonants incorrectly can also impact intelligibility. For example, stressing the wrong syllable in a word can cause it to be misunderstood, as in the case of "present" being mistaken for the verb "to present" rather than the noun "a gift." Similarly, placing the stress on the wrong syllable in a word with multiple meanings can lead to confusion about which meaning is intended, as in the case of "record" being mistaken for the verb "to record" rather than the noun "a record." While accent may be a factor in the intelligibility of speech, it is not the only determinant of comprehensibility.

There are several factors that contribute to the difficulty of learning the /l/ and /r/ phonemes. Age has a big influence on the learner's ability to learn the /l/ and /r/ phonemes (Piske, MacKay, & Flege, 2001). Critical period and sensitive period hypotheses point to age-determinant factors that can prevent a learner from developing the ability to distinguish between the sounds /l/ and /r/ (Lenneberg, 1967). Furthermore, learners who learn L2 at the late stage of the sensitive period will have difficulty developing the /l/ phoneme (Lenneberg, 1967). The Japanese language does not have certain specific sounds in the English sound system. The Japanese language has a flap [l] positioned between /l/ and /r/, and it does not have alveolar /l/ and rhotic /r/ (Nogita, 2010). In addition, the amount of L1 use affects the degree of the learner's accent when speaking L2 (Piske, MacKay, & Flege, 2001). Finally, motivation and prior experience

with the L2 can influence a learner's willingness to learn (Seliger et al., 1975; Piske, MacKay, & Flege, 2001). These factors can make it challenging for learners to master the /l/ and /r/ phonemes.

While it can be challenging for many Japanese learners to produce the /l/ phoneme, studies have shown that some are able to make progress. For example, Japanese individuals living in the United States for extended periods of time were able to distinguish /l/ and /r/ sounds like NS (Yamada, 1995). In another study, Japanese who lived abroad for more than 12 years performed better at discriminating /l/ and /r/ phonemes compared to those who only stayed for three years (Flege et al., 1995). Such studies suggest adult learners can improve their perception and production of the /l/ and /r/ phoneme through extensive practice and exposure.

There are various strategies to develop a learner's pronunciation. One effective approach is to provide opportunities for spontaneous speaking practice, as this can help address pronunciation difficulties (Saito, 2012). Additionally, it can be helpful to provide guidance and structured instruction to address specific challenges with pronunciation. Jenkins' (2000) Lingua Franca Core offers a standardized pronunciation system to help learners achieve intelligibility and reduce discrimination due to not sounding native-like. Saito (2012) suggests the following steps to treat learners with pronunciation difficulty: first, identify the areas the learner has difficulty pronouncing; second, do activities in a controlled setting to raise awareness of the diagnostic area; last, practice spontaneous pronunciation activities. Combining controlled practice with spontaneous pronunciation activities, and following this sequence of steps, can be effective in treating pronunciation difficulties.

There are a number of activities that can be used to improve a learner's pronunciation. In pronunciation classes, teachers use minimal pair activities to help learners distinguish words that sound similar. These activities can help learners develop their ability to perceive the /l/ phoneme (MacKain et al.,1981; Iverson et al., 2003; Lively et al., 1993; Logan et al., 1991; Uther et al., 2008). In a separate study, learners who took a three-week training program on pronunciation using minimal pair activities were able to recall and distinguish the phonemes /l/ and /r/ after three months (Lively et al., 1994). That said, recall accuracy was lower for new words produced by unfamiliar talkers compared to those produced by familiar ones. Also, learners developed their production skills with the /l/ phoneme. Learners who received explicit instruction and feedback through one-to-one training could correctly produce the /l/ phoneme (Hattori, 2009). Research has also shown that explicit instruction can be effective in building

awareness of a second language (Spada and Tomita, 2010). A study by Saito (2013) found that learners who received explicit instruction on pronunciation but did not focus directly on the /l/ phoneme, still improved their comprehensibility. Sitoresmi (2016) found that tongue twisters were a challenging activity to practice under time constraints, but drilling words exercises improved pronunciation and motivation.

2. Research Question

The study's objective is to see if pronunciation activities help improve the participant's ability to discriminate and enunciate the /l/ and /r/ sounds. This paper aims to explore the research question: Does the participant improve her ability to discriminate and enunciate the /l/ and /r/ phonemes with three treatments: minimal pair, gap fill activity, and tongue twister?

3. Methodology
Participant

Natsumi, a pseudonym for a 36-year-old Japanese woman living in Japan, participated in a study led by a 33-year-old male researcher from the United Kingdom in 2018. She first learned English in junior high school and attended an English cram school for six years. In addition, she traveled to Australia at the age of 17 and used English for functional purposes such as sightseeing and ordering food. After returning from her trip, Natsumi stopped using English until she started making foreign friends online in 2017. In order to communicate with them, she began relearning English and dedicated several hours a week to studying through voice calls and chatting apps. Her proficiency in English is demonstrated by her score of 420 on the TOEIC listening and reading test. Natsumi plans to continue improving her English skills and make more foreign friends, as well as travel internationally.

Pedagogical Materials

The pretest consists of two readings of 110-word passages designed to identify and test the participant's progress of the /l/ and /r/ phonemes. The three treatment activities were minimal pair, a gap fill activity, and tongue twister. The activities helped the learner practice the /l/ and /r/ phonemes.

Treatment one, the minimal pair activity, raised awareness of words that begin with the /l/ and /r/ phonemes. The participant listened to words pronounced with a British accent by the researcher, repeated them, and checked her accuracy on a worksheet (see

Appendix E). In treatment two, Natsumi read the gap fill activity out loud and filled in the appropriate word in the gap (see Appendix F). The sheet lists the correct words at the bottom of the gap-fill activity. In the free talk sessions, the participant responded to communication questions such as: *Where did you go last weekend? What was the most exciting thing you did today and why? Can you tell me what you plan on doing next week?* As the participant responded to the questions, she paid attention to how she used the /l/ and /r/ phonemes. In treatment three, Natsumi listened to tongue twisters sentences and repeated them (see Appendices G and H). Then, the participant paid attention to the onset of each word before saying them. She read each sentence at a slow pace and gradually read them faster. The activity allowed the learner to produce and discern the /l/ and /r/ phonemes.

Assessment Material

The study's assessment instrument is based on the participant reading aloud two passages. The pretest and posttest results are based on the correct and incorrect pronunciation of words with the /l/ and /r/ phonemes in the selected reading passages. The collected data was added to a spreadsheet file to see the pretest and posttest scores, see Appendices.

There are two readings. The first reading consists of 110 words, of which 43 have the /l/ phoneme. The second passage consists of 110 words with 41 /r/ phoneme words. The participant read the passages and practiced pronouncing the correct form of the word. A smartphone recorder application recorded the pretest responses. The participant received a score based on the number of correct pronunciations of the /l/ and /r/ words. If the learner produced words with the /l/ and /r/ phonemes correctly, it was considered a success but a failure if the words are produced incorrectly.

Procedures

This section provides a brief overview of the meetings, including the purpose of the exercises that were practiced.

Session 1, February 18, 2018: Initial meeting. Natsumi was interested in how her pronunciation assessment would go. She expressed that her pronunciation was terrible but understood that the activities were there to help improve her intelligibility. She was informed that her identity and the performance recordings would remain confidential. She felt self-conscious about mispronouncing words while reading. As she read the passage, the researcher listened for words she struggled to say (see Appendix A). The

researcher used an iPhone 10 built-in microphone to record conversational utterances. As she read the passage, the researcher took notes of the errors produced. During the reading, she muttered expressions in Japanese, such as *wakannai* (I don't understand) and *muzukashii* (That's difficult), when she did not know how to say certain words. At this point, it became apparent that she had trouble correctly pronouncing words that contained /l/ and /r/ phonemes. After the reading the passage on luxury travel on Airbnb, the researcher had a free talk discussion about how the participant felt about the reading. She expressed her desire to one day experience luxury travel. While she found some parts of the reading to be challenging, she was ultimately able to understand it.

Session 2, February 25, 2018: Administer a pretest. Natsumi read the two passages. The first passage consisted of words with the /l/ phoneme and the second with the /r/ phoneme. Both passages were challenging to read for Natsumi. She struggled to pronounce some of the words. When she read, she occasionally paused to think about how she would say the words to avoid mispronouncing them. The words she mispronounced are highlighted in the reading passages (see Appendices B, C, and D). During the free talk, she explained that she struggled with pronouncing words that contained the /l/ and /r/ phonemes. She found that words with the /r/ onset were more challenging to produce than those with the /l/ onset. She explained that constantly switching the tongue's position was tiring.

Session 3, March 4, 2018: Treatment one. Natsumi was very positive and eager to participate in the treatment session. We started the session with a free talk warm-up. Next, she talked about the events that took place over the week. Then the researcher explained to her about treatment one: the minimal pair activity. After that, the researcher proceeded to do the activity. First, the researcher gave her the minimal pair worksheet (see Appendix E). The participant was instructed to listen to the researcher and check the correct word for the minimal pairs presented. After completing the activity, the participant stated that it helped her focus on the words that differed only by the /l/ and /r/ phonemes. During the free talk discussion, she explained that she received limited instruction in junior and high school and paid little attention to the differences between /l/ and /r/ phonemes. She asked the researcher to explain how to produce the /l/ and /r/ phonemes and where to place the tongue when producing such sounds. The researcher showed Natsumi pictures of the tongue's position when producing /l/ and /r/ phonemes and how to pronounce them.

Session 4, March 11, 2018: Treatment two. She talked about her week and how she had practiced the /l/ and /r/ sounds at home using a mirror to direct her tongue. She

explained that she still finds pronouncing /l/ and /r/ challenging. Then, the researcher instructed Natsumi about the second treatment, the gap-fill activity like the pretest readings, one and two (see Appendix F). In the gap-fill activity, the participant listened to the researcher read the two passages and filled in the blanks with the appropriate words listed below each reading passage. The objective was for the participant to pay attention and discriminate between the /l/ and /r/ sounds in a controlled manner.

Session 5, March 18, 2018: Treatment three. During the free talk, Natsumi explained she had spent time practicing /l/ and /r/ words at home over the week. In the tongue twister activity, the researcher explained the instructions to Natsumi (see Appendix H). The researcher then asked the participant to repeat the sentences after him. However, the participant became agitated and was unable to remember the second half of the sentences when attempting to repeat them. Additionally, the participant mispronounced the words and conflated the /l/ and /r/ phonemes in the sentences. Natsumi explained that this activity was challenging for her. She explained that the words with /l/ or /r/ onsets were more difficult to say than those with phonemes in the middle or at the end.

Session 6, March 25, 2018: Administer a posttest. Natsumi was informed prior to starting the test that the posttest questions would be identical to the pretest questions. Then, Natsumi read the two passages for the posttest. As she read the text, the researcher made notes of the words she produced correctly (see Appendix I). Finally, during the free talk, she expressed her dream to travel the world. She found the posttest reading passages easier than the pretest one.

4. Results

The data for this study was collected through the administration of a pretest and a posttest. These tests included two readings, each made up of a 110-word passage focused on the /l/ and /r/ phonemes. The data collected was used to compare the number of times a participant correctly pronounced words containing the /l/ and /r/ phonemes on the pretest to the number of correct responses on the posttest. By comparing these scores, the researcher was able to determine the participant's overall progress and see how much they had improved. The result of this comparison allowed the researcher to understand the participant's improvement in her ability to produce the /l/ and /r/ phonemes accurately.

The participant scored 44.2% and 53.7% on the pretest for reading passages 1 and 2, respectively, indicating difficulty producing words correctly when /l/ and /r/ phonemes

were the beginning sounds. The pretest scores in Table 1 show that the participant tended to confuse these sounds, or conflate them.

Test Type	Reading Passage 1 Total obligatory occasion (number of correct items / total items)	Reading Passage 2 Total obligatory occasion (number of correct items / total items)	Overall total score (% correct items)
Pretest	19/43 (44.2%)	22/41 (53.7%)	41/84 (48.8%)
Posttest	30/43 (69.8%)	33/41 (80.4%)	63/84 (75%)

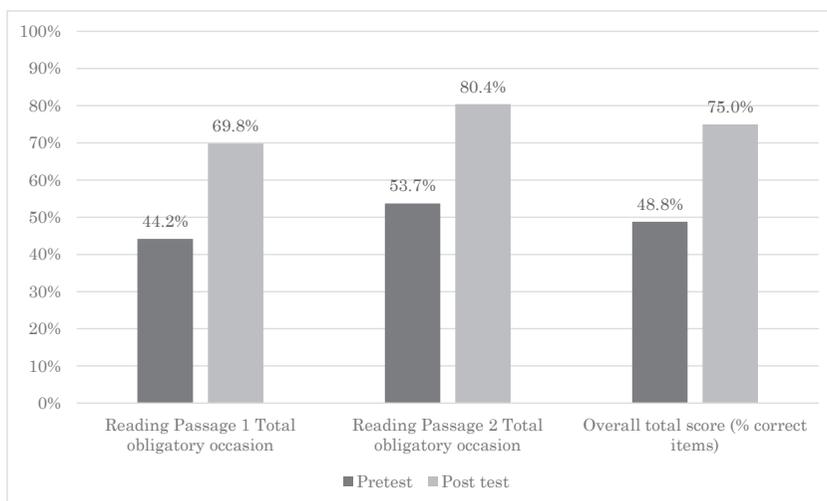Table 1. *Obligatory Occasion Analysis of /l/ and /r/*

Figure 1. *The overall scores for the pretest and posttest*

Posttest results indicate evidence of improvement. The participant's scores on the posttest for reading passages 1 and 2 are 53.7% and 80.4%, respectively. The participant's overall score on the posttest increased from 48.8% to 75% in comparison to the pretest. The result shows that the participant made some improvement in differentiating and producing the /l/ and /r/ phonemes (Figure 1).

5. Discussion

The purpose of the study was to determine the effectiveness of the three treatment activities on the participant's pronunciation over a six-week period. The treatments to some extent improved the participant's ability to discriminate and produce /l/ and /r/ phonemes. The six sessions followed a three-step process, diagnosing pronunciation

difficulties, treating the troubled areas, and seeing the level of the process the participant made. Initially, the participant found the /l/ and /r/ complicated, but as practice time increased, she showed signs of improvement by the end of the program.

In this study, the research question was: Does the participant improve her ability to discriminate and enunciate the /l/ and /r/ phonemes with three treatments: minimal pair, gap-fill activity, and tongue twister? The result shows that the participant made improvements. The overall score of the participant improved from 48.8% to 75%, a 26.2% increase from the pretest to the posttest (Figure 1).

In session 1, the participant stated that her priority was the /l/ and /r/ phonemes, even though she had trouble pronouncing other sounds. Natsumi explained she had some difficulty with the voiced and voiceless alveolar-fricatives, /s/ and /z/ phonemes, in the final consonant of a word. For example, she was unsure when to replace /s/ with /z/. She was aware of the distinction between /s/ and /z/ and produced such sounds correctly during the communicative activity inconsistently. She also stated that she had trouble with the voiced labiodental-fricative /v/ phoneme. She added that the /v/ sound was complex, included in Jenkins' LFC, and necessary for her comprehensibility. Although she had problems pronouncing different phonemes, she expressed that focusing on the pronunciation of the /l/ and /r/ phonemes was the priority. Furthermore, the participant mentioned a desire to experience "luxury travel" in the future, indicating a potential association between good English skills and high social status or upward mobility.

In session 2, the participant's reading of both passages was adequate. Natsumi frequently confused the /l/ and /r/ phonemes, reading words phonetically and mispronouncing them as a result. For instance, she pronounced the word 'realize' as /liəˌlaɪz/. This mispronunciation of the /l/ and /r/ phonemes was also apparent during the free talk discussion.

Natsumi's performance during the study was influenced by her fear of making mistakes. This fear may be rooted in the Japanese cultural emphasis on avoiding errors. During the free talk discussion activities, Natsumi tended to respond to open-ended questions in a way that minimized the risk of making mistakes. She formulated sentences that were easy to produce, given her relative understanding of English. For example, when she formulated sentences, she used words that were easy to produce and retrieve from memory rather than recalling ones that had the /l/ and /r/ onset to avoid making incorrect pronunciation. Natsumi had a good understanding of the correct forms of these words, but struggled to quickly produce the correct pronunciation during conversation. This suggests that her fear of making mistakes may have hindered her

ability to pronounce the /l/ and /r/ phonemes appropriately.

Natsumi had difficulty with the treatment activities as she was unfamiliar with some words in the reading and treatment activities. In session 3, she wanted to continue talking about her week instead doing minimal pair activities. She felt embarrassed when she could not perfectly pronounce words that contained the /l/ and /r/ phonemes.

In sessions 4 and 5, Natsumi found treatment activities helped her focus on correctly pronouncing /l/ and /r/ phonemes. She found the listening aspect of the gap-fill activity easier than the other treatments. This can be attributed to the listed answers below the passages, which she could read and select correctly to complete the blank spaces. However, the tongue twisters were very difficult for her. She appreciated the opportunity to practice the phonemes in a fun manner.

In session six, the posttest readings were the same as the pretest. The participant produced the words more quickly and clearly. One potential reason for making progress may be due to her being more prepared for the reading than the pretest, which helped her focus on reading the words more carefully. The /l/ and /r/ phonemes in the middle or end of a word have a more discreet sound than when they are at the onset. It may also explain why she made more progress on pronouncing words where /l/ and /r/ were in the middle or the end of the word.

While the posttest results show that the participant's pronunciation improved to some extent, she still had difficulty with some words that contained /l/ and /r/ at the onset. The posttest results also revealed that the incorrect words produced by the participant were similar to the ones she got wrong during the pretest. Despite this, the use of minimal pairs, gap-fill activities, and tongue twisters helped improve her pronunciation to some degree. These treatment activities allowed her to focus on her core difficulty with the /l/ and /r/ phonemes and taught her the correct way to produce these sounds.

During the free talk, the participant expressed her desire to travel the world, indicating that she is emotionally invested in learning English and potentially sees it as a means to achieve her aspirations. This emotional investment could potentially make it easier for her to improve her English skills. The improvement in her performance on the posttest reading passages compared to the pretest also supports this idea. Overall, the present study offers some insight into the effectiveness of pronunciation activities and how it may help learners focus on their pronunciation difficulties, leading to improved ability to distinguish and produce /l/ and /r/ phonemes. However, it is important to consider the limitations of the study, including the small sample size, which makes it difficult to generalize the findings to a larger population.

Conclusion

The present study offers some insight into the effectiveness of pronunciation activities. It shows that pronunciation activities may help enable learners to focus on their pronunciation difficulty, which can help improve their ability to distinguish and produce /l/ and /r/ phonemes. The participant's pronunciation improved to some extent due to the use of three treatments: minimal pair exercises, gap fill activities, and tongue twisters. The use of minimal pair exercises, gap fill activities, and tongue twisters led to an improvement in pronunciation for the participant in this study. However, it was also noted that some learners may need to be warmed up and be in the right mindset before receiving these treatments in order to be more receptive to them.

There are several limitations to this study, which make it difficult to apply the findings to a larger population. A study with a larger sample size would be necessary to determine the generalizability of these results. Secondly, it still needs to be determined whether the participant can retain her ability to discriminate and produce /l/ and /r/ in the long term. In hindsight, assessing the participant's performance in a spontaneous speaking situation would have been helpful. Also, informing the participant about orthographic reading and phonics would have been beneficial.

Overall, this study provides some insight into the potential benefits of pronunciation activities for language learners. Future research should aim to increase the scale of the study to better understand the generalizability of the findings.

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Appendix A: Initial Diagnostics

Airbnb is moving into luxury travel. Its new business will have new places to stay, like vacation homes and boutique hotels. Airbnb offers over four million rooms in 191 countries. It has had over 260 million reservations. This will be more than one billion in 2028. The Airbnb boss wants everyone to use it.

Airbnb does not own any rooms. It helps property owners to rent homes to travelers. The company gets money from booking fees. It will soon offer adventure travel and "unique spaces." It will offer yurts - big, round Mongolian tents. It will also offer travelers "full-on luxury stays." These include "some of the world's nicest homes."

Appendix B: Pretest Text

Reading A /l/

It is always difficult, not at all simple, to learn a new language. Language learning is a lifelong process of listening for the sounds of vowels and consonants and developing one's knowledge about language rules. Most people have to complete several classes to speak clearly. While learning new rules, some problems reveal little differences between languages. These subtle points can feel almost laughable, but they tell of cultural choices that happen when people are living in different worlds. A student will only be truly glad when real progress leads to fluent speech.

Reading B /r/

It is difficult for girls in America to prepare for the future. Many girls watch too much TV and, as a result, believe that dressing well, driving a great car, having a lot of friends, and being pretty will guarantee success in life. However, they are too young to realize that these values arise from the wealth of TV actors. As they become more grounded and grow up, they can see that product advertising clearly dictates the appearances on TV. Of course, some girls have a hard time accepting reality and carry their dreams of material fortune into adulthood. Only later do they realize how a person can be strong through moral character.

Appendix C: Pre-test Obligatory Occasion

Reading 1 /l/

It is **always difficult**, not at **all simple**, to **learn** a new **language**. **Language learning** is a **lifelong** process of **listening** for the sounds of **vowels** and consonants and **developing** one's **knowledge** about **language rules**. Most **people** have to **complete several classes** to speak **clearly**. **While learning** new **rules**, some **problems reveal little** differences between **languages**. These **subtle** points can **feel almost laughable**, but they **tell** of **cultural** choices that happen when **people** are **living** in different **worlds**. A student **will only** be **truly glad** when **real** progress **leads** to **fluent** speech.

Reading 2 /r/

It is difficult **for girls** in **America** to **prepare for** the **future**. Many **girls** watch too much TV and, as a **result,** believe that **dressing** well, **driving** a **great car**, having a lot of **friends,** and being **pretty** will **guarantee** success in life. However, they **are** too young to **realize** that these values **arise from** the wealth of TV **actors**. As they become more **grounded** and **grow** up, they can see that **product advertising clearly** dictates the **appearances** on TV. Of **course**, some **girls** have a **hard** time accepting **reality** and **carry their dreams** of **material fortune** into adulthood. Only **later** do they **realize** how a **person** can be **strong through moral character**.

Omar Serwor Massoud

Appendix D: Pretest result

Reading 1				Reading 2			
1. always	O	23. rules		1. prepare		23. advertising	
2. difficult	O	24. problems	O	2. for	O	24. clearly	
3. all	O	25. reveal		3. future	O	25. appearances	
4. simple	O	26. little		4. girls	O	26. course	O
5. learn		27. languages		5. result		27. girls	O
6. language		28. subtle	O	6. believe	O	28. hard	O
7. language		29. feel	O	7. dressing	O	29. reality	
8. learning		30. almost	O	8. driving		30. carry	O
9. lifelong		31. laughable		9. great		31. their	O
10. listening	O	32. tell	O	10. car	O	32. dreams	O
11. vowels		33. cultural		11. friends	O	33. material	O
12. developing		34. people	O	12. pretty	O	34. fortune	
13. knowledge	O	35. living		13. guarantee		35. later	
14. language		36. worlds		14. however	O	36. realize	
15. rules		37. will	O	15. are	O	37. person	O
16. people	O	38. only	O	16. realize		38. strong	O
17. complete	O	39. truly		17. arise		39. through	
18. several	O	40. glad	O	18. from	O	40. moral	
19. classes	O	41. real		19. actors	O	41. character	
20. clearly		42. leads		20. grounded			
21. while	O	43. fluent		21. grow			
22. learning				22. product	O		
Score: 19/43				Score: 22/41			

Appendix E: Treatment 1 Minimal pair /l/ and /r/

1	lack	rack	9	lied	ride
2	lamb	ram	10	lies	rise
3	lamp	ramp	11	lip	rip
4	lane	rain	12	locket	rocket
5	late	rate	13	loom	room
6	laze	raise	14	lows	rose
7	lead	read	15	luck	ruck
8	lice	rice	16	lush	rush

Appendix F: Treatment 2 Gap-fill activity

April, the elephant, _____ in Brazil. Her friends Lucy the _____ and Lexie, the Owl, liked to be lazy. They would play on the log in the lake, take extra long _____, and dig holes. Then they met Albert the Whale, near a pool of water, by the ocean. Albert told them it is okay to _____, be silly, and be _____ sometimes, but it was dangerous to do in the jungle. Albert told them eleven ways that would help them be safer. April, _____, and Lexie listened and _____ how to be safer. After _____ finished talking, the three friends yelled, "Thank you," to him as he swam away.

| Albert | lizard | lived | laugh |
| lucy | learned | lunches | lazy |

Whenever I have free time, I _____ to my garage. I have all kinds of crazy experiments going on in there. I don't mean testing rats or anything. I mean, really cool experiments. For example, _____ now I am experimenting to see if carrots can _____ batteries. I have had other experiments that have gone longer. My experiment to see if _____ will make the speakers in my _____ louder has been going on for over a year now. There are so many more ideas that I want to experiment with - making a fireproof door, testing to see what _____ are made of, trying to see if I can teach _____ to read. If my brain was made of trees, it would be a forest of ideas. Science is _____!

| race | radio | recharge | radical |
| raisins | rats | right | rainbows |

Appendix G: Treatment 2 Gap fill activity

April, the elephant, **lived** in Brazil. Her friends, Lucy the **Lizard** and Lexie,
the Owl, liked to be lazy. They would play on the log in the lake, take extra long
lunches, and dig holes. Then they met Albert the Whale, near a pool of water, by the
ocean. Albert told them it was okay to **laugh**, be silly, and be **lazy** sometimes, but
it was dangerous to do in the jungle. Albert told them eleven ways that would help
them be safer. April, **Lucy**, and Lexie listened and **learned** how to be safer.
After **Albert** finished talking, the three friends yelled, "Thank you," to him as he
swam away.

Albert	lizard	lived	laugh
lucy	learned	lunches	lazy

Whenever I have free time, I **race** to my garage. I have all kinds of crazy
experiments going on in there. I don't mean testing rats or anything. I mean, really
cool experiments. For example, **right** now, I am experimenting to see if carrots
can **recharge** batteries. I have had other experiments that have gone longer.
My experiment to see if **raisins** will make the speakers in my **radio** louder has
been going on for over a year now. There are so many more ideas that I want to
experiment with - making a fireproof door, testing to see what **rainbows** are made
of, trying to see if I can teach **rats** to read. If my brain was made of trees, it would be
a forest of ideas. Science is **radical**!

race	radio	recharge	radical
raisins	rats	right	rainbows

Appendix H: Treatment 3 Tongue twister /l/ and /r/ words

1. Lassie Lilly likes Ronny's rulers.
2. Lad Larry rarely loves lyres.
3. Lessening levels of lead really lures lily pads.
4. Revelers revel in leveling levels.
5. Rory's lawn rake rarely rakes really right.
6. A really leery Larry rolls readily to the road

Appendix I: Posttest result

Reading 1				Reading 2			
1. always	O	23. rules		1. prepare	O	23. advertising	O
2. difficult	O	24. problems	O	2. for	O	24. clearly	O
3. all	O	25. reveal		3. future	O	25. appearances	O
4. simple	O	26. little	O	4. girls	O	26. course	O
5. learn	O	27. languages		5. result		27. girls	O
6. language	O	28. subtle	O	6. believe	O	28. hard	O
7. language	O	29. feel	O	7. dressing	O	29. reality	O
8. learning		30. almost	O	8. driving	O	30. carry	O
9. lifelong	O	31. laughable		9. great		31. their	O
10. listening	O	32. tell	O	10. car	O	32. dreams	O
11. vowels		33. culture	O	11. friends	O	33. material	O
12. developing	O	34. people	O	12. pretty	O	34. fortune	O
13. knowledge	O	35. living		13. guarantee		35. later	O
14. language	O	36. worlds		14. however	O	36. realize	
15. rules		37. will	O	15. are	O	37. person	O
16. people	O	38. only	O	16. realize		38. strong	O
17. complete	O	39. truly		17. arise		39. through	
18. several	O	40. glad	O	18. from	O	40. moral	
19. classes	O	41. real		19. actors	O	41. character	O
20. clearly	O	42. leads		20. grounded	O		
21. while	O	43. fluent		21. grow	O		
22. learning	O			22. product	O		
Score 30/43				Score: 33/41			